FRIDAY, APRIL 9, 2021  CENTRAL TIME ZONE

8:30  Welcome and Introductions by President
     C. Gaelyn Garrett, MD MMHC, Nashville, TN

8:33  Introduction of Presidential Citations
     Roland D. Eavey, MD FACS, Nashville, TN
     Harold (Rick) C. Pillsbury, MD FACS, Chapel Hill, NC
     Wendell G. Yarbrough, MD FACS, Chapel Hill, NC

8:37  Introduction of Guest of Honor
     Mark S. Courey, MD, New York, NY

8:40  Presidential Address
     We Are All Otolaryngologists
     C. Gaelyn Garrett, MD MMHC, Nashville, TN

9:00  Introduction of Joseph H. Ogura, MD Annual Lecturer
     By C. Gaelyn Garrett, MD MMHC, President

9:05  JOSEPH H. OGURA, MD, LECTURE
     Update on the COVID-19 Pandemic and Vaccine Landscape
     C. Buddy Creech, MD MPH FPIDS, Nashville, TN
     Director, Vanderbilt Vaccine Research Program

9:35  break

9:40  Introduction of 2021 Thesis Award Presentations by Thesis Chair
     Daniel G. Deschler, MD FACS, Boston, MA

9:41  2021 Harris P. Mosher Thesis Award for Clinical Science
     Benefits of Cochlear Implantation in Childhood Unilateral Hearing Loss (CUHL Trial)
     Kevin D. Brown, MD PhD, Chapel Hill, NC

9:47  2021 Edmund Prince Fowler Thesis Award for Basic Science
     The Synthetic Triterpenoid RTA-408 Limits Radiation Damage to Normal Tissue, Enhancing
     Vascular Integrity, and Improves Post-Irradiation Surgical Outcomes
     Adam J. Luginbuhl, MD, Philadelphia, PA

9:53  2021 Maureen Hannley Thesis Award for Alternative Science
     Geographic Variations in Healthcare Utilization and Expenditures for Chronic Rhinosinusitis: A
     Population Based Approach
     David W. Jang, MD, Durham, NC

10:00  VISIT EXHIBITORS
10:20 COMPLEMENTARY/INTEGRATIVE MEDICINE
Moderator:
Michael D. Seidman, MD, Celebration, FL
Panelists:
- Ethics of Delivering Complementary/Integrative Medicine
  Susan D. McCammon, MD, Birmingham, AL
- Alternative Management for Vertigo and Tinnitus
  Michael D. Seidman, MD, Celebration, FL
- Complementary/Integrative Treatments for Head and Neck Cancer
  Marilene B. Wang, MD, Los Angeles, CA
- Nonmedical Approach to Pediatric ENT Symptoms
  Julie L. Wei, MD, Orlando, FL

10:52 Moderator Wrap-up and Q&A
11:00 break

ALLERGY/RHINOLOGY & FACIAL PLASTIC AND RECONSTRUCTIVE SURGERY
Moderators:
Tamer A. Ghanem, MD PhD, Detroit, MI
Ahmad R. Sedaghat, MD PhD, Cincinnati, OH

11:05 Outcome of Intravenous Immunoglobulin Replacement Therapy in Adults with Recurrent Acute Rhinosinusitis
Chadi Makary, MD, Morgantown, WV; John Behnke, MD, Morgantown, WV; Brian Peppers, DO PhD, Morgantown, WV; Hassan Ramadan, MD, Morgantown, WV

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the effect of IVIG therapy on adults with chronic rhinosinusitis.

Objectives: To evaluate the outcome of intravenous immunoglobulin (IVIG) replacement therapy in adults with recurrent acute rhinosinusitis and primary humoral immunodeficiency disorders. Study Design: Retrospective chart review. Methods: Retrospective chart review of adult (18 years and older) patients who were diagnosed with primary humoral immunodeficiency between 2003 and 2020 and had the diagnosis of chronic (>12 weeks) or recurrent (>3 times/year) rhinosinusitis. Demographic data, associated conditions, and duration of treatment were reviewed. Number of yearly sinus and pulmonary infections, sinus CT Lund-Mackay (LM) score, and need for sinus surgery were reviewed before and after starting IVIG therapy. Results: 58 patients were included. Average age was 52 years (18-79 years). 74% were female. 30 patients (51.7%) had common variable immunodeficiency, 18 (31.1%) had hypogammaglobulinemia, and 10 (17.2%) had specific antibody deficiency. 79% of patients had allergic rhinitis and 74% had asthma. Pretreatment LM score was 5.4 (+/-8.3, 0-24) compared to posttreatment score of 3.1 (+/-4.7, 0-16) (p=0.002). 11 patients (19%) had ESS pretreatment compared to only 2 patients (3.4%) requiring ESS after starting treatment on IVIG (p=0.001). Prior to starting IVIG, 5 patients (8.6%) had more than 10 sinus infections, 24 patients (41.4%) had 5-10 infections, and 20 patients (34.5%) had 1-5 infections per year. After starting on IVIG, 26 patients (44.8%) had no infections reported anymore, and 24 patients (41.4%) had only 1-2 infections reported per year (p<0.0001). Conclusions: IVIG is an effective treatment for recurrent acute sinusitis in patients with humoral immunodeficiency.

11:10 Above and Beyond: Orbital Transposition Technique for Endoscopic Endonasal Access to Difficult Frontal Sinus Pathology
Ashwini M. Tilak, MD, Birmingham, AL; Alejandro Pena-Garcia, MD, Birmingham, AL; Joshua Purvis, BS, Birmingham, AL; Do-Yeon Cho, MD MS, Birmingham, AL; Jessica W. Grayson, MD MS, Birmingham, AL; Bradford A. Woodworth, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the orbital transposition technique and identify some cases for which it may be beneficial.

Objectives: The orbital transposition (OT) is an advanced adjunctive technique performed during endoscopic approaches to frontal sinus pathology that would otherwise be too far lateral or superior to address using traditional endoscopic transnasal approaches. The objectives of this study are to characterize the utility of this technique for frontal sinus pathology, determine anatomic limitations, and assess outcomes following surgical treatment for benign and malignant pathologies. Study Design: Prospective case series. Methods: Patient data were collected regarding demographics, etiology,
technique, complications, and clinical followup. Preoperative CT scans were reviewed for 1) maximum lateral extent of pathology from the medial orbital wall; 2) maximum superior extent from the frontal sinus floor; 3) height of the supraorbital recess; and 4) the anterior-posterior (AP) diameter of the frontal sinus in the plane of the first olfactory neuron. Results: The OT approach was used in 29 surgeries (28 patients) for CSF leaks (n=5), benign tumors (n=19), and malignant lesions (n=5) between 6/2018 and 4/2020. Mean followup was 7.7 ± 4.4 months. Approaches included 14 Draf IIB and 15 Draf III frontal sinusotomies. All pathology was surgically accessible using the OT and there were no intraoperative or postoperative complications. For applicable cases, mean maximum lateral and superior extent of pathologies were 15.5mm (± 7.6, range: 6.4-30.8) and 22.4mm (± 6.8, range: 10.9-44.7). Mean supraorbital recess height was 5.2mm (± 2.9, range: 2.3-17.6) and mean anterior-posterior (AP) frontal sinus diameter was 13.0mm (± 4.7, range: 6.0-23.2). Conclusions: The OT technique can be safely and successfully utilized to provide endoscopic endonasal access to frontal sinus pathology that would otherwise be inaccessible.

11:15 Ergonomic Analysis in Functional Endoscopic Sinus Surgery Using Quantification of Joint Angles via Novel Inertial Sensors
Annie Arrighi-Allisan, MD, New York, NY; Katherine L. Garvey, MPH, New York, NY; Janki Shah, MD, New York, NY; Anni Wong, MD, New York, NY; Satish Govindaraj, MD, New York, NY; Alfred Marc Iloreta, MD, New York, NY

Educational Objective: Suboptimal ergonomics during endoscopic sinus surgery can lead to considerable physical discomfort and fatigue for the surgeon. At the conclusion of this presentation, participants should be able to understand the objective differences in attending and trainee posture while performing functional endoscopic sinus surgery (FESS).

Objectives: To objectively evaluate the ergonomic positions of trainee and attending surgeons while performing FESS. Study Design: Prospective trial. Methods: Four subjects (two attendings and trainees) performed FESS while wearing eleven inertial measurement units (IMU) affixed to either side of each major joint. Screen placement was standardized to be 1 meter directly in front of the surgeon and on the patient's left, 0-15° declined from the surgeons' eyes. Bed height was standardized such that the workspace was 0-10 centimeters below the elbows. IMU data, sampled at 128Hz, was used to calculate joint angles. Ideal joint angles (i.e., <10° for neck and trunk) were determined by the validated Rapid Entire Body Assessment (REBA). Subjects subsequently completed a modified NASA Task Load Index to assess mental and physical exertion and pain. Student's t-test was employed to detect differences between groups. Results: Trainees adopted positions involving significantly more back flexion while operating than did attendings (10.29° vs. -1.03°, p=0.04). While posture did not differ substantially between groups throughout the first half of each case, attendings were found to have significantly higher levels of neck flexion than were trainees by the latter half (17.99° vs. 4.63°, p=0.03). Trainees reported significantly higher levels of frustration postoperatively than did attendings (3.62/10 vs. 1.48/10, p=0.03), despite attendings reporting higher levels of baseline pain (4.4/10 vs. 1.7/10, p=0.03). Conclusions: Our preliminary data suggest that trainees operate with higher risk neck postures and report greater levels of frustration than do attendings. However, trainees appear to retain healthier back postures throughout cases in their entirety.

11:20 Natural History of Olfactory Dysfunction Associated with SARS-CoV-2 Infection
Katherine L. Garvey, MPH, New York, NY; Annie E. Arrighi-Allisan, BA, New York, NY; David K. Lerner, MD, New York, NY; Peter Filip, MD, New York, NY; Satish Govindaraj, MD, New York, NY; Alfred Marc Iloreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to characterize the natural history of olfactory dysfunction (OD) associated with SARS-CoV-2 infection.

Objectives: To characterize the natural history of olfactory dysfunction (OD) associated with SARS-CoV-2 infection. Study Design: Cross-sectional study. Methods: Individuals who experienced OD, including anosmia, hyposmia and parosmia, due to SARS-CoV-2 infection from March 1FÇôOctober 15, 2020 were recruited from otolaryngology practices and a web based application. Participants completed a 56 question OD survey. Descriptive statistics were used to analyze responses. Results: 145 participants completed the survey at a mean of 176.2 days (SD 31.0 days) following symptom onset. 27.0% (39/145) and 80.0% (116/145) tested positive for SARS-CoV-2 via PCR and antibodies, respectively. At symptom onset, 78.6% (114/145) experienced anosmia, 7.6% (11/145) experienced hyposmia, 2.8% (4/145) experienced parosmia and 10.3% (15/145) experienced both hyposmia and parosmia. The majority, 84.8% (123/145), reported sudden onset OD. 52.4% (76/145) reported concurrent ageusia. OD onset preceded other symptoms in 3.5% (4/114) by a mean of 7.8 days (SD 9.4 days), was concurrent with other symptoms in 13.2% (15/114) while the majority, 83.3% (95/114), reported OD onset after other symptoms by a mean of 9.6 days (SD 14.5 days). Mean severity of OD was 9.34/10 (SD 1.4) at its worst and 4.23/10 (SD 3.3) at survey completion. 83.4% (121/145) reported symptom improvement, with 47.9% (58/121) reporting no improvement until at least 4 weeks. The majority (84.1%, 122/145) reported persistent symptoms, with 54.9% (67/122) reporting both hyposmia and parosmia. Only 15.9% (23/145) reported complete recovery. Conclusions: SARS-CoV-2 infection is frequently associated with severe, sudden anosmia after general symptom onset. While OD improved over time, the majority experience delayed recovery and persistent symptoms.
11:25 Long Term Outcomes after Inferior Meatus Augmentation Procedure with Cadaveric Rib Cartilage to Treat Empty Nose Syndrome
Sachi S. Dholakia, BS, Stanford, CA; Dayoung Kim, BS, Stanford, CA; Angela Yang, BA, Stanford, CA; Jayakar Nayak, MD PhD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the efficacy of IMAP as a treatment method for ENS by analyzing long term postoperative trends in patient reported outcome measures.

Objectives: We sought to report empty nose syndrome patients' long term outcomes after undergoing inferior meatus augmentation procedure through 4 questionnaires: ENS6Q, SNOT-22, GAD-7, and PHQ-9. Study Design: A prospective case series. Methods: A single center observational case series was performed for patients diagnosed with ENS who underwent IMAP between July 2017 and October 2019. Diagnosis of ENS was based on the following criteria: 1) presentation of nasal discomfort and/or paradoxical nasal obstruction after inferior turbinate reduction; (2) a positive ENS6Q score of at least 11; and 3) a positive cotton test. Questionnaire responses were recorded prior to surgery as well as 1 month, 3 months, 6 months, and 1 year postoperatively. Results: 19 eligible patients were included. Mean ENS6Q scores were significantly reduced at all postoperative timepoints (p<0.0001, p=0.0002, p<0.0001, p=0.0005). Of the 6 ENS6Q subdomains, 5 (suffocation, dryness, sense of diminished airflow, nasal crusting, and burning) were significantly reduced 1 year postoperatively (p=0.0002, p=0.0016, p=0.0070, p=0.0191, p=0.0413, respectively). SNOT-22 scores were significantly reduced 1 year postoperatively (p=0.0024). Of the SNOT-22 subdomains, the rhinologic and sleep subdomains were significantly reduced 1 year postoperatively (p=0.0478, p=0.0306). Although GAD-7 and PHQ-9 scores were reduced without statistical significance, it is important to note that these patients mean scores at baseline were 6.6 and 9.4, respectively. A score between 5-9 is indicative of mild anxiety and mild depression for GAD-7 and PHQ-9. Conclusions: Inferior meatus augmentation with cadaveric rib cartilage shows significant, long term improvements in patients' ENS specific and general sinonasal symptoms.

11:30 Timing of Management of Maxillofacial Gunshot Wounds Requiring Free Tissue Transfer: Case Series with a Review of the Literature
Mark I. Knackstedt, BS, Houston, TX; Sean P. McKee, MD, Houston, TX; Bradley Due, BS, Houston, TX; Tang Ho, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to realize the complex situation maxillofacial gunshot wounds present and have an idea of the timing and use of free tissue transfer in the more devastating cases. We hope to educate the facial plastics community of the increasing use of free flaps in the case of facial gunshot wounds to augment functional and aesthetic outcome.

Objectives: Gunshot wounds (GSW) result in severe morbidity and mortality when the maxillofacial region is involved. Facial GSW vary widely in presentation, and the use of free tissue transfer (FTT) may be indicated to maximize functional and aesthetic outcomes. We review our experience with the use of FTT for reconstruction in GSW patients with complex maxillofacial defect. Study Design: Case series. Methods: A database including 649 patients with head and neck GSW presenting to a tertiary care level 1 trauma center between January 2013 and March 2020 was reviewed. Patients requiring FTT reconstruction after maxillofacial GSW were included in the study. Results: A total of 13 free flaps were used for 9 patients. Free flaps were harvested from the fibula (54%), radial forearm (15%), latissimus dorsi (8%), rectus muscle (8%), scapula (8%) and the iliac bone (8%). Initial FTT operations were carried out between 27 and 348 days with the average time to first repair being 118 days. The GSW was self-inflicted in 7 patients (77.8%). All patients had other maxillofacial surgery before free tissue transfer with 7 receiving open reduction with internal fixation and 2 receiving an external fixator. Flap failure was seen in 2 patients (22%) and 7 patients (77.8%) required additional followup procedures. Conclusions: Microvascular FTT is a valuable and often necessary reconstructive option in facial injury secondary to GSW. Both bony and soft tissue flaps are used depending on extent of defect involvement and timing to reconstruction. Multiple adjunctive procedures are often required for maximal restoration of functional and aesthetic outcomes.

11:35 Moderator Wrap-up and Q&A

11:40 break
11:45  COMBINED TRIO/AOS PANEL
ENDOSCOPIC EAR SURGERY: PROS, CONS AND TECHNIQUE
Moderator:
  Alejandro Rivas, MD, Cleveland, OH
Panelists:
  Joni K. Doherty, MD PhD, Los Angeles, CA
  J. Walter Kutz, MD, Dallas, TX
  Daniel J. Lee, MD, Boston, MA

12:20  Moderator Wrap-up and Q&A

12:25  VISIT EXHIBITORS and POSTERS

1:25  TRIOLOGICAL BUSINESS MEETING
NEW FELLOW INTRODUCTION OF 2020 FELLOWS & 2021 NEW FELLOWS
ON CADMIUM MEETING PLATFORM

2:25  break

2:30  SOCIAL MEDIA IN MEDICINE: PEARLS AND PITFALLS
Moderator:
  Romaine F. Johnson, MD MPH, Dallas, TX
Panelists:
  Hayley L. Born, MD, Cincinnati, OH
  Michael M. Johns III, MD, Los Angeles, CA
  Jennifer A. Villwock, MD, Kansas City, KS

3:10  Moderator Wrap-up and Q&A

3:15  break

3:20  3D Printed Models for Percutaneous Nasal Osteotomy Resident Surgical Education
Kurren Gill, MD, Philadelphia, PA; Raphael G. Banoub, MD, Philadelphia, PA (Presenter); Emily S.
Sagalow, BS, Philadelphia, PA; Joel J. Stanek, MD, Philadelphia, PA; Howard D. Krein, MD
PhD, Philadelphia, PA; Ryan N. Heffelfinger, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the utility of 3D printed models in percutaneous nasal osteotomy (pNO) surgical education.

Objectives: To determine whether 3D printed models enhance resident comprehension and performance of pNOs. Study Design: Prospective education simulation. Methods: Fifteen participants completed pre-education confidence surveys, quizzes, and baseline pNOs on 3D printed midfacial bony replicas overlayed with simulated skin product. Participants then attended didactics, observed live demonstrations, and repeated the surgical simulation and survey. Results: Two medical students, four post-graduate year (PGY)-1s, one PGY-2, four PGY-3s, one PGY-4, and three PGY-5s participated. Nine participants had some level of experience assisting with pNOs in the OR; none had experience performing pNOs independently. Average quiz score was 56% before education. Overall, and on an individual basis, participants reported increased confidence in conceptualizing the anatomy and surgical goals of osteotomies, performing osteotomies, striking the osteotome with the correct desired force, detecting the desired endpoint using change in tone and haptic feedback, and performing greenstick fractures (p75%, 50-75%, <50% of cuts made. Overall and on an individual basis, simulation technique scores were increased (p<0.001, p<0.0001) after baseline attempts, didactics, and live demonstration. Conclusions: Performing pNOs is technically challenging and made more difficult by an inability to visualize subcutaneous bony cuts. In this educational simulation study, we demonstrate the utility of 3D printed midfacial bone replicas overlayed with simulated skin product in enhancing resident and medical student understanding of and comfortability with performing pNOs.
Objectifying Injection Laryngoplasty for Unilateral Vocal Fold Paralysis: Challenges and Limitations
Melin Tan-Geller, MD, White Plains, NY; Alexandra Michalowski, MD, New York, NY; Juan Lin, PhD, Bronx, NY; Linda Carroll, PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify laryngeal aerodynamic measures that correlate to changes in the glottic gap of patients who undergo injection laryngoplasty for unilateral vocal fold immobility.

Objectives: Injection laryngoplasty (IL) is first line treatments for patients with unilateral vocal fold paralysis (UVFP). The resultant vocal fold augmentation restores the ability of the larynx to attain glottic competence for phonation. However, IL results in a temporary effect which diminishes over time. Its longevity and the extent to which it remains effective is unpredictable and variable. Understanding and quantifying this temporary change may prove valuable for prognosis and clinical decision making. We characterize change in glottic gap over time and correlate glottic gap area (GGA) with aerodynamic measures after IL. Study Design: Retrospective review of prospectively enrolled patients with UVFP undergoing IL. Methods: Laryngeal aerodynamic measures were reviewed and GGA calculations were performed from still videostroboscopic images. Correlations between laryngeal aerodynamic measures and GGA were statistically analyzed. Results: Thirty-six patients including 17 (47.2%) females and 19 (52.8%) males with an average age of 60.9 years were analyzed. GGA significantly decreased immediately after injection and remained decreased over time. Subglottal pressure (Psub) progressively declined over time. Glottal resistance (Rlaw) significantly increased immediately after injection and then declined although subsequent changes were not statistically significant. There was no significant association demonstrated between either GGA and Rlaw or between GGA and Psub. Conclusions: Measurements of GGA, Psub and Rlaw are helpful in tracking the effect of IL over time. While Psub and Rlaw are not directly reflective of the glottic changes seen in IL patients over time, they remain a reflection of the complex neuromuscular compensations in UVFP patients which can be alleviated with IL.

Surgeon Positioning during In-Office Laryngeal Surgery: An Ergonomic Analysis
James Burns, MD, Boston, MA; Brandon Jackson Baird, MD, Chicago, IL (Presenter); Lauren Tracy, MD, Boston, MA; Monica Tynan, BS, Boston, MA; James Heaton, PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to optimize operational positioning for favorable ergonomic outcomes during office based endoscopic laryngeal surgery.

Objectives: While it is acknowledged that otolaryngologists performing microlaryngeal surgery can develop musculoskeletal symptoms due to suboptimal positioning relative to the patient, fiberoptic laryngoscopy and office based surgeries can also pose ergonomic risk. This prospective study examined body posture during ergonomically favorable and poor positions when performing laryngoscopy using ergonomic analysis, skin surface electromyography (EMG), and self-report of procedure comfort. Study Design: This prospective study examined body posture during ergonomically favorable and poor positions when performing laryngoscopy using ergonomic analysis, skin surface electromyography (EMG), and self-report of procedure comfort. Methods: Eight participants trained in laryngoscopy assumed four ergonomically distinct standing positions (side/near, side/far, front/near, front/far) at three different heights (neutral - top of patient's head in line with examiner's shoulder, high - six inches above neutral, and low - six inches below neutral) in relation to a simulated patient. Participants' postures were measured using the validated Rapid Upper Limb Assessment (RULA, 1-best to 7-worst) tool for the 12 positions. Participants then simulated office based surgery for 10 minutes in both the best and worst scoring positions. Results: The position with the worst RULA score was the side/near/high (7.0), and the best was the front/near/neutral (4.5, ANOVA, p<0.001). Participants simulated office based surgery for 10 minutes in both the best and worst scoring positions. Twelve EMG sensors positioned on the four limbs and torso revealed significant differences between laryngoscopy positions, with the poor posture eliciting an average of 206% greater EMG root mean squared magnitude across all sampled muscles compared to the good posture (paired t-test, df=7, p<0.01), consistent with self-reported fatigue/discomfort when positioned poorly. Conclusions: Quantitative and qualitative posture measurements demonstrate the impact of positioning when performing laryngoscopy and suggest ergonomically beneficial examination positions that should facilitate office based laryngeal procedures.

Implementation of Mobile Audiometry during the Covid-19 Pandemic: A Quality Initiative Study
Alejandro Garcia, MD, Boston, MA; Divya A. Chari, MD, Boston, MA; Konstantina Stankovic, MD PhD, Boston, MA; Daniel J. Lee, MD, Boston, MA; Elliott D. Zokin, MD, Boston, MA; Kevin H. Franck, PhD MBA, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify alternative tools for screening hearing loss that minimize exposure of patients and health care workers to Covid-19.
Objectives: Access to otologic care was limited during the Covid-19 pandemic. In this quality improvement study, we aim to validate mobile audiometry in an adult cohort. Study Design: Quality improvement study. Methods: In a tertiary care hospital, adults presenting with hearing loss between March 16–June 30, 2020 were retrospectively reviewed. Mobile tablet based audiograms (Shoobox Ltd.) were implemented in the emergency department and outpatient clinic setting using Institute for Healthcare Improvement (IHI) methodology. The main outcome measure was the implementation of a mobile audiometer. The secondary outcome was air conduction thresholds (ACT) from mobile audiometry compared to that of standard audiometry at six different frequencies (0.25-8 kHz). A paired t test was used to calculate the difference in mean ACT. Results: 173 adults with hearing complaints were tested with mobile audiometry (mean age: 46.9 years; 50.2% females). The most common diagnoses were tinnitus (31.7%), sudden hearing loss (SHL, 24%), and eustachian tube dysfunction (ETD, 12.3%). 83/173 patients (47.9%) underwent a conventional audiogram. 4/173 patients (2.3%) had a history of Covid-19. Mobile audiometry was normal in 169/342 total tests (49.4%). There were no differences in mean ACT >10 dB for all the frequencies tested except for 8 kHz (p < 0.001). Conclusions: We implemented a systemwide process change to increase access to audiometry and decrease potential risk of viral transmission to healthcare workers during the Covid-19 pandemic. Mobile audiometry may be a useful screening tool for hearing loss. Results from mobile audiometry matched that of the conventional audiogram for all frequencies except the highest frequency (8 kHz).

3:40 Accuracy and Patient Perceived Difficulty of Utilizing Ototopical Antibiotic Therapy
Anne Morgan Selleck, MD, Chapel Hill, NC; Matthew M. Dedmon, MD PhD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand patient challenges with application of eardrops and the frequency of adequate eardrop administration.

Objectives: To examine how patients self-administer eardrops, ascertain their perceived difficulty in performing the task and determine if they are able to deliver the correct dosage. Study Design: Prospective observational study. Methods: Twenty-one subjects were given a pre-weighed five mL eardrop bottle and asked to give themselves three drops of ofloxacin otic solution. Subjects were observed administering the eardrops and monitored for skills performed during eardrop administration. The eardrop bottle was weighed after administration to determine the number of drops applied. Results: The mean number of drops applied was 2.91 +/- 2.1 (target = 3 drops) with a large variance in drop application, range of 0.6 to 9.2 drops. If "correct dosage" is considered 85-115% of the intended dose, then almost half of patients, 47.6%, underdosed with 23.8% that overdosed. Patients reported that the average difficulty in applying drops to themselves was 3.6 (1 being easy and 10 being difficult). Patients reported a high confidence level in applying the correct dose of eardrops of 6.7 (1 being not confident and 10 being very confident). Conclusions: In our study of 21 patients self-administering eardrops, only 28.6% of patients were able to correctly apply the appropriate treatment dose, with almost half of patients underdosing. Questionnaire data indicated that most patients were unaware they were administering an incorrect dose. Inaccurate administration of eardrops could be problematic and lead to longer durations of symptoms, false treatment failures, and increased costs.

3:45 Cochlear Implantation in Adults with Unilateral Deafness: A Systematic Review
Dillan F. Villavisanis, BA, New York, NY; Maria A. Mavrommatis, BA, New York, NY; Elisa R. Berson, BS, New Haven, CT; Zachary G. Schwam, MD, New York, NY; Maura K. Cosetti, MD, New York, NY; George B. Wanna, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to determine clinical outcomes of adult patients with unilateral deafness undergoing ipsilateral cochlear implantation.

Objectives: The objective of this study was to determine clinical outcomes of adult patients with unilateral deafness undergoing ipsilateral cochlear implantation. Study Design: A systematic review of articles in Medline and Embase was performed with a search strategy developed by a licensed librarian to identify studies of adult patients with unilateral deafness who underwent ipsilateral cochlear implantation. Methods: Articles were managed in Covidence and evaluated by two independent reviewers. Risk of bias was assessed using Joanna Briggs Quality Assessment tool. Data extracted included patient demographic information, etiology of deafness, duration of deafness, pure tone audiometry, speech recognition, and postoperative change in tinnitus control, sound localization, and quality of life. Patients were pooled across studies to determine results for desired clinical outcomes. Results: Of 2309 studies identified, 185 full texts were evaluated, and 133 were ultimately included. Preliminary data analysis demonstrates improvements in all clinical variables of interest. Speech recognition scores improved through a variety of tests (CNC, AzBio, etc). Through evaluation by the Tinnitus Handicap Index (THI) and self-reported measures, subjects achieved greater tinnitus control. Overall, data demonstrated improved quality of life when assessed by a disease specific metric and patient self-reported measures. Finalized results concerning magnitude of improvement and quantity of studies assessing each outcome is pending. Conclusions: To the authors' knowledge, this is the largest systematic review on cochlear implantation in adults with unilateral deafness. Recent expanded indications for cochlear implantation includes individuals with unilateral deafness. Preliminary results suggest postoperative outcomes support improvement in ipsilateral speech perception, tinnitus control, and sound localization.
**General & Head and Neck**

**Moderators:**
Jennifer J. Shin, MD, Boston, MA
Michael C. Singer, MD, Detroit, MI

### 4:00 Geographic Distribution of Otolaryngology Advance Practice Providers and Physicians

Derek H. Liu, BS, Los Angeles, CA; Marshall Ge, MD, Los Angeles, CA; Elisabeth H. Ference, MD MPH, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the current geographical distribution of otolaryngology providers and the unmet need in rural communities.

**Objectives:** As advanced practice providers (APPs), physician assistants (PAs) and nurse practitioners (NPs) may play an increasingly important role in otolaryngologic services, particularly in rural communities. This study analyzes the geographic distribution of otolaryngology providers, which is essential to addressing future demands. **Study Design:** Cross-sectional study of 2017 Medicare Provider Utilization and Payment Data. **Methods:** Thirteen commonly used otolaryngology CPT codes were used to identify APPs providing otolaryngologic services, whereas otolaryngology physicians were identified by their primary specialty. Geographic distribution was evaluated by calculating densities of APPs and otolaryngologists per 100,000 persons in urban versus rural counties as defined by the National Center for Health Statistics Urban-Rural Classification Scheme. **Results:** We identified cohorts of 8573 otolaryngologists, 1167 NPs, and 983 PAs. There were significantly higher densities of both otolaryngologists and APPs in urban counties compared to rural counties (Wilcoxon two sample test, p<0.001 for both). The majority of both otolaryngologists (92.1%) and APPs (83.9%) were in urban counties (n=1165). However, the proportion of APPs in rural counties (n=1976) was significantly higher than the proportion of otolaryngologists in rural counties (Chi square test, p=0.04). The majority (72.1%) of rural counties had zero identified providers. Other rural counties had only otolaryngologists (14.4%), only APPs (5.1%), or both (8.5%). Counties served exclusively by APPs were mostly rural (73%). **Conclusions:** Although otolaryngologists and APPs were mostly in urban counties, a larger proportion of APPs were in rural counties. The majority of rural counties had zero otolaryngologic providers, emphasizing the need for increasing access.

### 4:05 Evaluation of a Novel Low Cost, High Fidelity Epistaxis Simulator

Scott Edward Mann, MD, Aurora, CO; Farshad Nabid Chowdhury, MD, Aurora, CO; Anne Elizabeth Getz, MD, Aurora, CO; Cristina Cabrera-Muffy, MD, Aurora, CO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the utility of a novel and low cost epistaxis simulator.

**Objectives:** The objective of this study is to assess the fidelity and potential educational value of a novel epistaxis simulator. **Study Design:** Experts in epistaxis management underwent a simulation exercise and appraised attributes of the novel simulator. Evaluations from a pilot bootcamp curriculum were examined to assess learner satisfaction. **Methods:** 3D photography, CT data, and computer aided design were used to create a simulator of active epistaxis that can be produced with 3D printing equipment for under $20 USD. Eighteen experts in epistaxis management were recruited to undergo a simulated epistaxis emergency. Each expert performed at least 3 procedures (anterior rhinoscopy with evacuation of clot, endoscopy, and nasal packing) and completed a detailed questionnaire. Evaluations were also examined from twelve novice learners who had undergone a pilot bootcamp curriculum utilizing the novel simulator. **Results:** Using a 5 point rating scale (5 representing "excellent", "strongly agree", or "very valuable"), the expert participants provided a mean score of 4.49 ± 0.57 for overall realism, 4.73 ± 0.49 for anatomical accuracy, 4.03 ± 0.78 for tactile realism, and 4.93 ± 0.29 for potential educational value. The novice learners rated their simulation session as 4.79 ± 0.74 for enjoyment of experience and 4.89 ± 0.36 for the educational value. **Conclusions:** Expert evaluations of a novel epistaxis simulator concluded it had high fidelity and educational potential. A pilot curriculum utilizing the simulator was highly rated by novice learners.

### 4:10 Patient Defined Goals for the Treatment of Adult Sleep Apnea

Yi Cai, MD, San Francisco, CA; Arushi Gulati, BS, San Francisco, CA; Priyanka Tripuraneni, BA, San Francisco, CA; Erika Stephens, BA, San Francisco, CA; Megan Durr, MD, San Francisco, CA; Jolie Chang, MD, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe adult sleep apnea patients’ treatment goals and factors influencing their goals.
**Objectives:** Understanding patient goals enables personalized recommendations during surgical consultations for adult obstructive sleep apnea (OSA). Our objectives were to characterize OSA patients' treatment goals. **Study Design:** Mixed methods design. **Methods:** We conducted focus groups of adult OSA patients and performed qualitative analysis. Questionnaires completed by patients presenting to sleep surgery clinic between January 2018 and October 2020 were queried. ESS scores ≥ 13 represented high daytime sleepiness. Chi square testing was performed. **Results:** Eight focus groups with 19 participants were included in the qualitative analysis. Commonly described treatment goals included improving sleep quality, daytime fatigue, snoring, and cardiovascular health risks. Common themes regarding treatment values included efficacy, recovery, and cost. Survey analysis of 561 patients showed 48% were currently using CPAP and an additional 24% had previously tried CPAP. When asked to select the most important treatment goal, respondents more commonly reported OSA related health risk reduction (35%) and sleep quality improvement (28%), compared to daytime fatigue improvement (21%) and snoring sound reduction (16%). Patients' primary treatment goals differed between patients with high versus low ESS scores (p< .001), but not by CPAP status. For those with primary goal of improving daytime fatigue, rates with high versus low ESS differed (32% versus 16%, p< .001); conversely, for snoring sound reduction, 7% versus 18% (p< .001). **Conclusions:** Adult OSA patients have disparate treatment goals, and these may vary with levels of daytime sleepiness. Querying patient goals can help with expectation management and the surgical shared decision making process.

4:15 Public Perceptions of Radiofrequency Ablation vs. Standard Surgery for Benign Thyroid Nodules
Andy S. Ding, BA, Baltimore, MD; Deborah Xie, MD, Baltimore, MD; Lisa Zhang, BS BA, Baltimore, MD; Francis X. Creighton, MD, Baltimore, MD; Jonathon O. Russell, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) identify factors that the public find most important in deciding on thyroid nodule treatment; and 2) gain an understanding of public perceptions regarding nonsurgical treatment of thyroid nodules.

**Objectives:** Ultrasound guided radiofrequency ablation (RFA) has recently shown promising results for nonsurgical treatment of thyroid nodules. The purpose of this study is to investigate public perceptions of RFA and identify salient decision factors for thyroid nodule treatment. **Study Design:** An internet based survey was distributed via online platforms. **Methods:** Survey participants were prompted to envision having a thyroid nodule and were assessed on risk acceptance, willingness to pay, and importance of decision factors (e.g., cost, risk, scarring) regarding treatment with either RFA or standard surgery. **Results:** A total of 243 respondents (male 65%, mean age 39 ± 12.3 years) were included. Respondents ranked the most important factors for thyroid nodule treatment as risk of missing cancer and risk of repeat procedure (mean score 4.556 and 4.333 out of 7, respectively). As opposed to males, female respondents ranked risk of missing cancer higher in importance compared to other decision factors (coefficient=0.546, p=0.035). Respondents with higher education levels ranked having a scar (coefficient=0.267, p=0.001) and needing thyroid hormone (coefficient=0.140, p=0.036) as more important decision factors. Prior scars were positively associated with likelihood of undergoing a nonsurgical procedure (coefficient=9.12, p=0.001), even if scars were well healed (coefficient=11.8, p=0.028). On average, respondents are willing to pay as much for RFA as they are for standard surgery (RFA: $20,215; surgery: $20,891). **Conclusions:** Respondents identified risk of missing cancer and risk of requiring additional treatment as the most important decision factors for thyroid nodule treatment. Education level and history of previous scars are both associated with a proclivity towards nonsurgical treatment and RFA.

4:20 Trends in Adjuvant Therapy after Surgery for Oropharyngeal Squamous Cell Carcinoma
Ramez Philips, MD, Philadelphia, PA; Hamad Sagheer, BS, hamad.sagheer@jefferson.edu, PA; Brian Swendseid, MD, Philadelphia, PA; Adam Luginbuhl, MD, Philadelphia, PA; Joseph Curry, MD, Philadelphia, PA; David Cognetti, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe trends in adjuvant therapy after surgery for p16+ oropharyngeal squamous cell carcinoma over time. To evaluate change in survival over this time period.

**Objectives:** To assess trends in adjuvant therapy after surgery for p16+ oropharyngeal squamous cell carcinoma over time. To assess change in survival over time. **Study Design:** Retrospective chart review. **Methods:** Charts of patients who underwent transoral robotic surgery (TORS) for p16+ oropharyngeal squamous cell carcinoma between 2010 and 2019 were reviewed. Trends analysis was used to compare rate of adjuvant treatment over time. Kaplan Meier method was conducted to analyze overall survival (OS) and disease free survival (DFS). **Results:** 361 patients met inclusion criteria. 176 (48.8%) patients underwent adjuvant radiation, and 92 (25.5%) patients underwent adjuvant chemoradiation. Rate of adjuvant therapy significantly decreased from 80.5% to 70.8% between 2010-2014 and 2015-2019. In 2015-2019, patients who received adjuvant treatment were less likely to receive adjuvant chemoradiation therapy compared to patients in 2010-2014 (50.5% vs 20.4%; p <0.005). There was no difference in tumor characteristics including T/ N classification and adverse
features (p <0.005) between patients getting surgery in 2010-2014 vs 2015-2019. In 2010-2014, 2 year OS and DFS were 94% and 89%, respectively; in 2015-2019, 2 year OS and DFS were 95% and 94%, respectively. There was no difference in OS or DFS between the two time periods. **Conclusions:** After adjusting for confounders, the rate of adjuvant therapy has decreased over time. There was no change in OS and DFS over this time period.

**4:25 Identification of Malignant Head and Neck Lymph Nodes through Machine Learning**
S. Hamad Sagheer, BS BA, Philadelphia, PA; Aylin Tahmasebi, MD, Philadelphia, PA; Hudson Carter, BS, Philadelphia, PA; Uche Nwagu, BS, Philadelphia, PA; Joseph M. Curry, MD, Philadelphia, PA; Rashmi Balasubramanya, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand that machine learning (ML) programs can be utilized to identify malignant nodes in head and neck squamous cell carcinoma (HNSCC) patients.

**Objectives:** A promising application of ML is for automated diagnosis on computed tomography (CT). The objective is to evaluate the ability of a ML algorithm with object detection capabilities to recognize malignant lymph nodes in HNSCC. **Study Design:** Prospective study with chart review. **Methods:** A total of 175 cases of HNSCC with malignant lymph nodes were identified between February 2012 and December 2019. CT images were reviewed by a radiologist to identify the malignant lymph node. Malignancy was confirmed pathologically. An object detection model was trained using the Google AutoML Platform to identify the vertebrae for anatomic detail and suspicious/malignant lymph node in each image. Using training condition of 20 node/hours, training was performed on 157 images and internal testing on remaining 18 images. An Intersection over Union threshold of 0.5 was utilized. **Results:** The majority were male (85%) with a mean age of 63 (range 38-90) years. Most nodes were ipsilateral (98%) to the site of the primary cancer and involved the cervical lymph node level 2A (64%). When tested internally, the algorithm had a precision and recall rate of 94% and 89%, respectively for identification of the vertebrae and suspicious lymph node. **Conclusions:** Here a ML algorithm with object detection capabilities has demonstrated a good degree of precision and positive predictive value in the identification of malignant nodes and vertebrae on CT. Future directions include using an image classification model to study the ability to recognize extracapsular nodal spread and external prediction testing in an enlarged sample size.

**4:30** Moderator Wrap-up and Q&A

**4:35** break

**4:40** TRIOLOGICAL POSTERS - MEET THE AUTHORS POSTER SESSION

**5:45** Adjourn

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**SATURDAY, APRIL 10, 2021   CENTRAL TIME ZONE**

**7:30** TRIOLOGICAL ANNUAL BUSINESS MEETING - MEMBERS ONLY
WEBINAR INVITATIONS WILL BE SENT TO VOTING MEMBERS
(BUSINESS MEETING WILL NOT BE HELD ON COSM CADMIUM PLATFORM)

**8:30** Remarks by President
C. Gaelyn Garrett, MD MMHC, Nashville, TN

**8:35 - 9:55** LEARNING FROM OUR COLLEAGUES: SPECIALTY RESPONSE TO COVID-19
Moderator:
Sonya Malekzadeh, MD FACS, Washington, DC
Panelists:
AAFPRS - Theda C. Kontis, MD FACS, Baltimore, MD
ABEA & ASPO - Scott M. Rickert, MD FACS, New York, NY
AHNS - Cherie-Ann Nathan, MD FACS, Shreveport, LA
ALA - Maggie Kuhn, MD, Sacramento, CA
ANS & AOS - Alicia M. Quesnel, MD, Boston, MA
ASGO - Ozlem E. Tulunay-Ugur, MD, Little Rock, AR
ARS - Benjamin S. Bleier, MD FACS
SUO - Stacey T. Gray, MD FACS, Boston, MA

**9:50** Moderator Wrap-up and Q&A
10:00 Disparities in Pediatric Otitis Media and Tympanostomy Tube Placement
Ayan Purkayastha, BS, Worcester, MA; Prithwijit Roychowdhury, BS, Worcester, MA; Lindsay Sobin, MD, Worcester, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand some of the disparities that children from low income families face with the treatment of otitis media and how this is affected by insurance type.

Objectives: Tympanostomy tube placement is a common surgical procedure for treating pediatric patients with recurrent acute otitis media (AOM) or chronic otitis media with effusion (COME). Prior work suggests children from low income families face significant disadvantages in access to care for AOM or COM. It is unclear how these disparities have been impacted due to the expansion of Medicaid/public health insurance over the prior decade in our state. Herein, we seek to examine differences in care for patients with AOM and COME based on insurance type and zip code. Study Design: Retrospective review of 560 pediatric patients seen at a tertiary academic medical center between 2017-2019 for AOM or COME. Methods: Demographic data collected included age, ethnicity, insurance type (public, private, etc.) and zip code. Otological history collected included age and severity of initial presentation, time to followup and number of postop audiograms. Results: We found that patients covered by Medicaid/public insurance were likely to have less audiograms performed postoperatively (p = 0.04) and more likely to no show (p < 0.0001). There were no statistically significant differences seen in the time to followup after surgery or any of the other additional measures analyzed. Conclusions: Our work reveals that there were no differences in the initial presentation of otitis media and access to tympanostomy tube placement for pediatric patients depending on insurance type, but some differences in followup outcomes. Further research should be done to determine the factors affecting these outcomes to ensure appropriate follow up is obtained.

10:05 Characterization of Positional Obstructive Sleep Apnea in Children
Michal Trope, MD BA, Cincinnati, OH; Jenna Barengo, MD, Cincinnati, OH; Carol Li, MD, Cincinnati, OH; Stacey Ishman, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to characterize positional obstructive sleep apnea in children.

Objectives: Positional obstructive sleep apnea (POSA) has been studied extensively in adults with obstructive sleep apnea (OSA) but study in children is scant. Our aim was to identify the prevalence of POSA in children and compare sleep parameters and demographics between those with and without POSA. Study Design: Retrospective cross-sectional analysis. Methods: We studied children (1 event/hour) by polysomnography from 04/2005 to 10/2018. POSA was defined as a supine oAHI ≥ 2 times oAHI in the non-supine position. Patients were excluded when positional information was unavailable or >90% of total sleep time was spent in one position. Results: We assessed 165 children with OSA (48.2% female, 62.4% white, median body mass index percentile (BMIp)=75.5%); median age was 5.9 years (95% confidence interval: [5.3-6.5]). The prevalence of POSA was 16.4%. Age, gender, and BMIp were similar between groups. Children with POSA were more commonly classified as Black than those without (P=0.034). In addition, those with POSA had poorer sleep quality compared to those without POSA, with more time in stage 2 (49% vs 44%, P=0.009), less time in stage 3 (26% vs 29%, P=0.02), and greater time with carbon dioxide>50% (7.5% vs 3%, P=0.04). oAHI was similar for children with and without POSA (10.0 versus 10.1 events/hour, P=0.20). Conclusions: POSA occurred in 16.4% of children, was more common in Black versus White children, and was associated with poorer sleep quality. There was not a significant difference in other demographic or sleep parameters between those with and without POSA.

10:10 Differences in Clinical Presentation of Paradoxic Vocal Fold Motion (PVFM) by Age, Sex, Race/Ethnicity
Julie S. Yi, BS, Baltimore, MD; Kelly A. Scriven, MD, Baltimore, MD; Jonathan M. Walsh, MD, Baltimore, MD; Marisa A. Ryan, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to characterizes differences in clinical presentation of PVFM based on age, sex, and race/ethnicity.
Objectives: Paradoxical vocal fold motion (PVFM) is inappropriate closure of the vocal folds during inspiration, most often presenting in children and young adults. Although common symptoms and triggers are known, differences in clinical presentation based on demographic variables are unknown. This study characterizes differences in clinical presentation of PVFM based on age, sex, and race/ethnicity. **Study Design:** We reviewed electronic medical records of patients 0-21 years with PVFM based on ICD codes from 2009-2019 within a tertiary academic health system. **Methods:** Demographics, symptoms, triggers, concurrent diagnoses, and laryngoscopy findings were abstracted. Odds ratios (ORs) and 95% confidence intervals (CI) were estimated using exact logistic regression. **Results:** Among 96 individuals the mean age was 10.6 years (standard deviation ± 6.5) and 66 (69%) were female. Those age 0-12 years (n=42) were less likely to present with allergies (OR=0.27, 95% CI: 0.08-0.79), psychiatric diagnoses (OR=0.22, 95% CI: 0.07-0.60), shortness of breath (OR=0.11, 95% CI: 0.04-0.32), dysphonia (OR=0.20, 95% CI: 0.03-0.80), and physical activity as a trigger (OR=0.09, 95% CI: 0.03-0.25), and more likely to have PVFM observed on laryngoscopy (OR=3.45, 95% CI: 1.31-9.64) compared to 13-21 year olds. The proportion of females did not differ across age groups. Racial/ethnic minorities were more likely to present with pharyngeal findings (e.g., mucosal inflammation, adenotonsilar hypertrophy) on laryngoscopy (OR=4.58, 95% CI: 1.45-15.37) compared to non-Hispanic Whites. Differences in clinical presentation by sex were not observed. **Conclusions:** We identified several differences in symptoms, triggers, and laryngoscopy findings of PVFM based on age. Associations between sex and clinical presentation were not observed.

10:15 **Post-Tonsillectomy Hemorrhage Control with Nebulized Tranexamic Acid: A Retrospective Cohort Study**

Dylan Erwin, BBA BA, San Antonio, TX; Philip Heichel, MD, San Antonio, TX; Laura Wright, BS, San Antonio, TX; Timothy McEvoy, MD, San Antonio, TX; Marisa Earley, MD, San Antonio, TX; Andrew Meyer, MD MS, San Antonio, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the role of nebulized tranexamic acid in the management of post-tonsillectomy hemorrhage.

**Objectives:** Evaluate nebulized tranexamic acid (TXA) as a treatment to reduce the need for a secondary operation to control a post-tonsillectomy hemorrhage (PTH). **Study Design:** Retrospective cohort study. **Methods:** Completed a three year retrospective cohort study of children from 2016 to 2019 with PTH. Demographics, insurance, and blood loss information were collected from all pediatric tonsillectomies with and without adenoidectomy performed during the study period. Based on a successful case report of a child treated with nebulized TXA for PTH, our institution began to give all PTH patients three doses of nebulized TXA. A novel PTH clot and bleeding scale was developed using patient history and exam description before and after receiving TXA. **Results:** The incidence of pediatric PTH at our institution during the study period was 5.4%. Fourteen out of 58 PTH patients received nebulized TXA with no adverse events. Receiving nebulized TXA compared to routine care decreased the need for a second operation to restore hemostasis by 44%, p<0.005. There was no significant difference in age, body mass index, or blood loss between the children that received TXA and those that did not. The novel PTH clot and bleeding severity score decreased after administration of nebulized TXA. **Conclusions:** Treatment with nebulized TXA for PTH in children may be a safe way to decrease need for operative control of PTH. This data suggest large clinical trials will determine the efficacy and safety of nebulized TXA to mitigate this common and potentially fatal postoperative complication.

10:20 **Adenotonsillectomy Clinical Care Guideline Implementation Is Associated with Reduced Postoperative Length of Stay in Same Day Discharge Patients**

Jennifer M. Lavin, MD MS, Chicago, IL; Abbey Studer, MBA, Chicago, IL; Dana M. Thompson, MD MS MBA, Chicago, IL; Jonathan Ida, MD MBA, Chicago, IL; Jeffrey Rastatter, MD MS, Chicago, IL; Kathleen Billings, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how standardized protocols improve markers of quality such as length of stay after surgery.

**Objectives:** Standardization of postoperative care using clinical care guidelines (CCG) improves quality by minimizing unwarranted variation. It is unknown whether CCGs impact patient throughput in outpatient adenotonsillectomy (T&A). We hypothesize that CCG implementation is associated with decreased postoperative length of stay (LOS) in outpatient T&A. **Study Design:** Prospective quality improvement initiative. **Methods:** A multidisciplinary team was assembled to design and implement a T&A CCG. Standardized discharge criteria were established, including goal fluid intake and parental demonstration of medication administration. An order set was created that included a hard stop for discharge timeframe with choices "meets criteria", "four hour observation", and "overnight stay". Consensus was achieved in June 2018, and the CCG was implemented in October 2018. Postoperative LOS for patients discharged the same day was tracked using control chart analysis with standard definitions for centerline shift being utilized. Trends in discharge timeframe selection were also followed. **Results:** Between July 2015 and August 2017, the average LOS was 4.82 hours. This decreased to 4.39 hours in September 2017 despite no known interventions and remained stable for 17 months. After CCG implementation, an initial trend towards increased LOS was followed by centerline shifts to 3.83 hours and 3.53 hours in March and October 2019,
respectively. Selection of the "meets criteria" discharge timeframe increased over time after CCG implementation (R² = 0.38 p = 0.003). **Conclusions:** Implementation of a CCG with standardized discharge criteria was associated with shortened postoperative LOS in outpatient T&A. Concurrently, providers shifted practice to discharge patients upon meeting criteria rather than after a designated timeframe.

**Conclusions:**

Implementation of a CCG with standardized discharge criteria was associated with shortened postoperative LOS in outpatient T&A. Concurrently, providers shifted practice to discharge patients upon meeting criteria rather than after a designated timeframe.

**10:25**  Moderator Wrap-up and Q&A

**10:30**  break

**10:35**  SOMATIC SLEUTHING: HOW TO IDENTIFY AND SUCCESSFULLY MANAGE THE FUNCTIONAL SOMATIC PATIENT

**Moderator:**

Jay F. Piccirillo, MD, St. Louis, MO

**Panelists:**

Soha N. Ghossaini, MD, Auburndale, NY
Stephanie N. Misono, MD MPH, Minneapolis, MN
Jay F. Piccirillo, MD, St. Louis, MO

**11:10**  Moderator Wrap-up and Q&A

**11:15**  break

**THE BEST OF TRIO**

**Moderator:**

Scott L. Lee, MD FACS, Renton, WA

**11:20**  Olfactory Impairment and Neurodegenerative Changes on Magnetic Resonance Imaging (MRI) among Individuals with Cognitive Impairment - A Systematic Review

Julie Sunjoo Yi, BS, Baltimore, MD; Nanki Hura, BS, Baltimore, MD; Christopher Roxbury, MD, Chicago, IL; Sandra Y. Lin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe neurodegenerative changes on MRI in patients with olfactory impairment and mild cognitive impairment.

**Objectives:** The association between olfactory impairment (OI) and cognitive impairment (CI) is well established, and therefore olfactory testing may prove to be a screening tool for dementia. The underlying mechanism of this association remains uncertain but may be explained by neurodegenerative changes detected on magnetic resonance imaging (MRI). The purpose of this systematic review is to describe neurodegenerative changes on MRI in patients with OI and mild cognitive impairment (MCI) or dementia. **Study Design:** A literature search encompassing PubMed, Embase, Cochrane Library, Web of Science, Scopus, and Google Scholar for studies with MRI and olfactory testing among participants diagnosed with MCI or dementia was performed. **Methods:** English language articles with original data were included. Study design, cognitive impairment type, cognitive testing, olfactory testing, and MRI findings were abstracted. Two investigators independently reviewed all articles. **Results:** The search yielded 559 nonduplicate abstracts, from which 89 articles were reviewed and 24 were included. University of Pennsylvania Smell Identification Test (UPSIT) was the most common olfactory test used (12, 50%). Fifteen (63%) studies reported decreased hippocampal volume on MRI among individuals with cognitive impairment. Nine (38%) studies reported correlation of hippocampal volume atrophy with impairment of olfactory identification, with 4 (17%) commenting on volume reduction in the left hippocampus. The highest correlation coefficient described between volume of the left hippocampus and odor identification was r=0.85, p<0.006. **Conclusions:** These findings suggest a correlation between OI and volumetric markers of neurodegeneration on MRI, supporting the potential for odor identification tests as cost effective screening tools for progression to dementia.

**11:25**  Decisional Conflict in Obstructive Sleep Apnea Patients Presenting to Sleep Surgery Clinic

Arushi Gulati, BS, San Francisco, CA; Yi Cai, MD, San Francisco, CA; Jolie L. Chang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize that there are high levels of decisional conflict in adult obstructive sleep apnea patients presenting for consultation about CPAP alternatives and understand contributing factors.
**Objectives:** Numerous therapies exist for adult obstructive sleep apnea (OSA), creating potential for patient decisional conflict (DC), which impacts treatment adherence or risk for post-treatment regret. We evaluated DC in adult OSA patients presenting for continuous positive airway pressure (CPAP) alternatives in order to understand factors associated with DC.

**Study Design:** Retrospective survey study. **Methods:** Adult OSA patients presenting to an academic sleep surgery clinic from March-October 2020 completed questionnaires about sleep apnea symptoms, history, therapy interest, and the SURE checklist, a validated 4 item DC screening scale. SURE scores of less than 4 indicated presence of DC. **Results:** Amongst 106 respondents, 61 (58%) were open to multiple surgical or nonsurgical treatment options, whereas 22% were not interested in surgical treatment. Greatest interest was for hypoglossal nerve stimulator implantation (n=51, 48%) and palate or tongue surgery (n=34, 32%). Thirty-four percent (n=36) were currently using CPAP. Eighty-four respondents (79%) had DC. There were no differences in Epworth Sleepiness Scale scores between patients with and without DC (p=0.12). The proportion of patients with DC did not differ based on history of or current CPAP use. For a subset of 40 patients, average time reported researching OSA was 8.1 ± 12.1 hours and only 21 patients (53%) felt familiar with treatment options. **Conclusions:** The majority of OSA patients presenting for consultation about CPAP alternatives have DC regarding treatment. This may be influenced by lack of knowledge about options. Identifying DC can help with shared decision making for OSA therapy.

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**11:30 Evaluating Factors that Influence Patient Satisfaction in Otolaryngology Clinics**

Taylor S. Redding, BA, Salt Lake City, UT; Andrew R. Stephens, BS, Salt Lake City, UT; Richard K. Gurgel, MD MSCI, Salt Lake City, UT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify factors that influence patient satisfaction.

**Objectives:** To identify factors that influence patient satisfaction during outpatient visits in various settings of otolaryngology clinics in an academic medical center. **Study Design:** Retrospective cohort study. **Methods:** We reviewed Press Ganey patient satisfaction survey responses for new, outpatient visits between January 1, 2014 and December 31, 2018. Self-reported race was identified using electronic medical records. Multivariate binary logistic regression analyses were used to identify continuous and categorical variables associated with patient satisfaction. **Results:** Multivariate analysis revealed that responses for patients <18 years old are less likely to be satisfied with their care compared to patients ≥ 18 years old (OR 0.66; P < 0.001). For each 10 minute increase in wait time, patients were 43.4% less likely report satisfaction (P < 0.001). African American patients were also less likely to report satisfaction (OR 0.22; P = 0.043) while Native Hawaiian and Pacific Islanders were over 3 times more likely to be satisfied (OR 3.6; P = 0.013). Additionally, Medicare patients and those who were seen at community satellite clinics compared to the main university hospital had increased odds of achieving satisfactory care (OR 1.3; P = 0.005 and OR 1.3; P = 0.002 respectively). **Conclusions:** Wait time, clinic location, and patient race, insurance provider, and age were all shown to significantly influence patient reported satisfaction. Understanding how these variables influence patient satisfaction will hopefully lead to processes that improve patient satisfaction.

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**11:35 Comparison of Readmission and Complication Rates between Traditional Sleep Surgery and Upper Airway Stimulation Using a Novel, National Medical Record Database**

Ryan Nord, MD, Richmond, VA; Thomas Houston Fitzpatrick IV, MD, Richmond, VA (Presenter); Jonathan DeShazo, PhD, Richmond, VA; Evan Reiter, MD, Richmond, VA

**Educational Objective:** At the completion of this presentation, the participants should be able to explain the difference in readmission and postoperative complication rates between upper airway stimulation and traditional sleep surgery for obstructive sleep apnea.

**Objectives:** This study aims to compare complication and readmission rates between upper airway stimulation (UAS) and traditional sleep surgery (TSS), such as palatal or multilevel surgery, by examining such events in the 30 day postoperative period using a multicenter electronic medical record (EMR) database. **Study Design:** Although the safety of these procedures has been established, data comparing the complication rates of UAS and TSS is lacking. Thus, we conducted a retrospective observational study using TriNetX, a global federated health research network providing access to EMR data from approximately 37 million patients in 20 large healthcare organizations. **Methods:** We queried TriNetX to identify individuals who underwent either UAS or TSS for obstructive sleep apnea (OSA) from January 2014 to August 2019. Propensity scores based on demographics, obesity, and chronic condition diagnoses were used to balance groups. We compared the frequency of readmission and complication rates between the cohorts. **Results:** 1,654 patients had palatal surgery, 258 had multilevel surgery, and 252 patients had UAS. Palatal surgery had a higher risk of readmission or return to OR (12% vs 4%, p < 0.0001), and higher complication rate (15% vs 3%, p < 0.0001) than UAS. Multilevel surgery results were similar in both readmission/return (15% vs 4%, p < 0.0001) and complications (20% vs 3%, p < 0.0001). The most common procedural complications at ER visit or readmission were dehydration, bleeding, and pain. **Conclusions:** Upper airway stimulation has a lower risk of readmission and postoperative complications than traditional sleep surgery in a large, multicenter analysis.
Samih J. Nassif, MD, Boston, MA; Jennifer L. Harb, MD, Boston, MA; Jagdish K. Dhingra, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the utility and accuracy of MSRSGC to traditional cytopathology interpretation in salivary gland fine needle biopsies (FNB).

Objectives: Compare the utility and accuracy of MSRSGC to traditional cytopathology interpretation in salivary gland fine needle biopsies (FNB). Study Design: Retrospective chart review. Methods: A retrospective chart review for all the salivary gland FNBs (CPT code 42400) was performed between 1/1/2017 and 9/20/2020 at a large community otolaryngology practice. Cytopathology reports were divided into 2 groups - those utilizing MSRSGC and traditional descriptive reporting. Cytopathology results were compared to histopathology reports when available. Diagnostic accuracy, defined as concordance between cytopathology and histopathology, was calculated for both the groups. Diagnostic surgery rate for each group was also calculated. Statistical analysis was performed using Microsoft Excel and the chi square test to compare the two groups. Results: A total of 216 FNBs were performed on 199 salivary glands lesions in 197 patients. Eighty-one cytopathology reports utilized MSRSGC; histopathology was available for 27/81 lesions with a diagnostic accuracy of 85%. The traditional reporting group included 135 FNBs; histopathology was available on 35/135, with a diagnostic accuracy of 76% (p = 0.346). The rate of diagnostic surgery for lesions reported with MSRSGC was 36% compared to 50% of lesions reported using the traditional cytopathology reporting (p = 0.054). Conclusions: The MSRSGC is as accurate as the traditional methods of reporting. A trend towards a lower rate of diagnostic sialadenectomy in MSRSGC group may reflect clearer communication and easier interpretation for the treating surgeon.

11:45 The 5 Item Modified Frailty Index as a Predictor of Short Term Outcomes in Complex Head and Neck Surgery
Khodayar Goshtasbi, MS, Orange, CA; Jack Birkenbeuel, BS, Irvine, CA; Brandon M. Lehrich, BS, Irvine, CA; Yarah M. Haidar, MD, Irvine, CA; Tjoson Tjoa, MD, Irvine, CA; Edward C. Kuan, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the possible impact of preoperative frailty on predicting short term outcomes (such as complications, length of hospitalization, and discharge destination) following complex head and neck surgeries.

Objectives: To evaluate the impact of preoperative frailty on short term outcomes following complex head and neck surgeries (HNS). Study Design: Cross-sectional analysis of a national database. Methods: The 2005-2017 National Surgical Quality Improvement Program database was queried for patients undergoing complex HNS. Five item modified frailty index (mFI) was calculated based on functional status and history of diabetes, COPD, CHF, and chronic hypertension. Results: A total of 2786 patients (73.1% male) were included with a mean age of 62.0 ± 11.6 years. Compared to non-frail patients (41.2%), patients with mFI ≥ 1 (58.8%) had shorter lengths of operation (p=0.021), longer length of stay (LOS) (p<0.001), and higher rates of 30 day reoperation (p=0.009), medical complications (p<0.001), discharge to non-home facility (DNHF) (p<0.001), and mortality (p=0.047). These statistical differences were also observed when comparing across all individual mFI scores (all p<0.05). After adjusting for age, gender, race, BMI, and ASA score via multivariate logistic regression, patients with mFI ≥ 1 were significantly more likely to undergo reoperation (OR=1.40), surgical complications (OR=1.21), medical complications (OR=1.55), prolonged LOS (OR=1.25), and DNHF (OR=1.52) (all p<0.05). Multivariate logistic regression also demonstrated that after adjusting for confounders, compared to patients with mFI=1, patients with mFI=2-5 (18.7%) were more likely to undergo shorter operations (OR=0.75), have medical (OR=1.44) or any complications (OR=1.27), and DNHF (OR=1.61) (all p<0.05). Conclusions: The 5 point mFI can be an independent predictor of short term surgical outcomes following complex HNS. This simple and reliable 5 point metric can potentially lead to improved preoperative counseling and postoperative planning for patients receiving complex HNS.

11:50 Post-Tonsillectomy Ibuprofen: Is there a Dose Dependent Bleeding Risk?
Steven Losorelli, Stanford, CA; Patrick Scheffler, MD, Phoenix, AZ; Hung-Fu Charlie Lin, NP-C, Stanford, CA; Yifei Ma, PhD, Palo Alto, CA; Mai Thy Truong, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate the risks of post-tonsillectomy hemorrhage in children receiving low, intermediate, and high dose ibuprofen.

Objectives: Post-tonsillectomy hemorrhage (PTH) is a potentially life threatening complication of one of the most common procedures in pediatric otolaryngology. A recent meta-analysis suggests that ibuprofen may increase the risk of PTH following total tonsillectomy (Stokes et al., 2019). Dividing pooled data into groups based on the dose of ibuprofen given (5mg/kg vs 10mg/kg), and comparing to our institutional ibuprofen dose of 7.5mg/kg was further done to compare bleeding
rates to the dose of ibuprofen given. **Study Design:** Meta-analysis; retrospective review. **Methods:** We first conducted a meta-analysis of 11 studies comparing postoperative ibuprofen analgesia to non-nonsteroidal anti-inflammatory drugs (NSAID) controls. Five studies using a dose of 5mg/kg (828 patients, 1411 controls) and 6 studies using 10mg/kg (4480 patients, 4714 controls) were included. We then conducted a novel single institution, retrospective review of data for 1,045 patients prescribed intermediate dose 7.5mg/kg ibuprofen. **Results:** Rates of PTH from meta-analysis data in those prescribed 5 mg/kg and 10mg/kg ibuprofen were 2.05% and 4.62%, respectively. For patients prescribed 7.5mg/kg dose ibuprofen at our institution, the rate of PTH was 3.16%. In an unadjusted regression model comparing these doses to 7.5 mg/kg, 5 mg/kg is associated with a 35% lower (p=0.14) and 10 mg/kg with a 46% higher risk of bleeding events on average (p=0.04). **Conclusions:** Despite having a higher safety profile than the use of narcotics for postoperative analgesia, justifiable concern exists for the use of ibuprofen as NSAIDs may increase the risk of PTH. Our results suggest a possible dose dependent risk of PTH, with high dose ibuprofen showing a significantly increased risk of bleeding events.

**11:55** Moderator Wrap-up and Q&A

**Noon** Adjourn TRIO Session

**12:15 - 1:15** ASPO/TRIO COLLABORATIVE PANEL – **DURING ASPO SESSION**
THE FUTURE OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY: WHAT IS ON THE HORIZON?

**Moderator:** Reza Rahbar, MD FACS, Boston, MA

**Panelists:**
- Private Practice/Academic Affiliation
  - Mark S. Persky, MD FACS, TRIO Past President

- Solo Practice in Rural America
  - Sigsbee W. Duck, MD FACS, TRIO Immediate Past President

- ABOHNS Certification/Sub-certification
  - C. Gaelyn Garrett, MD, MMHC, TRIO President

- Big Tents Keep More of Us Sheltered from the Elements
  - Blake C. Papsin, MD FACS, ASPO Past President

- Viral Infection Children and the Future of Pediatric Otolaryngology
  - Anna H. Messner, MD, ASPO Immediate Past President

- Fellowship Trends in Pediatric ORL and Potential Workforce Implication
  - Diego A. Preciado, MD PhD, ASPO President

**135 TRIOLOGICAL SOCIETY POSTERS**
**POSTERS**

**Allergy/Rhinology**

1. **Postoperative Outcomes of Transsphenoidal Pituitary Surgery Patients Treated with Xeroform**
   Annie E. Arrighi-Allisan, BA, New York, NY; Katherine L. Garvey, MPH, New York, NY; Andrey Filimonov, MD PharmD, New York, NY; Maria A. Mavrommatis, BA, New York, NY; Satish Govindaraj, MD, New York, NY; Alfred Marc Iloreta, MD, New York, NY

   **Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the differences in outcomes of transsphenoidal pituitary surgery patients treated with and without xeroform.

   **Objectives:** Rhinologists employ a variety of packing materials in an attempt to achieve hemostasis, improve postoperative outcomes, and reduce debridement burden. This study compares the perioperative outcomes of patients treated with and without xeroform sterile dressing. **Study Design:** Retrospective chart review. **Methods:** The charts of 187 patients undergoing transsphenoidal excision of a pituitary adenoma were reviewed for baseline demographics and tumor characteristics. Postoperative outcomes were compared between cohorts of patients treated with and without xeroform sterile dressing using chi-square test of independence and multivariate logistic regression. **Results:** Xeroform and non-xeroform patients did not differ significantly by age (53.00 vs. 52.35 years, p=0.84), gender (65.21% vs. 55.70%, p=0.39), BMI (28.17 vs. 28.98, p=0.58), incidence of diabetes (DM; 30.43% vs. 18.63%, p=0.19), or tumor functionality (34.78% vs. 49.4%, p=0.57) or size (30.43% vs. 59.51% extending into cavernous sinus, p=0.40; 26.09% vs. 25.61% macroadenomas, p=0.96). Operative time was significantly longer for those in whom xeroform was used (270.83 vs. 189.63 min, p=0.00006). Xeroform patients were 18 times as likely to experience a postoperative cerebrospinal fluid (CSF) leak, even after controlling for BMI, DM, tumor size and functionality, cavernous sinus extension, and intraoperative CSF leak (OR=18.025, 95% CI 2.32ΓÇô140.10, p=0.006). These patients were also significantly more likely to experience a postoperative electrolyte imbalance (i.e., syndrome of inappropriate ADH, diabetes insipidus; OR=9.312, 95% CI 2.620ΓÇô33.097, p=0.001).

   **Conclusions:** Patients treated with xeroform were significantly more likely to experience a postoperative CSF leak and electrolyte imbalance. Increased incidence of postoperative CSF leak in these patients may be due to the anti-inflammatory nature of xeroform, thereby hindering the initial healing response around the surgical site.

   Gregory L. Barinsky, PharmD, Newark, NJ; Christina H. Fang, MD, Newark, NJ; Aleena Abdullah, Newark, NJ; Jordon G. Grube, DO, Newark, NJ; Wayne D. Hsueh, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

   **Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss patient characteristics predictive of navigation usage and compare complications between navigation assisted and unassisted endoscopic sinus surgery cases.

   **Objectives:** Computer aided navigation technology is available to assist in endoscopic sinus surgery (ESS) for a variety of indications, including revision surgery, distorted anatomy, and sinonasal malignancy. The objective of this study is to examine patient characteristics predictive of navigation usage and to compare complications between navigation assisted and unassisted ESS cases. **Study Design:** Retrospective review of a surgical database. **Methods:** All ESS procedures performed by an otolaryngologist were extracted from the National Surgical Quality Improvement Program database from 2011-2018 using current procedural terminology (CPT) codes. Cases were stratified using the code for cranial, extradural navigation (61782). Univariate and multivariate regression analyses were performed to assess differences in baseline characteristics and complications between the groups. **Results:** A total of 1,229 cases met inclusion criteria, of which 236 cases (19.2%) used navigation. Cases using navigation were more likely to be inpatient (39.8% vs 20.7%, p<0.001) and less likely to be obese (39.9% vs 49.4%, p=0.012). On multivariate logistic regression, inpatient status predicted navigation use (OR 2.809, p<0.001). There were no significant differences in any medical or surgical complication between the two groups. The mean operative time (159 vs. 124 minutes), work relative value units (wRVUs) (45.22 vs 26.73), and wRVUs/hour (25.60 vs. 20.05) were all significantly greater in the navigation group (all p<0.001). **Conclusions:** Inpatient status was associated with navigation usage in cases of ESS. No differences in short term complication rates between navigation assisted and unassisted ESS were noted.

3. **Predicting Postoperative Outcomes following Transsphenoidal Pituitary Surgery**
   Samer T. Elsamna, BA, Newark, NJ; Christina H. Fang, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Jean Anderson Eloy, MD FAC, Newark, NJ

   **Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize what preoperative factors are associated with the development of common postoperative complications following transsphenoidal pituitary surgery.
Objectives: Transsphenoidal pituitary surgery (TPPS) constitutes nearly a fifth of all intracranial operations for brain neoplasms. Postoperative complications of TPPS warrant close evaluation given their high risk of serious morbidity and mortality. We sought to identify preoperative factors associated with postoperative complications. Study Design: Retrospective study of a national database. Methods: The National Inpatient Sample database was queried for cases of TPPS from 2002-2013. Pre and postoperative variables were identified. Univariate and multivariate logistic regression analyses were performed to obtain odds ratios (OR) with confidence intervals for varying outcomes. The Bonferroni correction was then applied. Results: 16,200 cases were identified. Most patients were female (52.9%) and white (62.2%). Mean age was 50.8 years, ranging from 2-95. The most common complications included diabetes insipidus (DI) (12.9%), cranial nerve palsy (CNP) (2.9%), and cerebrospinal fluid (CSF) leak (2.2%). Mortality was 0.4%. Fluid electrolyte disorder was associated with increased risk of mortality (OR: 7.26, 3.93-13.41), CNP (OR: 2.45, 1.92-3.11), and meningitis (OR: 3.18, 1.52-6.63). Black race was associated with DI (OR: 1.32, 1.14-1.51) and cerebral edema (OR: 2.02, 1.22-3.33). Atrial fibrillation was associated with mortality (OR: 4.02, 1.47-10.98) and cardiac complications (OR: 11.28, 6.56-19.42). Conclusions: Several complications can occur following TPPS, but mortality is uncommon. Several factors were associated with postoperative complications and included fluid electrolyte disorders, Black race, and atrial fibrillation among others.

Omar A. Karadaghy, MD MSCI, Kansas City, KS; Rachel R. Vukas, MLS MA, Kansas City, KS; Jennifer A. Villwock, MD, Kansas City, KS

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the current state of shared decision making in the management of chronic rhinosinusitis. Participants should also be able describe shared decision making and have some understanding of the framework to incorporate either to clinical practice or research design.

Objectives: 1) Review all studies utilizing shared decision making (SDM) in the treatment of chronic rhinosinusitis (CRS); and 2) increase awareness of otolaryngologists to shared decision making providing a framework for its incorporation into research and clinical practice. Study Design: A scoping review conducted in accordance to PRISMA guidelines. Methods: Systematic search was performed in November 2019 using PubMed/Medline1947-, CINAHL Complete 1937-, the Cochrane Library, ClinicalTrials.gov, and Web of Science Core Collection (SCI-EXPANDED, SSCI, A&HCI, ESCI) 1900-. All databases were searched from their inception through the date of search. Studies were eligible if they involved a discussion of SDM in the management of CRS. Studies were excluded if they lacked original patient data or outcomes of interest. Identified studies were screened by title/abstract, followed by full text review. Results: In total, 416 articles met screening criteria. Six were eligible for full text review. Only one study - an expert panel of the framework for the presurgical treatment of CRS - pertained to SDM. While this study mentions that SDM is a critically important piece to optimize care quality, it does not directly investigate the effects of SDM in CRS. Conclusions: This scoping review defines a clear gap in the rhinology literature. Despite the recognized importance of SDM, there have been no interventional studies in the literature to investigate SDM. This review highlights 1) the need for exploring the role of SDM in rhinologic surgery; 2) its potential impact on patient outcomes; and 3) provides a proposed framework for incorporating SDM in research and clinical practice.

5. Trends in Nasal Spray Prescribing Patterns by Otolaryngologists in the US Medicare Population
Celeste S. Kim, BS, Los Angeles, CA; Erica M. Tran, BA, Los Angeles, CA; Kevin Hur, MJD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe recent trends in the prescribing patterns of the most common nasal sprays prescribed by otolaryngologists for Medicare patients.

Objectives: To quantify national and state level prescribing and cost trends for the three most commonly prescribed nasal sprays by otolaryngologists in the Medicare population. Study Design: Cross-sectional study. Methods: Through the Centers for Medicare and Medicaid Services (CMMS) database and the Kaiser Family Foundation, we retrieved data on Medicare enrollment and on claims and costs of fluticasone propionate, azelastine HCl, and ipratropium bromide prescribed by otolaryngologists from January 1, 2013 to December 31, 2017. Results: From 2013 to 2017, CMMS reimbursed $128.8 million for 5.2 million claims of fluticasone, azelastine, and ipratropium prescribed by otolaryngologists. For fluticasone, the number of prescriptions per beneficiary decreased by 6% from 2013 to 2017, and cost per beneficiary decreased by 46%. For azelastine, prescriptions per beneficiary increased by 97%, and cost per beneficiary increased by 9%. For ipratropium, prescriptions per beneficiary increased by 60%, and cost per beneficiary increased by 130%. Additionally, wide variations in prescription rates and cost per beneficiary from 2013-2017 were identified across states. For example, the number of prescriptions per beneficiary varied by state in 2017, from 0.45 in Vermont to 6.00 in Louisiana for fluticasone, 0.04 in Alaska to 2.46 in Louisiana for azelastine, and 0.11 in Vermont to 1.64 in Florida for ipratropium. Conclusions: Otolaryngologists are prescribing azelastine and ipratropium at an increasingly higher rate in the Medicare population, while the rate and cost for fluticasone have been decreasing nationally. Utilization and costs of nasal sprays also vary geographically across the United States.

6. Safety and Outcome of Endoscopic Septoplasty in Children
Educational Objective: At the conclusion of this presentation, the participants should be able to understand the safety and changes in the quality of life of endoscopic septoplasty in children.

Objectives: The timing of pediatric nasal surgery is a controversial topic. On the other hand, pediatric endoscopic surgery is most commonly performed in refractory and complicated sinonasal and skull base pathologies. Data on the safety and outcome of endoscopic septoplasty in pediatric patients have not been formally reported to date. We aimed to evaluate safety, procedure-related complications and changes in the quality of life of endoscopic septoplasty in children. Study Design: Case series. Methods: A retrospective cohort study of pediatric patients who underwent endoscopic septoplasty at a private tertiary center from 2009 to 2019 was conducted. Diagnosis, indication, comorbidities, safety and outcomes of endoscopic septoplasty were investigated. Change in Nasal Obstruction Symptom Evaluation (NOSE) score was analyzed using the Wilcoxon Signed Rank test. Results: A total of 16 patients (mean age at diagnosis: 8 years, IQR: 2; SD: 1.30) who underwent endoscopic septoplasty were eligible for the present study. The mean follow-up was 6 months. There was a statistically significant decrease in NOSE score from preoperative endoscopic septoplasty: median = 75, to postoperative endoscopic septoplasty: median = 20. No mortality, conversion to conventional septoplasty, transoperative or postoperative complications, readmission or reoperation was reported. Conclusions: In addition to significant improvement in NOSE scores, our results suggest that endoscopic septoplasty shows to be a safe surgical procedure in pediatric patients.

7. Skull Base Osteomyelitis Mimicking Nasopharyngeal Carcinoma
Jake Morgan, MD, Birmingham, AL; Chris Gentile, MD, Birmingham, AL; Sherif Helmy, BS, Birmingham, AL; Do-Yeon Cho, MD MS, Birmingham, AL; Brad Woodworth, MD, Birmingham, AL; Jessica Grayson, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize ways in which central skull base osteomyelitis can present clinically and radiographically as nasopharyngeal masses and subsequently be misdiagnosed as nasopharyngeal carcinoma.

Objectives: Skull base osteomyelitis (SBO) is a serious, life-threatening disease that is seen most commonly in the temporal bone as a complication of otitis externa (OE) in diabetic and immunocompromised patients. However, central SBO can be misdiagnosed as nasopharyngeal carcinoma due to similar physical exam and imaging findings. The objective of this study is to highlight clinical presentations of central SBO in patients presenting with nasopharyngeal masses. Study Design: Retrospective case series. Methods: Retrospective evaluation of patients diagnosed with central SBO from 2008 to 2019 was performed. Demographics, risk factors for SBO, clinical presentation, examination findings, imaging, surgical findings, microbiology, and clinical outcomes were collected. Results: Seven patients (avg. age 67, 5 males, 2 females) were referred for suspected nasopharyngeal mass that was later confirmed to have a diagnosis of central SBO. All patients presented with either otalgia or atypical facial pain and were presented at our multidisciplinary tumor board. Predisposing factors included diabetes mellitus (n=6) and chronic otitis media (n=5). The most commonly cultured pathogen was pseudomonas aeruginosa (n=4). Median time to resolution was 7.5 months confirmed with surveillance gallium scans. One patient expired due to other illness prior to resolution of SBO. Conclusions: SBO should be considered in the differential diagnosis of patients presenting with a nasopharyngeal mass and facial/otologic pain, particularly when a history of diabetes or chronic otitis media is present.

8. The Impact of Financial Hardship on Mental Health among U.S. Patients with Sinusitis
Vivek Pandrangi, MD, Portland, OR; Jess C. Mace, MPH, Portland, OR; Mathew Geltzeiler, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of personal financial insecurity on depression and anxiety among patients with sinusitis and understand the burden of financial barriers on access to mental health services and treatment.

Objectives: Recent efforts have examined the development of mental health conditions among sinusitis patients. The purpose of this study was to investigate the association between depression, anxiety, and financial insecurity among patients with sinusitis. Study Design: Cross-sectional study using the 2018 National Health Interview Survey (NHIS). Methods: Data regarding demographics, perceived financial hardship, self-reported depression and anxiety, mental healthcare utilization, and treatment compliance were obtained. Results: Among sinusitis patients (N=28.9 million adults), 6.9% reported depression and 9.4% reported anxiety. Sinusitis patients with depression or anxiety reported an increased severity of financial insecurity (p<0.001). Financial insecurity was associated with the highest odds of depression (odds ratio [OR]=7.53, 95% CI=7.402-7.667, p<0.001) and anxiety (OR=6.45, 95% CI=6.362-6.543, p<0.001), compared to common measures of financial status such as income level, employment, or health insurance status among sinusitis patients. Patients who reported the highest number of financial stressors had the highest odds of depression (OR=12.48, 95% CI=12.260-12.702, p<0.001) and anxiety (OR=9.62, 95% CI=9.481-9.756, p<0.001). Sinusitis patients with financial insecurity were
more likely to require mental health services and treatment (p<0.001), but were also more likely to report reduced access to mental healthcare due to costs (p<0.001) and cost related treatment noncompliance (p<0.001). **Conclusions:** Perceived financial hardship is associated with self-reported depression and anxiety among sinusitis patients. Sinusitis patients with financial hardship also face challenges in accessing mental health services and treatment due to costs. Understanding the burden of financial insecurity on mental health and access to treatment may improve quality of care through screening tools and individualized treatment strategies.

9. **Subjective Olfactory Dysfunction Is Significant in Chronic Rhinosinusitis Patients with Eosinophilic Mucin**
   Lindsey E. Ryan, MD, Augusta, GA; Aykut Unsal, DO, Philadelphia, PA; Matthew Brennan, DO MPH, Philadelphia, PA; Camilo Reyes, MD, Augusta, GA; Paul Biddinger, MD, Augusta, GA; Stilianos Kountakis, MD PhD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the multifactorial causes of hyposmia in patients with CRS. Participants should be able to understand the association between eosinophilic mucin with olfactory dysfunction and postoperative outcomes in eosinophilic CRS patients.

**Objectives:** This study seeks to determine if the presence of eosinophilic mucin (EM) correlates with subjective reported loss of olfaction in patients with eosinophilic chronic rhinosinusitis (eCRS). **Study Design:** Retrospective review of prospectively collected data. **Methods:** Review of patient database compiled at a tertiary referral institution in an academic rhinology practice. Olfactory compromise rated from 0 (none) to 5 (worse) on the Sino-Nasal Outcome Test (SNOT-22) was compared between EM+ and EM- eCRS patients with and without nasal polyposis (eCRSsNP and eCRSsNP), before and after surgery. Olfactory scores were compared preoperatively and postoperatively at 6 and 12 months. **Results:** One hundred ten total patients met inclusion criteria. Forty-nine eCRSsNP and forty eCRSsNP patients were identified. Preoperative subjective olfactory dysfunction was worse in EM+ vs EM- eCRSsNP patients (3.5 vs 1.5, p=0.0492). Both groups demonstrated improvement in olfaction at 6 months postoperatively, but EM+ olfactory dysfunction remained worse than EM- patients (1.5 vs 0.2, p=0.012). At one year postoperatively, there was no significant difference in olfactory dysfunction between EM+ vs EM- eCRSsNP patients. With regard to eCRSsNP patients, there was improvement in subjective olfaction postoperatively, but there was no significant difference in olfaction between EM+ and EM- patients at any pointtime. **Conclusions:** The presence of EM is associated with worse preoperative subjective olfactory scores in the absence of nasal polyposis. Olfactory dysfunction improves following endoscopic sinus surgery. At 12 months postoperatively, there is no significant difference in subjective sense of smell scores between EM- and EM+ patients. Olfactory dysfunction in the background of eCRS remains a troublesome problem and further studies are warranted to understand olfactory outcomes following sinus surgery.

    Jordan R. Salley, BS, Dallas, TX; Callie L. Fort, MS MBA, Lubbock, TX; Joshua C. Demke, MD, Lubbock, TX; Phat Tran, PhD, Lubbock, TX; James C. Wang, MD PhD, Cincinnati, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discern the benefits of essential oils in treating rhinosinusitis.

**Objectives:** To assess use of essential oils (EO) for treatment of rhinosinusitis. **Study Design:** Systematic review. **Methods:** PubMed, Ovid, Cochrane, and Embase computerized searches were performed through October 2019. Two independent reviewers conducted data extraction following a predetermined protocol. This systematic review focused on outcomes of rhinosinusitis patients after EO treatment. **Results:** Four randomized control trials including acute and chronic rhinosinusitis patients (totaling 599 subjects) were identified. Three studies investigated treatment of rhinosinusitis with EOs in capsule form (Myrtol or cineole). One study investigated EO inhalation therapy which was compared to controls receiving nasal saline irrigation and topical glucocorticoids. In the inhalation study, patient reported outcomes utilized the Glasgow Benefit Inventory and Glasgow Health Status Inventory revealing significant improvement in the EO treatment group versus control. The remaining three studies assessed symptoms before and after treatment with cineole or Myrtol compared to placebo or Sinupret. While both groups showed significant improvement, higher efficacy was seen for the cineole treatment group in both studies. One study compared patient reported facial pain and recovery time in patients treated with Myrtol versus Sinupret. Significant decrease in facial pain and slightly faster recovery was seen in the Myrtol group. **Conclusions:** There are a handful of randomized studies examining the effects of EOs for treatment of rhinosinusitis. Patients using EOs reported improvement in symptoms in all of the studies reviewed, though differences in methodology and outcomes measures were found. These improvements were statistically significant in three of four of the studies for EO treatment groups compared with their controls.

11. **Analysis of Anosmia during the Covid-19 Pandemic: Long Term Anosmia Rates by Disease Severity**
    Ryan Darius Tabtabai, MD MPH, Brooklyn, NY; Robert Gurevich, BS, Brooklyn, NY (Presenter); Sam Schild, MD, Brooklyn, NY; Marina Boruk, MD, Brooklyn, NY
Educational Objective: At the conclusion of this presentation, the participants should be able to understand rates of olfactory system disturbance for Covid-19 for inpatient versus outpatient treatment over both an acute and 6 month follow time frame.

Objectives: To identify the incidence of anosmia and dysgeusia in Covid-19 positive patients as well as duration/resolution of symptoms in both an inpatient and outpatient population. 6 month followup data will also be analyzed. Study Design: The study design is a descriptive, cross-sectional survey of Covid-19 positive patients focusing on anosmia and dysgeusia consisting of 2 groups: those admitted to the hospital for treatment and those that required only outpatient treatment.

Methods: The study population includes adult Covid-19 patients admitted to the hospital or seen in the outpatient Covid-19 clinic from March 1, 2020 to present. Patients were contacted via phone and administered a survey through REDCap. The survey consisted of 26 questions regarding symptom onset and clinical course. A smaller, followup survey is then administered over the phone at 6 months followup. Results: A total of 143 patients were surveyed for the inpatient group revealing an anosmia rate of 34.25% and dysgeusia rate of 39.9%. The symptoms prevailed for an average of 8 days with the majority of patients (83%) endorsing at least a partial recovery. 6 month followup data collection and outpatient arm enrollment are ongoing. Conclusions: Anosmia and dysgeusia rates for the inpatient arm of our study appear to be lower than those reported in other, outpatient focused survey studies. New onset deficiencies in taste and smell may then be a useful way to stratify Covid-19 patients and help predict the level of care they may ultimately require.

Franklin Wu, BA, Los Angeles, CA; Alison Yu, MD, Los Angeles, CA; Jee-Hong Kim, MD, Los Angeles, CA; Kevin Hur, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify a unique presentation of chronic rhinosinusitis that presented as a large nasal mass.

Objectives: At the conclusion of this presentation, the participants should be able to identify a unique presentation of chronic rhinosinusitis with nasal polyps that presented as a large nasal mass. Study Design: Case report. Methods: A case of chronic rhinosinusitis with nasal polyps presenting as a large nasal mass will be reported and surgical treatment and pathologic examination will be reviewed. Current literature will also be reviewed. Results: A 79 year old female with a 10 year history of nasal congestion, epistaxis, and epiphora presented to the hospital with acutely worsening nasal congestion and facial pressure. CT scan showed a large, well circumscribed mass within the right nasal cavity extending into the nasal vestibule anteriorly and the nasopharynx posteriorly with no bony erosion or skull base involvement. Initial biopsy of the mass revealed respiratory mucosa with necrotic and inflammatory debris. Endoscopic sinus surgery with septoplasty was performed to remove the mass and repair a deviated septum. After confirming that there was no attachment to the skull base, a 6cm x 5.5cm x 1.5cm nasal mass was excised and removed endoscopically through the right nostril. Final pathology of the mass revealed chronic polyoid sinusitis with cystic dilatation of ducts on histological examination. Conclusions: Chronic rhinosinusitis with nasal polyps can present as a large nasal mass that resembles a nasal tumor causing compressive symptoms. Such growths should be considered when evaluating a mass in the context of chronic rhinosinusitis.

Facial Plastic and Reconstructive

13. Factors Associated with Increased Time to Surgery for Laryngochondroplasty
David W. Chou, MD, Oakland, CA; Christopher G. Tang, G., Tang, MD

Educational Objective: To determine factors associated with increased time to surgery in male to female transgender patients seeking laryngochondroplasty.

Objectives: To determine factors associated with increased time to surgery in male to female transgender patients seeking laryngochondroplasty. Study Design: After IRB approval was obtained, demographic information including age, race, distance travelled, and median zip code income was analyzed to determine if there was a significant difference in wait time to laryngochondroplasty. Methods: From April 2016-April 2020, 209 unique patients received laryngochondroplasty within the author's institution. A retrospective chart review was performed. Results: Patients were on average 33.5 years old, traveled 51.6 miles to the hospital, lived in a zip code with a median income of $77,668, and waited 233.9 days for surgery. Patients older than the median age waited on average 53 more day for laryngochondroplasty (P < 0.022) and patients who lived in a zip code with less than the median income waited on average 66 more days for laryngochondroplasty (P < 0.006). Patients who wanted their laryngochondroplasty in conjunction with facial feminization surgery waited on average 268 more days for surgery (P < 0.0001). Differences in race and distance travelled were nonsignificant. Conclusions: Age, median zip code income, and combining laryngochondroplasty with facial feminization surgery are associated with increased time to surgery for male to female patients seeking laryngochondroplasty while race and distance travelled were not.

14. A Twelve Year Analysis of Facial Fractures among Professional Soccer Players
Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the most common mechanisms and sites of facial fractures suffered in professional soccer as well as understand how differences in injury management influence players’ return to play (RTP).

Objectives: To identify the epidemiology and effects of facial fractures in Major League Soccer (MLS) and the English Premier League (EPL). Study Design: Retrospective analysis. Methods: A total of 42 MLS players and 41 EPL players who sustained facial fractures from 2007-2019 were identified. Data on player demographics, the injury (mechanism/type of facial fracture), and the impact of their injury on return to play (days/games missed, fracture management, post-injury headgear status) was collected. Chi square and Student t-test analyses were performed on the data. Results: On average, player age was 27.3 years, BMI was 23.5 kg/m², and professional experience was 8.29 years at the incidence of injury. The most common mechanism of injury involved an upper extremity (hand, elbow, shoulder) to the head (48.3%), while the most common fractures involved the nose (45.7%) and zygoma (22.8%). Among the 83 players, 77 (92.8%) returned to play (RTP) the same season. MLS players missed 2.19 games and 19.23 days on average prior to RTP, while EPL players missed 1.42 games and 15.48 days on average. Significantly fewer MLS players who sustained a fracture wore headgear upon RTP compared to Premier league players (33.3% vs 80.5%, p<.001). Players who underwent an operation missed significantly more games (3.35 vs 0.895, p<.001) and days (30.5 vs 8.89, p<.001) than those managed non-operatively. Conclusions: Most professional soccer players who sustain facial fractures return the same season, although recovery time and injury management vary. These findings have the potential to aid healthcare providers treating soccer players and to help inform guidelines on player safety.

15. Functional Outcome Measures after Nasal Septal Perforation Repair: A Systematic Review
Maria A. Mavrommatis, BA, New York, NY; Jaclyn Klimczak, MD, New York, NY; Stephen M. Russell, BA, New York, NY; Annie E. Arrighi-Allisan, BA, New York, NY; Emma Spring, New York, NY; Joshua D. Rosenberg, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe how nasal septal perforation repair (NSPR) affects validated functional outcome measures such as nasal obstruction symptom evaluation (NOSE) scores.

Objectives: Multiple surgical techniques have been described for nasal septal perforation repair (NSPR). Although some techniques have high levels of reported success, there is significant heterogeneity among patient outcome measures evaluating the treatment of nasal septal perforations (NSP). In order to better understand treatments for NSP that may yield the greatest clinical benefit, we reviewed NSPR as it relates to functional outcome measures. Study Design: Systematic literature review. Methods: An Embase and Medline search was performed to identify studies measuring functional outcomes after NSPR. Non-English and animal studies were excluded. Results: Of 535 studies identified, 20 were included involving 437 patients (mean age 42.2 years; range 5-79 years). Seven studies utilized validated outcome measures specific to nasal surgery (NOSE and/or SNOT-20). An additional six studies used visual analogue scale (VAS) for obstruction, pain, epistaxis, crusting and whistling. The remaining studies reported on physical changes, including rhinomanometry, mucociliary clearance, humidity/temperature testing, olfaction testing, and computational fluid dynamics. Among the studies using validated outcome measures, statically significant improvements were seen in NOSE scores with a mean pre- and postoperative score of 13.5 and 2.8, respectively (p = 0.05). Mean pre- and postoperative VAS scores were 5.7 and 1.2, respectively (p < 0.005). The majority of studies utilized some form of local nasal mucoperichondrial flap closure resulting in a 75.0% reduction in NOSE scores, on average. Conclusions: Surgical NSPR leads to an improvement in functional outcome measures across a variety of metrics, with mucoperichondrial flaps leading to a statistically significant difference in NOSE and VAS scores.

Cullen M. Taylor, MD, Phoenix, AZ; Stephen F. Bansberg, MD, Phoenix, AZ

Educational Objective: It is estimated that the incidence of nasal septal perforation in the general population is around 1 percent. Factors which may impact perforation symptomatology have not been studied. At the conclusion of this presentation, the participants should be able to describe the implications of perforation symptoms on treatment options.

Objectives: To determine if perforation size, etiology, age, or patient demographics affect perforation symptomatology. Study Design: Case series. Methods: The medical records of patients who presented for evaluation of a septal perforation between October 2018 and November 2019 were reviewed. Patient demographic data and septal perforation measurements were collected. All patients completed the Nasal Obstruction Symptom Evaluation (NOSE) instrument and rated the severity of their symptoms across 7 additional domains using a 5 point Likert scale. The scale ranged from 0 (not a problem) to 4 (most severe problem). Results: Eighty-seven patients were identified across the study period. Patient's
age ranged from 16-79 years (mean, 50). There were 36 males and 51 females. The most common perforation etiologies were determined to be septal surgery (30%), idiopathic (18%), digital trauma (13%), intranasal steroid use (11%), nasal trauma (10%), and cocaine use (5%). Average perforation size for this cohort was 1.2 cm in length by 0.9 cm in height. Mean NOSE score (95% CI) was 53.9 (48.1-59.7). Mean (95% CI, range) symptom scores, on a 5 point Likert scale 0-4, were as follows: crusting 3.0 (2.87-3.13), rhinorrhea 2.2 (2.05-2.35), whistling 2.0 (1.85-2.15), epistaxis 2.0 (1.86-2.14), facial pain 1.6 (1.45-1.75), decreased sense of smell 1.3 (1.15-1.45), and foul odor 1.0 (0.85-1.15). There was not a statistically significant correlation between age, gender, or perforation size with severity of presenting NOSE scores, or overall symptom severity scores. **Conclusions:** This review provides a quantitative baseline measurement of septal perforation symptoms prior to treatment. The incidence of prior septal surgery as a perforation etiology is less than that presented in other studies. The findings of this study improve our understanding of perforations and the potential impact of treatment beyond surgical closure or septal button treatment outcomes.

17. **Haller's Ansa: An Unrecognized Route of Facial Movement after Skull Base Surgery**
   Torin P. Thielhelm, BS, Miami, FL; Christine T. Dinh, MD, Miami, FL; Zoukaa Sargi, MD, Miami, FL; Michael E. Ivan, MD, Miami, FL; Liliana Ein, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize Haller's ansa as an unappreciated anatomical variant that connects the glossopharyngeal and facial nerve. Participants will learn that preservation of the glossopharyngeal nerve during skull base surgery may have important implications for facial tone and mobility in patients with Haller's ansa, and that swallowing assessment as it pertains to facial mobility should be performed pre and postoperatively to determine if this neural communication is present.

**Objectives:** A direct communication between the glossopharyngeal and facial nerves exists in a minority of patients. This communicating branch, known as Haller's ansa, arises from the glossopharyngeal nerve after it exits the jugular foramen. Clinical manifestations of this anastomosis are not commonly observed. We describe postoperative facial movement with swallowing after facial nerve sacrifice in two patients who underwent surgery for skull base tumors. **Study Design:** Case series and literature review. **Methods:** Patient 1, a 23 year old female, underwent skull base surgery for left jugular paraganglioma, requiring facial nerve sacrifice and cable graft (second genu to lower division of the facial nerve). Patient 2, a 49 year old male, received a transcoclear approach for resection of endolymphatic sac tumor and intra temporal facial nerve sacrifice without nerve reconstruction. Both patients had preoperative facial weakness and intraoperative preservation of the glossopharyngeal nerve. A literature review was performed using PubMed and Embase from 1920-2020. **Results:** Postoperatively, both patients demonstrated oral commissure movement with swallowing, suggesting a communication between the glossopharyngeal nerve and the distal facial nerve (Haller's ansa). Patient 2 had a prominent nasolabial fold depth at rest, suggesting that neural communications may contribute to facial tone. Although anatomical references to Haller's ansa exist, there are no reported clinical manifestations of this neural anastomosis. **Conclusions:** Glossopharyngeal facial nerve communications may contribute to facial tone and movement. Pre and postoperative assessment of facial nerve movement with swallowing may help assess for the presence of Haller's ansa. Better understanding of this neural anastomosis may have implications for facial reanimation surgery.

**General**

18. **Retropharyngeal Fluid: To Drain or not to Drain**
   Diala T.H. Almardeeni, MD, Boston, MA; Rohan C. Wijewickrama, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) provide exposure to an infrequently reported clinical condition mimicking retropharyngeal abscess; 2) improve diagnostic acuity in the evaluation of retropharyngeal inflammation; and 3) reduce unnecessary patient morbidity and risk thereby improving clinical outcomes.

**Objectives:** This study provides exposure to an infrequently reported clinical condition mimicking retropharyngeal abscess to help reduce unnecessary patient morbidity and risk through advancement of clinical knowledge. Further, the aim is to improve the diagnostic acuity of all providers in the evaluation of retropharyngeal inflammation to ultimately improve patient care and clinical outcomes. **Study Design:** Case report. **Methods:** Chart review. **Results:** 47 year old female with history of non-insulin dependent diabetes mellitus and childhood tonsillectomy presented to the emergency department with 3 days of constant worsening posterior neck pain and odynophagia. Examination was significant for neck stiffness limiting range of motion while flexible laryngoscopy and complete blood count were unremarkable. Computed tomography (CT) of the neck with contrast revealed calcification anterior to the C1-C2 junction and a 6 x 1.4 x 0.8cm retropharyngeal fluid collection from C2 to C6 without rim enhancement. The patient received intravenous ketorolac with significant improvement and was discharged home following brief hospitalization and followup revealed complete resolution of symptoms. **Conclusions:** Acute longus colli calcific tendinitis (ALCCT) remains an infrequent and potentially underreported diagnosis. While clinical and radiographic presentation may resemble retropharyngeal abscess the treatment of ALCCT unequivocally differs. Recognition of key CT findings remains paramount in differentiating ALCCT from retropharyngeal abscess to avoid unnecessary medical or surgical interventions.
19. Panel Parity in Otolaryngology: Female Representation and Introductions at Annual Conferences
Annie E. Arrighi-Allisan, BA, New York, NY; Katherine L. Garvey, MPH, New York, NY; Anni Wong, MD, New York, NY; Janki Shah, MD, New York, NY; Marita S. Teng, MD, New York, NY; Maura K. Cosetti, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize patterns of professional addresses and female representation at recent American Academy of Otolaryngology - Head and Neck Surgery (AAO-HNS) annual meetings.

Objectives: To examine female representation and forms of address employed at recent American Academy of Otolaryngology - Head and Neck Surgery (AAO-HNS) annual meetings. Study Design: Retrospective review. Methods: Recorded panel presentations from the AAO-HNS annual meeting from 2017 to 2019 were reviewed. Gender and advanced degrees of each moderator and speaker and the presence or absence of professional titles in each introduction were recorded. Chi square test of independence and multivariate logistic regression were performed to detect differences between cohorts and control for confounders.

Results: 1,585 introductions from 469 panels were analyzed, and men comprised 74.75% of all speakers. Male speakers were significantly more likely to be otolaryngologists than female speakers (96.00% vs. 82.87%, p < 0.0001). Female moderators were significantly more likely to utilize professional titles when introducing male otolaryngologists than were male moderators introducing either male or female otolaryngologists (66.14% vs. 52.37%, p < 0.0001; 66.14% vs. 54.40%, p = 0.039). Female and male otolaryngologists were equally likely to be professionally introduced (57.67% vs. 55.76%, p = 0.28). If a panel was moderated by a male, any given speaker on that panel was over twice as likely to be male (OR 2.12, 95% CI 1.63-2.69, p < 0.0001).

Conclusions: Women constitute 20% of all academic otolaryngologists and represented 22.27% of AAO-HNS conference speakers in recent years. However, female panelists were significantly less likely to be otolaryngologists, illuminating a subtle complexity to gender parity in this context. Informality was more prevalent among male moderators, who also more commonly led all male panels. Greater awareness of these patterns in professional addresses and gender composition will hopefully contribute to ever improving gender equity in otolaryngology.

Annie E. Arrighi-Allisan, BA, New York, NY; Katherine L. Garvey, MPH, New York, NY; Aisosa Omorogbe, BS, New York, NY; Peter Filip, MD, New York, NY; Satish Govindaraj, MD, New York, NY; Alfred Marc Iloreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the significant disparities in short term outcomes of Covid-19 inpatients of various ethnicities.

Objectives: To examine the racial and ethnic discrepancies in short term outcomes of Covid positive inpatients. Study Design: Retrospective review. Methods: A database of over 302,000 patients seen for a Covid-19 related visit within a large, multihospital system was analyzed. The first encounter of all inpatients with a positive Covid-19 PCR result were included in the analysis. Demographics and in-hospital short term outcomes were collected. Chi square test of independence and multivariate logistic regression were performed to detect differences between cohorts and control for confounders. Results: 4,911 inpatients with a positive Covid-19 PCR result were included in the analyses. In an unadjusted multivariate model, patients who identified as Black were significantly more likely to experience acute kidney injury (AKI) and acute respiratory distress syndrome (ARDS). When controlling for age, sex, language, zip code, insurance, smoking status, and preexisting comorbidities, Black Covid-19 inpatients were 4.4 times as likely to experience an acute ischemic stroke (AIS, odds ratio 4.443, 95% confidence interval 1.230-16.055, p-value 0.023) and 1.5 times as likely to experience AKI (OR 1.504, 95% CI 1.061-2.134, p-value 0.022) than were white inpatients.

Conclusions: Black Covid-19 inpatients were 344% and 50% more likely to experience an AIS and AKI, respectively, than were white inpatients. Of note, most of these discrepancies in short term outcomes emerged as significant only after controlling for numerous socioeconomic factors, highlighting the disturbing role ethnicity alone appears to play in these devastating outcomes. Significant research into the root of these in-hospital discrepancies, as well as what disparities persist within the long term sequelae of Covid-19, is warranted.

21. The Accuracy of Primary Language Documentation among Patients Undergoing Transsphenoidal Resection of Anterior Skull Base Lesions
Annie E. Arrighi-Allisan, BA, New York, NY; Katherine L. Garvey, MPH, New York, NY; Kevin Wong, MD, New York, NY; Rebecca Kellner, BSE, New York, NY; Satish Govindaraj, MD, New York, NY; Alfred Marc Iloreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the importance of accurately documenting spoken language and the potential ramifications of language incongruence on anterior skull base tumor patients.
Objectives: To determine the accuracy of documented language preferences for patients undergoing anterior skull base surgery and quantify the impact of these discrepancies on hospital length of stay (LOS) and readmissions. Study Design: Retrospective chart review. Methods: All patients with anterior skull base tumors excised via a transsphenoidal approach at one urban, tertiary care referral center between 2013-2019 were reviewed. Each patient's chart was queried for "translator", "interpreter", and the 22 most commonly spoken languages within our state. A patient's chart was classified as possessing a language discrepancy if the "primary language" listed in the demographics portion of their medical record was incongruous with documented interpreter use. LOS was considered prolonged if it was greater than the 75th percentile. Z-score of two populations was utilized to detect differences between groups. Results: Among 297 patients, 77.8% were documented as speaking English, and 8 languages were formally listed. When using interpreter utilization to ascertain spoken language, 14 distinct languages were detected. Non-English speaking patients possessed a 60.61% likelihood of having an incorrectly documented primary language. Patients with incorrectly documented language more commonly experienced prolonged LOS (42.86% vs. 22.12%, p=0.04) and 30 day readmissions (42.86% vs. 20.54%, p=0.03). Conclusions: Our results highlight a profound lack of accuracy in documentation of patients' primary languages, a discrepancy found to be associated with prolonged LOS and readmission. Initial encounters with clinical staff speaking an incorrect language may exacerbate minority stress, weaken patient provider rapport, and contribute to poorer postoperative outcomes. Further studies are needed to elucidate the precise factors contributing to these differences.

22. Access to Otolaryngologic Telemedicine Care during the Covid-19 Pandemic at an Urban Tertiary Hospital System
Sarita S. Ballakur, BA, New York, NY; Katerina Andreadis, MS, New York, NY; Anais Rameau, MD MPhil, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe demographic and socioeconomic characteristics of urban patients accessing otolaryngologic care via telehealth during the Covid-19 pandemic, and to discuss disparities produced from rapid deployment of exclusively telemedicine based otolaryngologic care in this setting as compared to conventional practice.

Objectives: Little is known about the effects of rapid telehealth deployment on healthcare disparities among otolaryngologic patients in the urban setting. During the height of the Covid-19 pandemic in our city, all non-emergent otolaryngologic care at our institution was exclusively conducted through telehealth. This provided opportunity to study demographic and socioeconomic characteristics of patients using telehealth services, compare it to those of a conventional in-person practice, and identify potential barriers to access. Study Design: Single center, retrospective cohort comparison. Methods: A chart review was undertaken of otolaryngology practice appointments from 03/17/2019 - 05/11/2019 (in-person) and 03/17/2020 - 05/11/2020 (telemedicine). Patient demographic and socioeconomic data including age, sex, zip code, self-identified race, insurance type, and primary language were collected for each cohort. Household income was estimated from zip code using US Census information. Statistical analysis was performed using chi squared tests, Wilcoxon signed rank tests and logistic regression modeling. Results: 12,294 otolaryngology clinic appointments were analyzed (2019: n=11,162, 2020: n=1132). Despite a significant decrease in outpatient visits (p=0.0117), the distribution of appointments by subspecialty did not change. Significant differences were observed in the 2020 cohort compared to 2019 in terms of younger age (p<0.0001), decreased racial diversity (df=5, p=0.027), decreased income (p=0.0012), and more commercial insurance (df=6, p<0.001). Our logistic regression analysis revealed female sex (OR 1.13, p=0.048) to be positively associated with telemedicine usage while noncommercial insurance possession (OR=0.82, p<0.001) was negatively associated. Conclusions: Rapidly shifting to an exclusively telehealth based otolaryngologic outpatient practice was associated with significant differences in patient demographic and socioeconomic characteristics, reflecting possible barriers to care.

23. Clinical Applications of Remote Telesurgery: A Systematic Review
Patrick J. Barba, BA, La Jolla, CA; Joshua A. Stramiello, MD, San Diego, CA; Emily Funk, MD, San Diego, CA; Ryan K. Orosco, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the current applications of telesurgery in humans and identify the limitations of its widespread adoption.

Objectives: This systematic review explores the clinical application of remote robotic surgery where the primary surgeon operates at a distance from the patient site and seeks to identify barriers to its widespread adoption. Study Design: Systematic review. Methods: In collaboration with institutional librarians, PubMed, Web of Science, Embase, Compendex and Inspec were queried on September 25, 2020 using the key words "telesurgery", "remote robotic surgery", "remote surgery", and "distance". A 2 person research team screened the results in accordance with the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) guidelines. Results: 2,339 reports were identified, and 8 articles were selected based on inclusion and exclusion criteria. Current clinical applications span multiple specialties including transoral microsurgery, with a strong focus on minimally invasive procedures. Sample sizes in the reported articles are limited, with a range of 1-22 patients. Latency in telecommunications remains a significant limiting factor in the broad
acceptance of remote telesurgery. Connectivity ranged from wired connections in early cases to 5G networks in recent years, while reported time delay varied from 0-280 milliseconds. **Conclusions:** Remote telesurgery, though first pioneered nearly two decades ago, remains in early development. There is great potential in the clinical applications of remote telesurgery to increase access to care. With recent technological advances in connectivity and subsequent reduced time delays, there appears to be a new conduit for investigation in otolaryngology.

24. **Man's Best Friend? A Retrospective Review of Dog Bites During the Covid-19 Pandemic**
Andrew Jay Bowen, MD MS, Rochester, MN; Joseph N. El-Badaoui, MD, Rochester, MN; Alyssa Jane Smith, MD, Rochester, MN; Shelagh A. Cofer, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the need to inform the public of a health precaution relevant in the era of stay at home orders during a worldwide pandemic.

**Objectives:** During the Covid-19 pandemic, we observed an increase in the frequency of injuries sustained to the head and neck by dogs. This study analyzed whether there was an increase in the frequency of dog bites treated at a tertiary care center during a statewide emergency stay at home order. **Study Design:** Retrospective review. **Methods:** This study was a chart review across a tertiary care center's clinical enterprise evaluating patients who suffered a dog bite to the head and neck, from March 13th to May 27th, coinciding with a statewide stay at home order. An adjusted Poisson regression model comparing the number of dog bites in 2020 to the same time period over the preceding five years was performed. Injury location, severity (modified Lackmann classification), need for surgical repair, and any complications were recorded. **Results:** There were 63 patients evaluated for dog bite during the stay at home order. This was significantly higher than the number of bites sustained during the same time period each year from 2015-2019 (37, 47, 40, 34, and 53 respectively; adjusted p = 0.02). 68% of bites in 2020 were sustained in patients less than 18 years of age, although this was similar to prior years. **Conclusions:** We report a confirmed increase in the observed number of dog bites to the head and neck during a time when the majority of Americans were at home. We hypothesize this increase arises from increased canine/human interaction time. The general public should be made aware that their canine companions at home may need alone time of their own.

25. **Utilization of Disposable Laryngoscopes on an Inpatient Otorhinolaryngology Consulting Service**
Andrew Jay Bowen, MD MS, Rochester, MN; Wanda Lai Fussell, MD, Rochester, MN; Andrew J. Goates, MD, Rochester, MN; Robert James Macielak, MD, Rochester, MN; Ryan Alexander McMillan, MD, Rochester, MN; Garrett W. Choby, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the benefits of disposable video assisted laryngoscopes in today's cost conscious and pandemic focused medical environment.

**Objectives:** Flexible fiberoptic laryngoscopy is a vital service that otorhinolaryngology consulting services provide at medical centers. Given issues with cost, sterilization techniques, and the COVID-19 pandemic, this study aims to evaluate the efficiency and effectiveness of disposable video monitor assisted flexible laryngoscopes (DVAFL) compared to standard reusable flexible laryngoscopes (SRFL) during completion of inpatient consults. **Study Design:** Prospective double arm trial. **Methods:** A 12 week prospective trial with weekly alternation between DVAFL and SRFL is currently ongoing. Residents were surveyed on various topics utilizing a Likert scaled survey to quantify their experience with both scoping systems at the beginning and midpoint of the trial as well as after each examination. Additionally, patients completed Likert scaled surveys evaluating exam discomfort and comprehension of examination findings and treatment recommendations after each examination. **Results:** Resident surveys demonstrated preference for DVAFL compared to SRFL in all evaluated aspects of care (Wilcoxon rank sum; p < 0.05). Resident surveys completed after each scope examination showed the DVAFL to provide comparable imaging quality and improved ease of use compared to SRFL (Wilcoxon rank sum; p < 0.05). Patients indicated that the video monitor accompanying the DVAFL improved their understanding of their illness and the rationale for treatment recommendations compared to SRFL (Wilcoxon rank sum; p > 0.05). **Conclusions:** DVFAL appears to provide comparable image quality to SRFL. In addition, these data suggest an improved resident and patient experience with DVAFL compared to SRFL.

Avery A. Bryan, BS, Shreveport, LA; Hrishikesh Samant, MD, Shreveport, LA; Ameya Asarkar, MD, Shreveport, LA; Cherie-Ann Nathan, MD, Shreveport, LA; Alok Khandelwal, PhD, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the incidence of cutaneous manifestations in Covid-19 positive patients in a majority African American population.

**Objectives:** The USA is currently leading in both confirmed cases and deaths for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2, Covid-19). Recently, 0.8% in a Chinese Covid-19 positive cohort and 20.4% of patients in the
Italian Covid-19 positive cohort developed cutaneous abnormalities. Cutaneous abnormalities due to Covid-19 are not well documented or discussed and there is a critical need to investigate if cutaneous manifestation have any clinical value. **Study Design:** An IRB approved retrospective study was conducted comprising of Covid-19 positive patients that were either hospitalized or were outpatient between March 17, 2020 and June 16, 2020. **Methods:** Covid-19 positivity was confirmed via nasopharyngeal swab and standard PCR testing. Cutaneous manifestations were determined on the basis of clinical notes, description in medical charts and using billing ICD code for skin rashes. **Results:** Of 1,086 Covid-19 patients investigated, 871 and 130 were African American (AA) and Caucasian, respectively. Interestingly, only 10 patents exhibited probable Covid-19 induced cutaneous abnormalities. 6 out of 871 (0.01%) AA and 4 out of 130 (0.03%) Caucasians exhibited Covid-19 induced dermatological abnormalities including pruritic or erythematous rash and hypopigmentation in the face, upper chest, abdomen, trunk areas. Our data is consistent with the Chinese cohort study identifying a smaller percentage of cutaneous manifestation in Covid-19 patients. **Conclusions:** Our data provides evidence that cutaneous manifestations of Covid-19, especially in African American patients, are rare and there is need to establish and document more cases to establish a cause and effect for Covid-19 induced skin manifestations.

27. **Covid-19: Otolaryngologic Manifestations**

Jonathan S. Choi, MD, Houston, TX; Alyssa Claire Chapel, BS, Houston, TX (Presenter); Mas Takashima, MD, Houston, TX; Mary T. Bowden, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to accurately identify common otolaryngologic manifestations of Covid-19.

**Objectives:** To investigate the evolving prevalence of otolaryngologic symptoms in patients with laboratory confirmed Covid-19. **Study Design:** Retrospective case control series. **Methods:** A retrospective review of patients who underwent testing for Covid-19 at an otolaryngology clinic was conducted from March 2020 to August 2020 to identify subjects with laboratory confirmed Covid-19. Sociodemographic factors, exposure information, travel history, clinical symptoms (including otolaryngologic symptoms), and comorbidities were analyzed for each subject. They were compared with 692 patients with similar demographics who were seen at the same otolaryngology clinic but tested negative for Covid-19 (control group). Logistic regression model and chi square test were used for analysis. Significance was set at P <= 0.05. **Results:** A total of 790 patients underwent testing for Covid-19. 88 patients were diagnosed with Covid-19 and analyzed. Nasal congestion (32.95%) and anosmia (28.4%) were the most common Covid-19-related otolaryngologic symptoms. Gustatory dysfunction was reported in 19 patients (21.6%). Anosmia (p < .01), ageusia (p < .01), fever (p < .001) and cough (p = .042) were significantly associated with Covid-19 infection. The odds ratio of a positive Covid-19 test among patients presenting with anosmia is 7.43. **Conclusions:** Patients with Covid-19 commonly have olfactory and gustatory dysfunctions. Clinical suspicion for Covid-19 should be heightened when evaluating patients with sudden anosmia or ageusia during the epidemic period of Covid-19.

28. **Correlation between Intolerance of Uncertainty and Postop Decisional Regret in Otolaryngology Patients**

Chelsea Cleveland, BS, Buffalo, NY; Shari Steinman, PhD, Morgantown, WV; Tyler Wanstreet, BS, Morgantown, WV; Sarah Callaham, BS, Morgantown, WV; Michele M. Carr, DDS MD PhD, Buffalo, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the relationship between intolerance of uncertainty, a cognitive bias, and postop decisional regret.

**Objectives:** To determine if intolerance of uncertainty, depression, anxiety, worry, or stress are related to postop regret in otolaryngology patients. **Study Design:** Survey study. **Methods:** Adult patients or parents giving consent for pediatric patients meeting criteria for otolaryngological surgery were recruited and completed the Intolerance of Uncertainty Scale (IUS-12), Penn State Worry Questionnaire (PSWQ), and Depression, Anxiety and Stress Scale-21 (DASS-21) preop and the Decisional Regret (DR) scale 1month postop. Pearson correlations between the scales were calculated. **Results:** The cohort included 109 patients, 73 (67%) males and 36 (33.3%) females. 43 (39.5%) were college graduates and 66 (60.9%) were not. Mean IUS-12 score was 22.9 (95% CI 21.0-24.8), mean PSWQ score was 46.9 (95% CI 44.5-49.3), DASS-21 mean score was 11.9 (95% CI 9.6-14.3). Mean DR score was 11.1 (95% CI 8.6-13.6). IUS-12 subscales Prospective Anxiety mean score was 14.2 (95% CI 12.8-15.5) and Inhibitory Anxiety mean score was 16.5 (95% CI 14.5-18.6). Pearson correlation coefficients for total IUS was 0.188 (p=.027) and for the Prospective Anxiety subscale score was 0.174 (p=.037). Correlations with PSWQ and DASS-21 scores and DR were not statistically significant. **Conclusions:** Intolerance of uncertainty is a cognitive bias that is associated with postop DR. More work is needed to determine whether screening for IU and behavior modification directed at IU for those with high levels would improve postop decisional regret.

29. **Current Landscape of Clinical Trials in Head and Neck Fluorescence Guided Surgery: A Systematic Review**
Educational Objective: To describe the current landscape of development and integration of fluorescence guided surgery contrast agents into the field of otolaryngology - head & neck surgery.

Objectives: Fluorescence guided surgery (FGS) is a rapidly developing intraoperative visualization modality with increasing application in the field of otolaryngology - head & neck surgery. Nonspecific and targeted fluorophores alike are under investigation for their utility in improving tumor margin detection during oncologic surgery, detecting sentinel lymph nodes, and identifying normal structures including nerves. Study Design: Systematic review. Methods: Study search was performed on clinicaltrials.gov according to the PRISMA workflow. Search terms included permutations of "fluorescence", "malignancy", "surgery", and "nerve" to identify all relevant studies. Studies that were active, enrolling, or soon to be enrolling patients undergoing head and neck surgery were included. Results: Eighteen studies were eligible for inclusion. Sixteen of the 18 ongoing studies (88%) target cancer resection, positive margin detection, and sentinel lymph node biopsy (SLNB). Contrast agents under development are conjugated to fluorophores that excite in the 800nm range (ICG), 410nm range (5-ALA), 700nm range (Cy5.5) and 525nm range (fluorescein derivatives). Antibodies are frequently used for tumor targeting and IRDye800CW is the most widely studied fluorophore, commonly linked to antibodies and small molecules such as panitumumab and olaparib. Conclusions: Presently, there are eighteen ongoing trials investigating six contrast agents for their safety, efficacy, and utility in head and neck surgery. These agents rely on unique fluorophores and absorption ranges in the near infrared and visible light spectra. Eighty-eight percent of studies are targeted at oncologic resection and SLNB. Fluorescence guided surgery is a rapidly expanding discipline within otolaryngology and oncologic surgery in general with applications that have significant potential to fundamentally change the field.

30. Safety and Efficacy of Upper Airway Stimulation for Obstructive Sleep Apnea in a Community Hospital
John Dewey, BS, Kalamazoo, MI; Adithya Reddy, BS, Kalamazoo, MI; Aaron Zebolsky, MS, Kalamazoo, MI; Corbin Sullivan, MD, Kalamazoo, MI; Leslie Steven Szeles, MD, Kalamazoo, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the short term outcomes of upper airway stimulation in community hospitals and understand the potential impact this has on obstructive sleep apnea management.

Objectives: The vast majority of research on upper airway stimulation (UAS) for moderate to severe obstructive sleep apnea (OSA) comes from academic centers and clinical trials. This study evaluates UAS performed at a general otolaryngology practice within a community hospital. Study Design: Case series of consecutive patients. Methods: After IRB approval, all patients undergoing UAS surgery from January 2017 to July 2020 were reviewed. Primary outcomes were technical failures, complications, and other adverse events. Secondary outcomes were the change in preoperative to postoperative apnea-hypopnea index (AHI), oxygen desaturation index (ODI), and Epworth Sleepiness Scale (ESS) scores. Results: 67 patients underwent UAS with a mean age of 56.7 (standard deviation [SD]: 12.3), body mass index of 28.8 (SD: 3.3), and Charlson comorbidity index of 2.4 (SD: 2.6). There were no technical failures or reinterventions for device complications. Only one (1.5%) patient experienced a surgical site infection which resolved with antibiotic therapy. Postoperative polysomnograms after device activation were available for 13 patients. There was a significant improvement in mean postoperative AHI (32.8 to 14.7; p < 0.001) and ODI (32.4 to 12.1; p=0.001) at a mean followup of 4.3 months. Mean ESS improved from 9.8 to 6.2 (p=0.007) after surgery. Conclusions: When performed by an adequately trained general otolaryngologist, UAS is a safe and effective approach for patients with moderate to severe OSA presenting to community hospitals. This warrants further investigation of long term outcomes to assess the durability of UAS in this population.

31. Comparing Postoperative Parathyroidectomy Outcomes between Otolaryngologists and General Surgeons
Samer T. Elsamna, BA, Newark, NJ; Omar Elkattawy, BA, Newark, NJ; Boris Pashkov, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discern the potential differences in outcomes of parathyroidectomies between otolaryngologists and general surgeons.

Objectives: Parathyroidectomy in the context of hyperparathyroidism due to a parathyroid adenoma is traditionally performed by a general surgeon. However, otolaryngologists are also able to and do perform this procedure as the parathyroid is located in the head and neck region. We therefore sought to assess whether there are any differences in patient outcomes in parathyroidectomies performed by otolaryngologists and general surgeons. Study Design: Retrospective study of a national outcomes based surgical database. Methods: Cases of parathyroidectomy following diagnosis of parathyroid adenoma from 2005-2015 were obtained from The National Surgical Quality Improvement Program using CPT and ICD-9 codes. Patient demographics and comorbidities were assessed. A propensity score match was
employed to create comparable surgeon cohorts. Postoperative outcomes were then assessed between the two using chi square analysis and logistic regression. **Results:** 25,204 cases were identified. Most cases were >60 years old (52.6%), white (67.1%), and female (76.8%). Otolaryngologists performed less cases than general surgeons (9.0% vs 91.0%). Patients in the otolaryngology cohort were more likely to be older (55.7% vs 52.3%, p<0.001), obese (42.9% vs 40.2%, p=0.014), American Society of Anesthesiologists class 3 or 4 (41.8% vs 34.5%, p<0.001), dependent functional status (0.9 vs 0.2%, p<0.001), and in acute renal failure (0.4% vs 0.1%, p 0.05). **Conclusions:** Otolaryngologists perform less parathyroidectomies and operate on older, sicker patients. There were no discernible differences in major outcomes between the two surgeon cohorts.

32. **Outpatient Thyroidectomy: Expanded Indications for Same Day Discharge**
Ethan Frank, MD, Loma Linda, CA; Jaimie Park, BA, Loma Linda, CA (Presenter); Lauran Evans, MD MPH, Los Angeles, CA; Kristelle Imperio-Lagabon, BS, Loma Linda, CA; Joshua Park, MD, Loma Linda, CA; Traci Bailey, MD, Indianapolis, IN; Alfred Simental, MD MBA, Loma Linda, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the benefits of applying our protocol to stratify patients by risk of post-thyroidectomy hypocalcemia and determine safety for same day discharge as well as need for calcium and calcitriol supplementation.

**Objectives:** To evaluate safety and outcomes of expanding one hour postoperative parathyroid hormone (PTH) based criteria for same day discharge following total or completion thyroidectomy from PTH ≥ 15 pg/mL to ≥ 10 pg/mL. **Study Design:** Retrospective cohort. **Methods:** Retrospective review of 1033 consecutive patients who underwent total or completion thyroidectomy at a single institution between July 2003 and December 2018. Patients were analyzed in three groups. Group A consisted of patients treated prior to implementation of a PTH based protocol, group B consisted of patients managed using one hour postoperative PTH cutoff of 15 pg/mL for same day discharge, and group C consisted of patients managed using the new PTH cutoff of 10 pg/mL for same day discharge. Some patients in groups B and C were given supplemental calcium carbonate and calcitriol; the doses were dependent on PTH. **Results:** Groups A (n=168), B (n=798), and C (n=61) showed statistically significant differences in percentage of patients requiring overnight stay and length of hospitalization. However, these differences were not realized when analyzed as groups A & B vs. C, or as group C alone vs. group A or group B. The number of patients presenting with postoperative symptomatic hypocalcemia was 24/168 (14.3%) in group A, 101/798 (12.7%) in group B, and 8/69 (13.1%) in group C (p= 0.936). The number of patients returning to the emergency department for hypocalcemia or developing permanent hypocalcemia was zero to three in each group. **Conclusions:** Patients with one hour postoperative parathyroid hormone ≥ 10 pg/mL can be safely discharged on oral calcium supplementation on the day of surgery without increased risk of symptomatic postoperative hypocalcemia and with decreased utilization of hospital resources.

33. **Does Presence of Treatment Emergent Central Sleep Apnea Related to Positive Pressure Predict Development to that Associated with INSPIRE Device Usage?**
Scott D. Hirsch, MD, Aurora, CO; Gabriela Heslop, MD, Aurora, CO; Katherine K. Green, MD MS, Aurora, CO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how the presence of treatment emergent central sleep apnea related to positive pressure can predict the future development of INSPIRE related treatment emergent central sleep apnea.

**Objectives:** Treatment emergent central sleep apnea (TE-CSA) is the development or persistence of central apneas and hypopneas with resolution of obstructive events. Our study sought to determine the incidence of TE-CSA with INSPIRE usage in patients with a previous diagnosis of TE-CSA related to continuous positive airway pressure (CPAP). **Study Design:** Retrospective chart review. **Methods:** A retrospective review was conducted on 57 adult patients who underwent INSPIRE device placement from January 2017 to January 2020. Inclusion criteria included subjects with pre-implant polysomnography and post-implant titration polysomnography. **Results:** Thirteen (23.6%) subjects had TE-CSA with 2 (15.38%) developing TE-CSA after INSPIRE device implantation. There was no difference between those who developed INSPIRE TE-CSA when comparing age, body mass index (BMI) or gender. However, patients who developed INSPIRE TE-CSA had higher pre-implant central apnecic index (pre-CAI) than those that did not (3.29 versus 1.15; p=0.027). No difference in pre-CAI existed for subjects who developed continuous positive airway pressure (CPAP) TE-CSA (1.34 versus 1.2; p=0.862). **Conclusions:** It does not appear that a history of TE-CSA with CPAP predisposes patients to development of TE-CSA with INSPIRE device usage. However, patients with a higher predominance of pre-implant central events were more likely to develop TE-CSA with INSPIRE device usage.

34. **Surgical Exposure and Competence in Performing Open Tracheostomy: A Trainees Self-Perception Questionnaire**
Hala M. Ali Kanawi, Jeddah, Saudi Arabia; Faisal Zawawi, MD MSc FRCSC, Jeddah, Saudi Arabia; Hanin Abdulrahman Alamoudi, Jeddah, Saudi Arabia; Shahad Zuhair Munshi, Jeddah, Saudi Arabia; Shahad Turki Almatrafi, Jeddah, Saudi Arabia; Yousef I. Marzouk, MBBS, Jeddah, Saudi Arabia
Educational Objective: At the conclusion of this presentation the participants should be able to understand the impact of practice changes on residents' training on routine procedures such as tracheostomy. This paper highlights the reduced level of confidence of trainees in performing tracheostomy. This is likely a multifactorial issue that requires changing on how we teach and train residents on tracheostomy surgery.

Objectives: The aim of this study is to highlight the OHNS trainees' perception of their surgical exposure and competency in performing OT. Study Design: Observational cross-sectional multicenter study. Methods: This is an observational cross-sectional multicenter study conducted from June 2019-February 2020 among multiple hospitals. Otolaryngology-head and neck surgery residents (OHNS) trainees were approached and asked to participate in a questionnaire about their self-belief and confidence in performing open tracheostomy (OT). Main outcome measures: the self-reported perception of confidence in clinical knowledge and surgical competence in performing OT through a validated and peer reviewed and published subjective themed questionnaire consisting of 22 items was used. Results: The response rate was 54% (which represents n= 67 out of 125). There were 35 juniors (52.2%) and 32 seniors (47.8%). Thirty (44.8%) residents estimated that there are ≤ 50 tracheostomies/year in their hospital. The trainee’s confidence in performing OT when they first started the residency program was poor, and as they progressed in their residency, their confidence level increased. Only 6% of the residents reported scheduled teaching regarding OT, and only one-third (34.3%) were actually aware of the different types of cannulas and postoperative care. Conclusions: The reason behind the lower confidence of trainees is likely multifactorial and requires restructuring of the training program to improve the confidence of graduating trainees.

35. Impact of Covid-19 Pandemic on Access to Surgery in a Large, Integrated, Community Based Health System
Katherine Keefe, MD, Salt Lake City, UT; Brandon Hiatt, HSD, Salt Lake City, UT; Andrew Knighton, PhD CPA, Salt Lake City, UT; Eric Coon, MD, Salt Lake City, UT; Rajendu Srivastava, MD MPH FRCP, Salt Lake City, UT; Jeremy Meier, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the impact of the Covid-19 pandemic on otolaryngology surgical volume and identify the percentage of patients with postponed operations early in the Covid-19 pandemic who have not yet undergone surgery.

Objectives: Evaluate the impact of the Covid-19 pandemic on surgical volume and identify surgical patients postponed that have not yet undergone surgery. Study Design: Retrospective case series. Methods: Within a 24 hospital healthcare system, surgical access was limited from March-June due to the pandemic. Case volume for common otolaryngology procedures was compared from 3/1/20-6/30/20 to 3/1/19-6/30/19. Patients scheduled for surgery but then postponed due to the pandemic were identified to determine if or when the postponed operation occurred. Results: Otolaryngology procedure volume decreased by 54.6% from 3/1/19-6/30/19 to 3/1/20-6/30/20 (4452 to 2020) with the most significant decrease in tympanostomy tubes (1604 to 593 (63.0%)}. There were 808 patients scheduled for an otolaryngology operation that were postponed and 37% have not yet undergone the procedure. More postponed pediatric patients have completed surgery (67%) compared to adults (58%) (p<0.001). Likelihood of rescheduling between different postponed surgical procedures did not vary among children (p=0.05), but did in adults (p<0.001), with thyroidectomy rescheduled the most (77%). Overall, mean delay for those patients postponed but ultimately receiving surgery was 52 days (SD ± 48) with no significant differences between different procedures (p=0.75) or between pediatric and adult patients (p=0.32). Conclusions: Surgical volumes significantly decreased early in the pandemic compared to historical volumes. Many patients with scheduled operations that were postponed have not yet rescheduled. This unique cohort allows us to study vulnerable patients harmed by delays and limited access, as well as investigate patients that could potentially wait and safely avoid surgical intervention.

36. Health Literacy: Otolaryngology Patients Reading between the Lines
Garren M.I. Low, MD MS, Houston, TX; Shaina W. Gong, BS, Houston, TX; Joshua S. Smith, MD, St. Louis, MO; Ibrahim Alava, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the concept of health literacy, how it applies to otolaryngology patients, and which patients are at risk for having poor health literacy.

Objectives: For our ORL-HNS clinic population, we sought to assess sociodemographic risk factors for inadequate HL and improve HL through means of a one time educational intervention. Study Design: Prospective nonrandomized controlled trial. Methods: A prospective cohort study was conducted on English speaking patients who presented to either a private or safety net ORL-HNS clinic. The Short Test Of Functional Health Literacy in Adults (S-TOFHLA) was administered to all patients in the clinic. Using a HL toolkit provided by the Agency for Healthcare Research and Quality (AHRQ), we created a handout to help improve communication between patients and healthcare practitioners. Results: One hundred seventy-seven ORL-HNS patients were included in the study. Of this cohort, twenty patients (11.3%) had marginal or inadequate HL. There was no significant difference between initial and 1 year followup S-TOFHLA scores in the control group (Z=-1.10)
or the intervention group (Z=-.88, p=.38). Inadequate HL was more associated with presentation at our safety net clinic (p<.001). There was a significant difference in S-TOFHLA scores between the subspecialties. Most patients with inadequate HL were found in the general ORL-HNS and head and neck cancer (HNC) patient populations (p=.006). There were 6 (20.7%) of 29 HNC patients and 8 (20%) of the 40 general otolaryngology patients that were found to have inadequate HL. **Conclusions:** Existing literature has shown that patients with poor health literacy have poorer global health outcomes. Our data show that there is an unmet need for evaluation and acknowledgement of HL disparities in the ORL-HNS clinic, which may be greater in the safety net clinic and when treating patients with HNC.

37. **Professionalism in Otolaryngology Residencies You Know It When You See It…Or Do You?**
Keith Myers, BS, Philadelphia, PA; Larry Laufman, EdD, Houston, TX; Anna Messner, MD, Houston, TX; Ellen M. Friedman, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify successful aspects in the current assessment of professionalism and areas for additional research and development in this assessment.

**Objectives:** To describe program directors (PDs) experience with the Milestone Project and the Core Competency Committee (CCC) to improve the assessment of otolaryngology residents' professionalism. **Study Design:** Online and telephone survey. **Methods:** We contacted all OHNS PDs (N=122), to complete a 16-question survey. **Results:** Sixty-four PDs (52.5%) responded. Many (44.4%) indicated no specific concerns about these assessments. However, 29.6% reported general concerns about the vague definition of professionalism, lack of unified assessment formats or standards, and the subjectivity. Almost all PDs report enough time (98.3%) and exposure (96.7%) with residents for valid assessments. In response to the concern about the subjectivity, many PDs have broadened input beyond the attending faculty and allow evaluators with inadequate exposure to opt out of the process. Most PDs (59.5%) reported the CCC improved the process, however, 40.5% were unsure or disagreed. Although professionalism concerns were infrequent, the range uncovers the broad variety of behaviors considered within professionalism: communication issues or not working well with others (44.2%); and administrative responsibility lapses, e.g., untimely completion of records, inattention to detail, tardiness or dress code violations (17.3%). **Conclusions:** Most PDs (59.5%) reported the ACGME Milestone Project improved the assessment of professionalism within otolaryngology residency programs, however, 40.5% were not sure or disagreed. This project identifies two process concerns requiring additional improvement: the lack of a specific definition of expected professional behavior and degree of subjectivity.

38. **Telemedicine and Otolaryngology in the Covid-19 Era: An Analysis of Practice Patterns**
Brandon Khoa Nguyen, MD, Newark, NJ; Hafiah Z. Eltahir, DO, Newark, NJ; Gregory L. Barinsky, PharmD, Newark, NJ; Yu-Lan M. Ying, MD, Newark, NJ; Wayne D. Hsueh, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the impact the Covid-19 pandemic has had on an institution's outpatient visits as well as the expansion and inclusion of telemedicine.

**Objectives:** The global Coronavirus disease 2019 (Covid-19) pandemic has resulted in an expansion of telemedicine. The purpose of this study is to present our experience with outpatient telemedicine visits within a single institution's department of otolaryngology during the Covid-19 era. **Study Design:** Retrospective chart review. **Methods:** This was a single institution study conducted within the department of otolaryngology at an urban tertiary care center. Data on outpatient visits was obtained from billing and scheduling records from January 6 to May 28, 2020. Visits were divided into "pre-shutdown" and "post-shutdown" based on our state's March 23, 2020 Covid-19 shutdown date. **Results:** A total of 3,447 of 4,340 (79.4%) scheduled visits were completed in the pre-shutdown period as compared to 1,451 of 1,713 (84.7%) in the post-shutdown period. The proportion of telemedicine visits increased from 0.7% to 81.2% (p<0.001). Overall visit completion rate increased following the shutdown (80.2% vs 84.7%, p<0.001). Subspecialties with an increase in visit completion rate were general (88.0% vs 76.9%, p=0.002), otology (87.2% vs. 77.4%, p=0.001), and rhinology (86.2% vs. 80.0%, p=0.003). Older age was associated with decreased appointment cancellation pre-shutdown (OR 0.994 [0.991-0.997], p<0.001) but increased appointment cancellation post-shutdown (OR 1.008 [1.001-1.014], p=0.015). Mean Covid-19 risk scores were unchanged between the groups (p=0.654). **Conclusions:** Covid-19 has led to major changes in outpatient practice, with a significant shift from in-person to telemedicine visits following the mandatory shutdown. An associated increase in appointment completion rates was observed, reflecting a promising viable alternative to meet patient needs during this unprecedented time.

39. **Gender Representation on Otolaryngology-Head and Neck Surgery Journal Editorial Boards: Does It Reflect Our Workforce?**
Anju K. Patel, MD, Boston, MA; Maya D. Fiore, BA, St. Louis, MO; Albert L. Merati, MD, Seattle, WA; Lyndsay L. Madden, DO, Winston-Salem, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the gender distribution of otolaryngology journal editorial boards.
Objectives: Gender representation on otolaryngology-head and neck surgery (OTO-HNS) journal editorial boards (EB) has not been formally examined. The aim for this study is to identify gender distribution of OTO-HNS journal EB. Study Design: Cross-sectional analysis, with subgroup analysis comparing male/female cohorts. Methods: EB members of the 25 highest impact factor OTO-HNS journals (2019 Journal Citation Reports data) were identified. Further analysis of 16 US based journals was performed. EB gender using binary assumption was determined with genderize.io software and publicly available data. Gender representation at different EB leadership positions was examined. Comparisons were made with 2019 American Association of Medical Colleges (AAMC) OTO-HNS US physician gender data. Results: 1100 EB members were identified (males, 767, 70%; females, 333, 30%). These data were further divided to editors-in-chief, n=18 (males, 15, 83%; females, 3, 17%), other journal leadership positions, n=191 (males, 134, 70%; females, 57, 30%), and general EB members, n=891 (males, 618, 69%; females, 273, 31%). Gender of US physician members were 633 (males, 509, 80%; females, 124, 20%) compared to AAMC OTO-HNS US physician data (males, 82%; females, 18%) and US resident physician data (males, 64%; females, 36%). Conclusions: Previous work has shown that gender diversity on journal editorial boards increases quality of journal articles and innovation in research. These findings provide the first comprehensive measure of gender distribution on OTO-HNS EB. Gender representation of US physician OTO-HNS EB members in 2019 reflects the US OTO-HNS physician workforce. As the workforce changes given our resident population, the specialty should continue to monitor for parity among EB members and promote gender diversification to benefit the OTO-HNS community.

Educational Objective: At the conclusion of this presentation, the participants should be able to apply knowledge of intraoperative teaching content, methods, and control to improve awareness of and optimize their own teaching habits.

Objectives: The study objectives are to characterize and describe intraoperative otologic teaching. Study Design: Single center qualitative observational pilot. Methods: Mastoidectomies performed by paired combinations of four neurotology surgeon-educators and two senior trainees were video/audio recorded. The recordings were transcribed. Using principles of grounded theory, transcriptions were analyzed by three authors and coded through iterative constant comparisons. Maximum variability of educators was met, and data became saturated after analysis of three recordings. Additionally, trainees completed surveys and semi-structured interviews on their perceptions of intraoperative teaching methods and content. Results: Two hundred and eighteen minutes from five mastoidectomy recordings were analyzed, during which educator verbalizations dominated relative to trainees (8.4±8:1.6±8). Intraoperative teaching methods identified were that of directing, explaining, questioning, demonstrating, encouraging, providing feedback, summarizing and warning. Intraoperative content themes identified were anatomy, instruments, positioning, technique, avoiding pitfalls, planning and approach. While trainees perceived both goal setting and matching their level of competency to autonomy most important to their learning, goal setting was not an educator method identified. Additionally, trainees cited mismatches between educator verbalizations and their needs as the most distracting educator behavior. Conclusions: A variety of methods are employed during intraoperative mastoidectomy teaching, but they are primarily educator centered. While patient safety remains a primary concern of intraoperative activities, educators should take into account, communicate and agree upon trainee goals and level of competency in order to optimize intraoperative teaching.

Sialendoscopy Findings of Sjogren's Syndrome Compared to Open Salivary Biopsy Results
Leighton Forest Reed, MD, Memphis, TN; Edmond Benedetti, MD, Memphis, TN; Akash Patel, BS, Memphis, TN; Madhu Mamidala, PhD, Memphis, TN; M. Boyd Gillespie, MD, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe whether sialendoscopy findings are suggestive of Sjogren’s syndrome or are more generally related to chronic sialadenitis.

Objectives: Sjogren’s syndrome (SS) damages salivary glands by chronic inflammation and is commonly diagnosed by histopathology. Sialendoscopic intervention improves salivary flow and reduces xerostomia in SS. During sialendoscopy, multiple clinical findings may be seen on exam. The objective of this study is to compare sialendoscopy findings to salivary tissue biopsies results. Study Design: This is a retrospective study comparing sialendoscopic findings to salivary biopsy results for patients evaluated for SS. Methods: A total of 38 patients underwent sialendoscopic intervention and were evaluated for SS via biopsy. Descriptive characteristics were collected including demographics, tobacco and caffeine use, drying medication use, presenting symptoms, ultrasound findings, treatment, and level of improvement. Endoscopic findings investigated included scarring, stenosis, webs, and duct dilation. On biopsy, focus score was the diagnostic indicator used for SS. Multivariate regression analysis was used to compare endoscopic findings and histopathology results. Results: A focus score positive for SS was seen in 13 of the 38 patients. None of the endoscopic findings, scarring, stenosis, webs, and duct dilation had a statistically significant difference between patients with a histopathology confirmed SS diagnosis and those with histopathology negative for SS (p=0.978, p=0.497, p=0.578, and p=0.314, respectively). Conclusions:
Sialendoscopic intervention has been demonstrated to improve salivary flow and reduce xerostomia in SS patients. There are multiple findings on sialendoscopy that may suggest the level of damage to the duct secondary to chronic inflammation. However, our study suggests that sialendoscopy findings are not specific SS but are more generally related to chronic sialadenitis.

**42. Evaluation of Factors Affecting Management of Post-Tonsillectomy Hemorrhage**
Batsheva R. Rubin, MPH, Boston, MA; Alekha Kolli, BA, Boston, MA; Michal J. Plocienniczak, MD MS, Boston, MA; Lauren F. Tracy, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to examine patient characteristics who present with a post-tonsillectomy hemorrhage (PTH) and evaluate the effectiveness and predictors of management strategies.

**Objectives:** Examine patient characteristics who present with a post-tonsillectomy hemorrhage (PTH) and evaluate the effectiveness and predictors of management strategies. **Study Design:** Single center retrospective chart review. **Methods:** Retrospective review of patients who presented with PTH between June 1, 2015-January 1, 2020. Patients were divided into 3 categories: 1) immediate operative control of hemorrhage; 2) discharge after otolaryngology evaluation; and 3) hospital admission for observation. Patient demographics and etiology of tonsillectomy were compared between the groups using a chi squared test. Admitted and discharged patients were further divided into those who eventually required operative control of hemorrhage and those who did not require any surgical intervention. **Results:** Of 141 patients who experienced PTH, 98 (70%) were adults and 43 (30%) were pediatric patients. Patients presented on average 5.7 days after surgery. 68 patients (48%) underwent urgent operative control of hemorrhage, 28 patients (20%) were discharged without intervention, and 45 patients (32%) were admitted for observation. There were no significant differences in demographics or etiology of tonsillectomy between these three groups. Of patients who were observed, 11 (24%) underwent surgery during admission for PTH while 34 (76%) were then discharged without requiring surgery. No patients who were discharged went on to require surgery for PTH. **Conclusions:** Patient demographics and etiology for tonsillectomy were not associated with management strategy of PTH. Three quarters of patients observed for PTH did not require surgery. Further research is warranted to distinguish those patients with PTH requiring surgical intervention from those who can be safely managed with observation.

**43. Characteristic Pressure Waveforms Can Distinguish Different Airway Collapse Patterns in Sleep Apnea Patients**
Ravi Rajendra Shah, MD, Philadelphia, PA; Ahmad F. Mahmoud, MD, Berkeley Heights, NJ; Raj C. Dedhia, MD, Philadelphia, PA; Erica R. Thaler, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the relationship between pressure, flow, and resistance in the airway, and identify key differences in airway collapse patterns.

**Objectives:** To use pharyngeal pressure recordings to distinguish different upper airway collapse patterns in obstructive sleep apnea (OSA) patients, and to assess whether these pressure recordings can improve candidacy assessment for various sleep surgeries. **Study Design:** Prospective case series. **Methods:** Subjects with OSA underwent simultaneous drug induced sleep endoscopy (DISE) and transnasal pharyngeal pressure recording with a pressure transducing catheter. Pressure was recorded in the nasopharynx and oropharynx, and endoscopic collapse patterns were classified based on location, extent, and direction of collapse. Pressure recordings were classified categorically by waveform shape as well as numerically by inspiratory and expiratory amplitudes and slopes. Waveform shape, amplitude, and slope was then compared with the endoscopic findings. **Results:** 25 subjects with OSA were included. Nasopharyngeal waveform shape was associated with extent of collapse at the level of the palate (p=0.001). Oropharyngeal waveform shape was associated with anatomical site of collapse (p<0.001) and direction of collapse (p=0.019) below the level of the palate. Pressure amplitudes and slopes were also associated with extent of collapse at various sites. Waveform shape was also associated with favorable collapse pattern on endoscopy for hypoglossal nerve stimulator (HGNS) implantation (p=0.004), as well as surgical candidacy for HGNS (p=0.043). **Conclusions:** Characteristic pharyngeal pressure waveforms are associated with different airway collapse patterns and can be used as an adjunct to DISE in the sleep surgery candidacy evaluation.

**44. Characteristics and Diagnostic Accuracy of Angioedema Cases: A Single Institution Retrospective Study**
Rahul K. Sharma, BS, New York, NY; Alexandria L. Irace, BA, New York, NY; Ade Obayemi, MD, New York, NY; David A. Gudis, MD, New York, NY; Matthew Spotnitz, MD MPH, New York, NY; Jonathan B. Overdevest, MD PhD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the trends in presentation, treatment, and diagnostic accuracy of angioedema patients at a single institution, and identify predictors of worse outcomes and ICU level care.
Objectives: Angioedema is a relatively understudied condition. Understanding trends in presentation, treatment, and outcomes is important for efficient decision making in acute settings. We aim to characterize the accuracy of diagnosis and presentation of angioedema in the emergency department (ED) and identify possible clinical correlates of adverse outcomes at a single institution. Study Design: Retrospective cohort study. Methods: Patients who received an ICD-9/10 code of angioedema or related conditions in the ED from 2001-2020 were analyzed under IRB approval. Final discharge diagnosis was noted to determine the accuracy of initial diagnosis. Charts were reviewed for demographic data, comorbidities, medications administered in the ED, ACE-I/ARB use, and whether the patient underwent an otolaryngology consult, required hospital/ICU admission, or required airway intervention. Multivariable logistic regression models controlled for age, sex, race, comorbidities, exam findings, prior presentations, smoking, and medication use in the ED. Results: 395 patients' charts were analyzed. The average patient age was 59.6 (SD=17.5) years old. 29.1% of patients were African American and 60.0% of patients were female. 11% were initially diagnosed with angioedema but were discharged with a different final diagnosis. Otolaryngology consult was performed for 58.9% of patients. 44.3% of patients were admitted, and 19.8% of patients were admitted to the ICU. Among those with a discharge diagnosis of angioedema, predictors of ICU level care included prior presentation of angioedema, smoking, diabetes, allergic diagnoses, physical exam findings, and epinephrine/dexamethasone use in the ED (p<0.05). Conclusions: Patients initially presenting with angioedema were diagnosed with 89% accuracy. Various comorbidities including diabetes, smoking, allergic diagnoses are associated with need for ICU level care.

45. Comparison of Scheduled Ibuprofen vs NSAID Avoidance on Post-Tonsillectomy Hemorrhage following Very Low Energy Monopolar Tonsillectomy
Steven David Shotts, MD FACS, Louisville, KY; Donald Vincent Welsh, MD FACS, Louisville, KY; Aisaku Nakamura, MS, Lexington, KY; Arnold J. Stromberg, PhD, Lexington, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the effect of ibuprofen use on bleeding following very low energy monopolar tonsillectomy compared to NSAID avoidance.

Objectives: To compare rates of post-tonsillectomy hemorrhage requiring surgical intervention (PTHRSI) between those avoiding postoperative NSAIDs to those receiving scheduled postoperative ibuprofen after very low energy transfer monopolar tonsillectomy (VLET). Study Design: Retrospective case control study. Methods: All tonsillectomies performed by one surgeon solely utilizing VLET tonsillectomy during the period January 1, 2010 to August 31, 2019 were identified. Those patients experiencing PTHRSI were examined. Two groups were compared based on postoperative ibuprofen utilization: strict avoidance (-NSAID) and scheduled administration (+NSAID). Hemorrhage events were classified as primary (24 hr). Groups were compared statistically by multivariate logistic regression (MVA) controlling for age and sex and univariate analysis collectively and subdivided into subgroups based on age (<12yo, ≥12yo). Results: During the study period 1174 tonsillectomies were performed (980 -NSAID, 394 +NSAID), and 3 patients (0.26%) experienced PTHRSI (1 primary (0.085%), 2 secondary (0.17%)). The PTHRSI rate of the -NSAID group (0.10%) and the +NSAID group (0.51%) were not different on MVA (p= 0.16). Univariate analysis between the groups and subgroups also failed to demonstrate a significant difference (p> 0.19-1). Age was a significant factor for PTHRSI on MVA (p=0.018, OR 1.075/yr, [1.012-1.141]). Conclusions: Rates of PTHRSI are low after minimized energy transfer monopolar tonsillectomy and the addition of scheduled ibuprofen does not raise the rate significantly.

46. Acquired Nasopharyngeal Stenosis
Jeremiah Charles Tracy, MD, Boston, MA; Elishama Garvens Michel, BSc, Charlottesville, VA (Presenter); Lauren Fedore Tracy, MD, Boston, MA; Andrew Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the etiology and presentation of acquired nasopharyngeal stenosis. Participants should know the various surgical and medical interventions that have been described in the management of this condition.

Objectives: Acquired nasopharyngeal stenosis (NPS) is a rare condition with variable etiology and presentation. Many different interventions have been proposed in the management of NPS. A systematic review was performed to better characterize the etiology, presentation, workup, and management of NPS. Study Design: Systematic review. Methods: The PubMed database was queried using search terms "nasopharyngeal stenosis", "choanal stenosis". Reports describing congenital stenosis and patients with history of radiation to the nasopharynx were excluded. Results: 115 patients were identified with nasopharyngeal stenosis (NPS). The most common etiology was postsurgical, secondary to adenotonsillectomy (n=63), uvulopalatopharyngoplasty (n=38), or other procedures (n=14). Patients presented with multiple complaints, most commonly nasal obstruction (67%) and obstructive sleep apnea (50%). Diagnostic workup included endoscopy in 60% of patients (n=70); with polysomnography, speech analysis, and imaging also utilized. Surgical techniques involving flap repair were used in 50% of cases; excision and stenting were used in 30 and 20% of cases respectively. Adjuvant medical therapy was uncommon, however the use of mitomycin was reported in 18 patients. Complications were rare during 16 month average followup, with 9 revision surgeries reported. No revision was required after local flap reconstruction. All procedures reported none to mild nasopharyngeal obstruction after surgery.
Conclusions: NPS is a rare complication following oropharyngeal surgery. The presentation and etiology of NPS is quite variable. As such, there may not be a single optimal management pathway. A variety of surgical approaches are discussed herein.

47. ENT Residency and Society Leadership: Evaluation of Diversity in a Nationwide Study
Priya A. Uppal, BS BA, Albany, NY; Tejas Kollu, BS, Albany, NY; Melissa A. Thomas, BS, Albany, NY; Melissa Mortensen-Welch, MD, Albany, NY

Educational Objective: Diversity in medicine positively influences healthcare delivery. As we aim to make otolaryngology more diverse, it is essential to analyze our current leadership.

Objectives: Diversity in medicine positively influences healthcare delivery. As we aim to make otolaryngology more diverse, it is essential to analyze our current leadership. Study Design: All 120 ENT residency programs and nine ENT national societies in the United States were included in this study. Methods: The position, professorship level, name, gender, inferred race (based on name and image), and h-index were collected and recorded from publicly available data. Non-full professorship was defined as any title excluding that of full professor such as associate professor, assistant professor, and lecturer. Fischer's Exact Test and unpaired t-tests were used. Results: A total of 260 ENT residency program directors, associate directors, chairs, and chiefs of otolaryngology, laryngology, rhinology departments were included. The racial breakdown was as follows: 205/260 (78.85%) Caucasian, 40/260, Asian (15.38%), 5/260 (1.92%) Black, 5/260 (1.92%) Middle Eastern, 3/260 (1.15%) Latinx, 2/260 (.77%) Other. Male gender was found to be a predictor of full professorship title (p<.0001) with an odds ratio (OR) of 4.104. The Caucasian race was a predictor of full professorship (p=.0325; OR of 2.036). When comparing h-index, males and females differed (p<.0001) across all residency program positions. There was a higher h-index among full professors compared to non-full professors (p<.0001). A total of 92 physicians were included from the nine societies (years of 2010-2020). A higher h-index was found among full professors compared to non-full professors (p<.0001). Conclusions: In conclusion, otolaryngology leadership has an underrepresentation of certain racial groups. Continued efforts should be made to diversify our specialty's leadership.

48. The Impact of an Otolaryngology Inpatient Consult Documentation Improvement Program
Farrukh R. Virani, MD, Sacramento, CA; Peter C. Wickwire, MD, Sacramento, CA; Debbie A. Aizenberg, MD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to apply the strategies implemented at a tertiary care center otolaryngology residency program to improve the commensurate coding and billing for services to support the missions of their respective practices.

Objectives: As we enter an era where medical training funds are limited and teaching centers struggle to maintain their academic mission, the importance of accurate documentation to ensure commensurate coding and billing for services is critical. We sought to develop a practical program that would teach residents documentation skills with the goal of more accurately capturing the work being done in a tertiary care academic medical center. Study Design: This is a case control study. Methods: We reviewed otolaryngology inpatient consultation notes and identified knowledge gaps and shortcomings in documentation. Three short educational sessions were provided on documentation skills. During the same timeframe, standardized electronic templates were designed to help maintain thoroughness of documentation. Additionally, workflow interventions were introduced to maximize direct attending supervision of hospital consultations. Results: A total of 1476 inpatient consultations performed by the otolaryngology department in FY17/18 (pre-intervention) were compared to a total of 1622 inpatient consultations performed during FY19/20 (post-intervention). The percent of inpatient billable consultations increased from 42.4% to 50.9% (p < .01). Similarly, the percentage of consultations coding at a higher level of complexity rose from 51.6% to 59.5% (p < .01). This improvement led to an increase in inpatient consultation charges of more than $130,000 between the two time periods. Conclusions: This study demonstrates that a simple documentation and coding curriculum and workflow interventions can lead to more thorough and improved inpatient consult documentation as evidenced by a significant increase in the percentage and complexity of billable otolaryngology inpatient consultations at a tertiary academic center.

49. Prophylactic Antibiotic Use in Surgical Management of Submandibular Gland Sialoliths
Melia Wakeman, BS, Syracuse, NY; Rohan Patel, MD, Syracuse, NY; Mark Marzouk, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the role of prophylactic antibiotics in preventing infectious complications in submandibular gland sialolithotomy.

Objectives: The purpose of this study is to provide evidence against the use of preoperative antibiotic prophylaxis in patients undergoing sialolithotomy of submandibular stones. Study Design: This is a retrospective review of patients undergoing sialendoscopy and sialolithotomy of submandibular stones from January 2015 to July 2020 in a tertiary care institution by a single surgeon. Patients’ charts were reviewed for surgical site infections (SSI) in patients with respect to
perioperative antibiotics administration. **Methods:** Patients who underwent robotic assisted sialolithotomy and sialendoscopy (RASS) or open sialolithotomy during the study period were included after IRB exemption. A total of 69 patients meet criteria after excluding those lost to followup. Patient demographics, length of postoperative followup, surgical site infection (SSI), and use of postoperative antibiotics were reviewed. **Results:** Of the 69 total patients reviewed, 38 (55.1%) underwent RASS and 31 (44.9%) underwent open sialolithotomy. During this period, 58 patients did not receive perioperative antibiotics, of which 56 (96.6%) patients had no SSI, 30/32 (93.8%) within RASS group and 26/26 (100%) within the open sialolithotomy group. 11/11 (100%) of patients who received perioperative antibiotics did not have SSI. Postoperative antibiotics were prescribed to 4/69 (5.8%) patients. **Conclusions:** In patients who underwent submandibular sialendoscopy and sialolithotomy without antibiotic prophylaxis, 2/58 (3.4%) of patients had postoperative SSI. This low SSI rate suggests antibiotic prophylaxis may not be necessary for submandibular sialolithotomies.

**Head and Neck**

50. **Novel Virtual Workshop to Improve HPV and Oropharyngeal Cancer Knowledge among Interprofessional Students and Trainees**
Shaghauyegh S. Azar, BS, Los Angeles, CA; Lauran K. Evans, MD MPH, Los Angeles, CA; Brooke M. Su-Velez, MD MPH, Los Angeles, CA; Maie A. St. John, MD PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand gaps in knowledge regarding HPV and its role in oropharyngeal cancer among medical students and primary care residents, recognize the educational return of an interactive virtual HPV workshop didactic session, and see improvements in HPV knowledge and vaccination practices after the workshop.

**Objectives:** To improve knowledge regarding human papillomavirus (HPV), HPV related head and neck cancer (HNC) and the role of vaccination through an interprofessional workshop, given the lower rates of awareness of HPV related HNC in students and trainees. **Study Design:** Prospective cohort study using a didactic session (virtual). **Methods:** A previous in-person HPV educational workshop (which successfully improved HPV knowledge among medical students) was adapted virtually. Surveys were distributed to medical students and primary care residents immediately before, and 2 weeks after the implementation of the interactive virtual HPV workshop, which was led by otolaryngologists. **Results:** Data collection is ongoing from several workshops including family medicine, pediatrics, internal medicine, and dentistry. Preliminary presurvey results from 16 participants indicate 69% were themselves vaccinated against HPV, 81% aware of HPV in HNC, and 88% believed HPV vaccination should be mandatory. Respondents preliminarily demonstrated increased knowledge in areas pertaining to HPV after the intervention, such as the risk of salivary transmission (25% to 80%) and approval of the vaccine for patients up to age 45 (69% to 90%). **Conclusions:** An interactive virtual workshop has demonstrated improved HPV related knowledge among primary care residents and can continue to be adapted for multidisciplinary curriculum settings. This course serves to foster an interprofessional understanding of the role of HPV in HNC and subsequently strengthen recommendations for HPV vaccination. This workshop is now available in virtual format and can be shared with trainees in multiple specialties all across the globe, thus aiding prevention and screening for all patients with HPV related disease.

51. **Adverse Events Associated with Devices Used in Sialendoscopy: A MAUDE Database Review**
Christopher D. Badger, MD MBA, Washington, DC; Rohan A. Singh, Arlington, VA; Ameet Singh, MD, Washington, DC; Arjun S. Joshi, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the most common devices, device failures, and adverse events associated with sialendoscopy equipment as reported to the Food and Drug Administration's (FDA) Manufacturer and User Device Facility Experience (MAUDE) database.

**Objectives:** The purpose of this study is to review the medical device reports (MDRs) submitted to the Food and Drug Administration's (FDA) Manufacturer and User Device Facility Experience (MAUDE) database to find adverse consequences related to sialendoscopy. **Study Design:** Retrospective database study. **Methods:** A search of the FDA MAUDE database was performed using the terms "stone OR sialolith OR duct OR calculi" AND (gland OR parotid OR submandibular OR salivary), "Wharton", "Stensen", "sialendosc*", and "sialadenitis". Reports for adverse events associated with sialendoscopy from December 2009 to March 2020 were analyzed. From these, variables were collected, including device type, problem type, injury type, patient outcome, and stone size. **Results:** The search query yielded 206 reports for screening, containing a total of 47 unique cases meeting inclusion criteria. The most common device that malfunctioned was the wire basket used in endoscopic sialolithotomies (n = 40, 85.1%), followed by balloon dilators (n = 3, 6.4%), and sialoendoscopes (n = 2, 4.3%). The most common malfunction associated with wire baskets was breakage of the basket wire (n = 24/40, 60.0%). A retained device was the most common adverse event experienced by patients (n = 18, 38.3%), which were commonly associated with the use of wire baskets (n = 16, 34.0%). **Conclusions:** An understanding of the devices used in sialendoscopy and their associated malfunctions and adverse patient events is essential for physicians to plan these procedures and counsel patients regarding risk.
52. **Post-Thyroidectomy Transfers of Care for Complications in the Rural Setting**

Nathan A. Blaseg, BS, Sioux Falls, SD; Sean Clausen, BS, Sioux Falls, SD; William C. Spanos, MD, Sioux Falls, SD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the transfers of care taking place for thyroidectomy complications and surveillance in rural settings.

**Objectives:** To describe previously unknown transfers of care when patients present to another provider for thyroidectomy complication care in a mixed rural-urban healthcare setting. **Study Design:** Retrospective chart review. **Methods:** Patients who underwent thyroidectomy from 2010-2020 in one vertically integrated healthcare system with both rural and urban facilities were reviewed. Complications were identified using ICD-10 codes for laryngeal nerve paralysis, hypoparathyroidism, postoperative bleeding, and postoperative infection. Demographic characteristics, home ZIP codes, and surgical site ZIP codes were recorded along with practice type and location of the initial site of complication care. Presentations beyond 90 days from surgery were excluded. Rurality of home address was determined using ZIP code data from the Federal Office of Rural Health Policy. Analysis of variance and unpaired t-testing was performed. **Results:** 2,667 patients underwent thyroidectomy from 2010-2020 at 5 different surgical sites with 9 different surgeons. 278 (10.42%) had an ICD-10 code associated with post-thyroidectomy complication within 90 days of surgery. Preliminary data suggests that, out of all patients with complications, nearly one third initially presented to a provider other than their surgeon. Significant differences in number of visits and distance traveled for care exist between complication types. Rural patients traveled nearly three times farther for complication care. **Conclusions:** Rural patients with postoperative complications may present to providers other than their surgeon for complication care, representing previously unrecognized transfers of care. This is an opportunity for improved coordination of care in mixed rural-urban healthcare settings.

53. **Socioeconomic Status and Survival in Nasopharyngeal Carcinoma: A Population Based Study**

Sabrina Brody-Camp, MD MPH, New Orleans, LA; Edward McCoul, MD MPH, New Orleans, LA; Rizwan Aslam, DO, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss how survival of nasopharyngeal carcinoma is affected by socioeconomic status.

**Objectives:** To evaluate survival for nasopharyngeal carcinoma in relation to socioeconomic status. **Study Design:** Retrospective, population based study using the Surveillance, Epidemiology, and End Results Census Tract-level Socioeconomic Status Database (2000-2016). **Methods:** Patients with nasopharyngeal carcinoma diagnosed between 2000 and 2016 were identified. Data was stratified based on the socioeconomic status, divided into tertiles: group 1 being the poorest and group 3 the wealthiest. Univariate analysis as well. **Results:** A total of 6,029 patients were included in the study, with 35% in group 1, 35% in group 2, and 30% in group 3. There was a significant difference between tertiles in regard to age at diagnosis, race, overall stage, tumor stage, nodal stage, and whether or not they received radiation. Patients in group 1, the poorest socioeconomic status, were more likely to be young (P=.003), Black (P<.0001), present with higher overall stage (P=.009), tumor stage (P=.01), and nodal stage (P=.02), and less likely to receive radiation (P=.005). In multivariate analysis, there was a significant difference in survival between the groups, with group 1 patients less likely to survive compared to group 3 (hazard ratio = 1.3; 95% CI 1.07-1.57; P = .007). **Conclusions:** Patients in the poorest socioeconomic status presented with more advanced nasopharyngeal cancer and were less likely to receive radiation when compared with individuals of higher socioeconomic status. The poorest socioeconomic status group were less likely to survive from their disease when controlling for other variables.

54. **Socioeconomic Disparities among Patients with Oral and Oropharyngeal Carcinoma**

Nicolas Casellas, MD, Rochester, NY; Katherine Rieth, MD MA, Rochester, NY; Saiganesh Ravikumar, MPH, Rochester, NY; Shalini Shah, BA, Rochester, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe some of the socioeconomic disparities in patients with oral and oropharyngeal cancer.

**Objectives:** To examine the relationship between cancer stage at clinical presentation and socioeconomic characteristics of patients with oral cancer (OC) and oropharyngeal carcinoma (OPC). **Study Design:** A cross-sectional analysis of patients diagnosed with a primary malignancy of the oral cavity and oropharynx. **Methods:** Retrospective data was collected from patients evaluated at a single tertiary care center diagnosed with OC and OPC between 3/11/11-10/31/2019. Chi squared and Fisher's exact tests were performed to reveal the differences in patient characteristics between cancer sites. Spearman correlations analysis were performed between the cancer stage at time of diagnosis and the socioeconomic factors within their zip code of residence. A geographic information system (GIS) was used to illustrate these relationships. **Results:** Patients with OPC (n=127), both HPV negative and HPV positive, were most likely to present with an advanced stage cancer, compared to patients with oral cavity cancers (p<0.01). Among patients with OC (n=268), stage at initial
presentation was directly correlated with the percentage of population living below poverty level (p=0.18, p<0.01), and inversely correlated with median household income (p=-0.19, p < 0.01) and level of education (p=-0.15, p < 0.01). Among HPV negative OPC, stage at initial presentation was directly correlated with median household income (p=0.42, p=0.03) and level of education (p=0.40, p=0.02). Conclusions: Male gender, lower income and lower levels of education are potential risk factors for advanced stage presentation of OC and OPC.

55. Sinonasal Papillomas: 10 Year Followup Review of Etiology, Epidemiology, and Recurrence
Leila Chew, BS, Los Angeles, CA; Albert Y. Han, MD, PhD, Los Angeles, CA; Nopawan Vorasubin, MD, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the epidemiology of sinonasal papillomas as well as identify factors associated with recurrence and malignant transformation of sinonasal papillomas.

Objectives: Sinonasal papillomas are locally aggressive papillomas that exhibit high rates of recurrence and potential for malignant transformation. The purpose of this study is to clarify the etiology, epidemiology, subtype differences, and predictive factors of recurrence and malignant transformation. Study Design: A retrospective chart review was conducted to collect data related to patient demographics, papilloma characteristics, comorbidities, and recurrence. Methods: 120 patients with sinonasal papillomas were identified 2009-2019. The following variables were identified: papilloma subtype, papilloma location, age, sex, chronic rhinosinusitis, allergic rhinitis, malignant transformation, tobacco use, alcohol use, prior sinus surgeries, SNOT-22 scores, time to followup, recurrence rates, and time to recurrence. Factors significantly associated with subtype, time period, recurrence, and malignant transformation were determined. The data was aggregated with previously published data at the same center to elucidate changes over time. Results: Between 2009-2019, 80 males and 40 females presented with sinonasal papillomas. The subtypes were inverted (85%), oncocytic (7%), exophytic (5%), and mixed (3%). 90% were negative for malignant transformation, 6% presented with dysplasia, and 2% with squamous cell carcinoma. 15.8% recurred after an average of 37.2 months. Inverted papillomas increased from 38.2% in 2000-2004 to 88.4% in 2015-2019, while the exophytic subtype decreased from 44.1% to 5.8%. Oncocytic subtypes had a significantly higher proportion of female patients. Factors predictive of recurrence were younger age, prior surgery for papilloma, and malignant transformation. Older age was predictive of malignant transformation. Conclusions: This study explored the demographic and tumor features of sinonasal papillomas as well as their associated risk factors for recurrence and transformation. Future studies should further characterize the etiologic factors that can be targeted to reduce the incidence and recurrence of these tumors.

56. Management of Lacrimal Gland Carcinoma: A National Cancer Database Study
Yeshwant R. Chillakuru, MSc, Washington, DC; Daniel A. Benito, MD, Washington, DC; Matthew Liu, BS, Washington, DC; Luke Pasick, MD, Miami, FL

Educational Objective: At the end of this presentation, participants will be able to identify clinical features associated with worse outcomes in lacrimal gland cancer.

Objectives: Lacrimal gland carcinoma is a rare malignancy with limited published data on outcomes. We conduct the first analysis of the National Cancer Database (NCDB) to date to examine clinical features and treatment trends. Study Design: Retrospective analysis. Methods: Patients with epithelial lacrimal gland carcinoma were identified in NCDB. Survival analysis was conducted with Kaplan-Meier estimates and Cox regression. Results: We identified a cohort of 627 patients from 2004-2016. Adenoid cystic carcinoma (31.4%) and squamous cell carcinoma (29.5%) were the most common subtypes. Surgery with adjuvant radiation (56.1%, of which 22.5% received adjuvant chemotherapy) was the most common treatment modality. 5 year overall survival (OS) for our cohort was 68.0% (95% CI, 63.6-72.7%). Tumors with invasion into adjacent non-orbit structures had worse 5 year OS (51.8%; 95% CI, 36.9-72.9%, p=.012) compared to those with no invasion. Patients with positive nodal disease demonstrated worse 5 year OS (N0: 68.2%; 95% CI: 61.5-75.4%; N1: 27.1%, 95% CI, 11.2-66.5%; p=.005). When controlling for treatment, large tumors (20-40mm: aHR, 8.16; 95% CI, 1.59-42.00; p=.012; >40mm: aHR, 21.52; 95% CI, 3.74-123.88, p<.001) and adenocarcinoma histology (aHR, 3.10; 95% CI, 1.03-9.36; p=.045) were associated with worse OS. Conclusions: Adenocarcinoma, tumor size >20mm, invasion into adjacent structures (brain, sinus, pterygoid plate, and temporal fossa), and positive nodal disease are independently associated with worse survival in lacrimal gland carcinoma.

57. Metastatic Adenoid Cystic Carcinoma of the Head and Neck: Treatment Trends and Survival Analysis
Yeshwant R. Chillakuru, MSc, Washington, DC; Daniel A. Benito, MD, Washington, DC; Matthew Liu, BS, Washington, DC; Luke Pasick, MD, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand factors associated with survival for metastatic adenoid cystic carcinoma.
Objectives: We describe management and survival trends for metastatic adenoid cystic carcinoma (ACC). Study Design: Retrospective analysis. Methods: Patients with ACC of head and neck primaries are identified from the National Cancer Database (NCDB). Logistic regression was used to calculate odds ratios (OR), and Kaplan-Meier estimates and multivariate Cox regression were used for overall survival (OS) analysis. Results: 7150 patients with ACC were identified, of which 542 had metastasis. Base of tongue (OR, 2.63; 1.84-3.72; p<0.001), floor of mouth (OR, 2.03; 1.06-3.62; p=0.022), and major salivary gland (OR, 4.75; 3.41-6.58; p<0.001) primaries were more likely to present with metastasis. Cutaneous ear primaries were less likely to present with metastasis (OR, 0.20; 0.03-0.63; p=0.023). Metastatic oral cavity (aHR, 0.62; 95% CI, 0.46-0.84, p=0.002, 5 year OS, 44.4%) and oropharynx/hypopharynx (aHR, 0.52; 95% CI, 0.36-0.77, p=0.001. 5-year OS, 37.6%) primaries were associated with worse survival, when adjusting for demographic and clinical features. The most common treatment modalities for metastatic disease were surgery with radiation (29.1%, of which 9.64% received chemotherapy) and primary radiation therapy (22.7%, of which 10.1% received chemotherapy). Conclusions: Base of tongue, floor of mouth, and major salivary glands ACC were more likely to metastasize. Metastatic primaries of the oral cavity and oropharynx/hypopharynx were associated with worse overall survival.

58. Quality of Life following Total Thyroidectomy and Lobectomy in Thyroid Cancer Survivors: Analysis of the PROFILES Registry Data

Peter V. Cooke, BA, New York, NY; Naomi Alpert, MS, New York, NY; Rebecca Schwartz, PhD, New York, NY; Eric Genden, MD, New York, NY; Emanuela Taioli, MD PhD, New York, NY; Maaike van Gerwen, MD PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand quality of life outcome analysis comparing thyroidectomy and lobectomy patients from the PROFILES database.

Objectives: Our objective was to study quality of life (QoL) following surgery for low risk thyroid cancer since total thyroidectomy (TT) and lobectomy (LT) are both viable options according to current guidelines. Study Design: We therefore assessed QoL following TT versus LT in differentiated thyroid cancer survivors using the Dutch Patient Reported Outcomes Following Initial Treatment and Long term Evaluation of Survivorship (PROFILES) database. Methods: General health related QoL was measured using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC-QLQ-C30). Thyroid cancer specific QoL measures were assessed using the THYCA-QoL questionnaire. Association of QoL questionnaire items in TT vs LT was assessed using univariable and multivariable regression models. Results: The study population (n=58; 24 TT and 34 LT) was mostly female (TT: 79%; LT: 85%). The physical and mental component of EORTC-QLQ-C30 comparisons yielded no significant difference between LT and TT for all QoL scales. THYCA-QoL Likert scale questionnaire results revealed that TT group was more bothered by their surgical scar (p=0.004) and fatigued (p=0.017) versus LT group in univariable analysis. For additional items in the PROFILES database, univariable analysis showed that TT group worried more about their thyroid medication use (OR: 8.7, 95% CI: 1.7-45.5) compared to the LT group, which trended towards significance after adjustment (OR: 5.8, 95% CI: 0.9-36.6). Conclusions: Our study provides evidence that TT and LT have nearly equivalent QoL results for low risk thyroid cancers. Future studies are needed with a larger study population.

59. Evaluation of Postoperative Pain in Outpatient Thyroid and Parathyroid Surgery Patients

Erin W. Creighton, MD, Little Rock, AR; Lindsay E. Dayer, PharmD BCACP, Little Rock, AR; Emre Vural, MD, Little Rock, AR; Mauricio A. Moreno, MD, Little Rock, AR; Jumin Sunde, MD, Little Rock, AR; Brendan C. Stack Jr., MD FACS, Springfield, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the general postoperative course regarding pain management in outpatient thyroid and parathyroid surgery patients involved in an early recovery after anesthesia (ERAS) protocol in order to better discuss patient expectations and optimize prescribing practices.

Objectives: Efforts to reduce opioid medications following endocrine neck surgery in our institution were successful with implementing an ERAS protocol and education. This study aims to answer two questions: what pain regimen do patients follow at home and how well is it controlling their pain? Study Design: Prospective, exploratory study of up to 50 endocrine neck surgery patients utilizing smart pill bottle technology. Methods: Patients undergoing thyroid and parathyroid surgery beginning June 2020 are eligible for inclusion. Exclusion criteria include: patient refusal, age less than 18, pregnancy, overnight observation or admission, insufficient data from surveys or smart pill caps. Patients undergo surgery and perioperative care standard to our institution and surgeons. Patients are given standard postoperative instructions and prescribed acetaminophen, ibuprofen, and tramadol dispensed in smart pill caps that record "events" that correspond to taking a medication. Pain score was recorded in the post anesthesia care unit (PACU). Patients receive an automated message three times per day for seven days with a one question survey regarding their current pain level on a scale of one to ten. Results: Eight patients met the above criteria. Patients at least one pain score recorded after discharge. Patients responded to the survey an average 6.5 times (range = 1-15). The average pain score prior to discharge from PACU was 1.5 (median=2, range = 0-3). Pain scores were highest in the 24 hours after surgery with an average score of 5.33 (median=4, range=3-9). Beginning 48 hours after surgery, pain scores were, on average over a 24 hour period, less than...
3. Conclusions: Pain scores are highest in the first 24 hours after surgery and average less than 3 out of 10 on postoperative day three through seven. To our knowledge, this is the first study to characterize pain for this length of time postoperatively in the outpatient setting, using smart pill cap technology. We expect better defined trends in pain scores and medication taking with further enrollment in our study over the next several months.

60. Cervical Spine Sarcopenia: A Possible Perioperative Predictor for Head and Neck Cancer Outcomes
Gabriela M. DeVries, MD, Winston Salem, NC; Irina Gavrila, BS, Winston Salem, NC; Joshua Waltonen, MD, Winston Salem, NC; Paul Bunch, MD, Winston Salem, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to determine whether cervical spine sarcopenia can be used as a prognostic indicator for outcomes in patients with head and neck cancer. The purpose of this study was to compare perioperative outcomes in patients with HNC with and without cervical spine sarcopenia. Subjects meeting the study inclusion/exclusion criteria will be identified and recruited via CPT codes from prior records from the otorhinolaryngology department. The chart is then reviewed for the various computed tomography (CT) prior to the subject's surgical resection of head and neck cancer. Software utilized by the radiology department will be used to analyze the CT scans to obtain lumbar and cervical spine muscle density. A preliminary total of 93 patients have been included thus far. We anticipate over 500 patients will be included in our study by the completion. Results: Using the following BMI groups (0=underweight 30), the average value of level 3 lumbar spine musculature SMI was noted to be 46.8687 in our study compared to the standard of 52.4 for males. The underweight BMI group was statistically significantly for the most complications to include perioperative and postoperative complications. Using the following BMI groups (0=underweight 30), the average value of level 3 lumbar spine musculature SMI was noted to be 41.57232 in our study compared to the standard of 41.4 for females. However, the sample size was small and only included 23 females. We remain optimistic that more patients will be included in our study to increase the power and deduce further conclusions. Conclusions: Tentative conclusion include patients with sarcopenia are at increased risk of developing perioperative complications associated with surgery and can benefit from preoperative nutritional optimization.

61. Targeting GPR35 in the Treatment of Cutaneous Squamous Cell Carcinoma
Manon Doucet, BS, Shreveport, LA; Gauri Shishodia, PhD, Shreveport, LA; Emily Zimmerman, BS, Shreveport, LA; Xiaohua Rong, Shreveport, LA; Cherie Ann Nathan, MD, Shreveport, LA; Alok Khandelwal, PhD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss GPR35 as a novel therapeutic target for the treatment of cutaneous squamous cell carcinoma.

Objectives: Ultraviolet radiation (UV) induced cutaneous squamous cell carcinoma (cSCC) arising from malignant proliferation of epidermal keratinocytes is one of the most rapidly increasing cancers in the USA and is associated with significant morbidity and mortality. Further, organ transplant patients are 65-250 times more likely to develop aggressive cSCC. Moreover, excision of cSCC of the head and neck results in significant facial disfigurement, and thus photo prevention for patients with condemned skin is critical. Increased understanding of the mechanisms involved in the pathogenesis of cSCC could identify means to prevent, inhibit and reverse UVB induced cSCC. Chemokine (C-X-C motif) ligand 17 (CXCL17) is the latest member of the chemokine family. Previous studies from our lab demonstrated that UVB (ultraviolet B) significantly induces CXCL17 in mouse epidermis. Further, CXCL17 protein expression was significantly overexpressed in cSCC cells compared to normal skin keratinocytes. CXCL17 significantly induced cSCC cell proliferation, migration, and motility, suggesting an essential role in tumor cell intrinsic processes. Tumor specific overexpression of CXCL17 was detected in human cSCC that further bolsters our in vitro findings, indicating a causative role for CXCL17 in skin tumorigenesis. Study Design: Interestingly, G protein coupled receptor 35 (GPR35) is identified as a putative receptor for CXCL17. Accordingly, using a pharmacological antagonist for GPR35, ML145, we sought to investigate the role of GPR35 in cSCC cell intrinsic mechanisms such as proliferation, migration and elucidate the underlying mechanism. Methods: cSCC metastatic (SCC59A), and non-metastatic (SCC12A and SCC118) cells were treated with either vehicle or increasing doses of ML145 and the effect on cell proliferation, migration and motility was assessed. Additionally, cSCC cells were treated with ML145 and the effect on cell growth signaling pathways including AKT/mTOR, NF-KB and STAT was evaluated. Results: Our preliminary experiments demonstrate GPR35 inhibition significantly and dose dependably attenuates the growth of both metastatic and non-metastatic cSCC cells. Interestingly, the effects were much more profound in non-metastatic (SCC12A and SCC118) cell lines as compared to metastatic SCC59A cells. Similar to its effects on cell growth, ML145 significantly attenuated cell migration and motility in non-metastatic (SCC12A and SCC118) and metastatic (SCC7...
and SCC59A) cells. Initial assessment suggests an important role for STAT3 and NF-KB pathways in GPR35 mediated effects. **Conclusions:** Our data has identified GPR35 as a novel therapeutic target for treatment of cSCC.

### 62. Lung Carcinoma Presenting as Tongue Lesion
Jeewan Jot S. Grewal, MD, Detroit, MI; Natalia Kyriazidis, MD, Syracuse, NY; Jesse Ryan, MD, Syracuse, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to form a greater differential when combining clinical findings with relevant imaging upon the initial presentation of a new patient.

**Objectives:** Metastatic disease to the tongue is a rare disease entity. We report a case of an undifferentiated carcinoma of the tongue metastatic from the lung in an otherwise healthy, non-smoking patient. This case highlights the need for clinical suspicion with unusual pathologic and imaging findings. Furthermore, while surgical resection remains the mainstay for efficient local therapy, we discuss the use of a multidisciplinary approach to treat metastatic disease to the tongue.

**Study Design:** Case report

**Methods:** Computed tomography (CT) neck with contrast revealed an irregular enhancing lesion along the right lateral tongue approximately 1.5 cm in diameter and a second rim enhancing lesion measuring 1.7 x 2.2 x 1.8 cm in the left tongue. Biopsy of the right lateral tongue mass revealed an undifferentiated carcinoma with 95% of tumor cells positive for PD-L1. Pathologic findings and multifocal disease in the tongue on CT imaging were concerning for possible metastatic disease to the tongue and additional workup was undertaken.

**Results:** Lingual metastasis from a non-head and neck primary cancer carries a poor prognosis. This is attributed to the diffuse metastatic process present once a primary malignancy outside the head and neck spreads to the oral cavity and specifically the tongue. Our patient survived less than 3 months while receiving palliative radiation therapy. Another study compiled 3 other reports commenting on lung cancer with lingual metastasis. These patients with lung cancer ranged from 39-65 years of age with metastasis to a wide variety of sites, which included but not limited to solid organs, abdominal lymph nodes, bone, and brain. The average survival was found to be 4 months after undergoing a combination of palliative radiation and chemotherapy, which further highlights the poor prognosis regardless of management.

**Conclusions:** Very few cases of primary tumors outside the head and neck initially presenting as a lingual metastasis have been reported. We report a case of an undifferentiated carcinoma of the tongue metastatic from the lung in an otherwise healthy, non-smoking patient. This case highlights the need for clinical suspicion with unusual pathologic and imaging findings as well as a multidisciplinary approach to treat and palliate this overwhelming disease process.

### 63. Prognostic Indicators of Survival in Surgically Treated HPV Related Oropharyngeal Squamous Cell Carcinoma
David Guirguis, BS, Farmington, CT; Ernest Gomez, MD, Boston, MA; Victoria Huang, MD, Boston, MA; Peter Nagy, MD, Boston, MA; Scharukh Jalisi, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) know the difference between lymph node yield, number of positive lymph nodes, and lymph node ratio in the context of head and neck cancer; 2) understand the reliability of lymph node ratio when compared with lymph node yield and number of positive lymph nodes in patients with HPV related oropharyngeal squamous cell carcinoma; and 3) apply these results to practice when interpreting guidelines for prognosis and management of patients with HPV related oropharyngeal squamous cell carcinoma.

**Objectives:** To compare lymph node ratio (LNR) to lymph node yield (LNY) and number of positive lymph nodes (LNP) as a prognostic indicator of survival in surgically treated patients with HPV related oropharyngeal squamous cell carcinoma (OPSCC).

**Study Design:** Retrospective cohort study

**Methods:** Using the National Cancer Database (NCDB), 4130 patients with HPV related OPSCC treated with primary surgery from 2010-2016 were identified. Using classification and regression tree analysis (CART), maximally statistically significant thresholds for LNR, LNY, and LNP were identified. Analysis was repeated to include only patients who had LNY ≥ 18, which has been established as a quality metric for neck dissection.

**Results:** Among 4116 patients meeting inclusion criteria, CART optimally subdivided patients into LNP groups of 0-2 (relative hazard ratio \(RHR=0.78, p=0.002\)), 3-6 (\(RHR=1.19, p=0.002\)) and ≥ 7 (\(RHR=2.85, X^2=71.9, p<0.001\)). CART analysis identified 10% as the optimal LNR cutoff (LNR 0-10% RHR=.72, LNR 10-100% RHR=1.49, \(p<0.0001\)). When analysis was repeated on patients who had LNY ≥ 18, thresholds of LNP were unchanged: 0-2 (\(RHR=0.72\)), 3-6 (\(RHR=1.16\)) and ≥ 7 (\(RHR=2.90, p<0.001\)). In contrast, LNR thresholds were changed when adjusting for LNY: 0-5% (\(RHR=.64, p=0.0003\)), 5-15% (\(RHR=1.13, p=0.0003\)), 15.0-100% (\(RHR=2.34, X^2=55.11, p<0.0001\)).

**Conclusions:** The statistically, and potentially clinically, significant LNR thresholds that predict patient survival are affected by LNY, making lymph node ratio less reliable as a prognostic indicator of survival in HPV related OPSCC than number of positive lymph nodes and lymph node yield.

### 64. Factors Associated with Thigh Free Flap Donor Site Complications
Tu-Anh N. Ha, MD, Houston, TX; Nathan R. Lindquist, MD, Houston, TX; Zipei Feng, MD PhD, Houston, TX; David J. Hernandez, MD, Houston, TX; Andrew T. Huang, MD, Houston, TX
Educational Objective: At the conclusion of this presentation, the participants should be able to identify factors associated with thigh free flap donor site complications.

Objectives: To determine the incidence and risk factors of donor site complications following free flap harvest from the thigh for reconstruction of the head and neck. Study Design: Retrospective review. Methods: Retrospective review of all patients undergoing head and neck reconstruction with a microvascular free flap harvested from the thigh between 2016 and 2018 at an academic medical center. Results: A total of 165 patients were identified. The mean follow-up from date of surgery was 7.6 (± 6.6) months. Mean free flap width and surface area harvested were 8.5 (± 2.2) cm and 124.5 (± 69.8) cm², respectively. Thirty-five (21%) patients had at least one donor site complication. Thigh donor site complications included wound dehiscence or skin necrosis (n = 15, 9%), soft tissue skin infection or abscess (n = 10, 6%), seroma (n = 10, 6%), scar hypertrophy (n = 7, 4%), subjective quadriceps weakness (n = 5, 3%), hematoma (n = 1, 1%), and pain (n = 1, 1%). Five (3%) patients presented to the emergency room or had to be readmitted within 30 days of surgery for a donor site complication. On univariate analysis, body mass index (BMI) ≥ 25 was found to be a significant risk factor for development of a donor site complication (p = 0.0367). Neither thigh flap width > 8 cm nor surface area > 105 cm² were significantly correlated with donor site complications (p > 0.05). Conclusions: Donor site complications following thigh free flap harvest for head and neck reconstruction occur in 21% of cases but rarely result in 30 day readmission or reoperation. Overweight or obese patients are at increased risk for thigh donor site complications.

65. Sociodemographic Factors Impact Selection of Primary Treatment for HPV Associated Oropharyngeal Squamous Cell Carcinoma

Andy Mina Habib, MPH, Washington, DC; Aman Prasad, BS, Philadelphia, PA; Ryan M. Carey, MD, Philadelphia, PA; Robert M. Brody, MD, Philadelphia, PA; Jason G. Newman, MD, Philadelphia, PA; Jason A. Brant, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify how key sociodemographic factors impact primary treatment (either primary surgery or radiotherapy) for patients with HPV+ oropharyngeal squamous cell carcinoma (OPSCC). Additionally, they will appreciate how primary treatment choice for HPV+ OPSCC has changed over the past several years.

Objectives: Evaluate the impact of sociodemographic factors on primary treatment (surgery versus radiotherapy) for patients with HPV+ oropharyngeal squamous cell carcinoma (OPSCC). Study Design: Retrospective chart review of the National Cancer Database (NCDB). Methods: Records were obtained for patients diagnosed with HPV+ OPSCC from 2011 to 2015, focusing on those receiving primary surgery or radiotherapy (with/without adjuvant therapy). We accounted for a host of variables including sex, race, treatment facility, income, and insurance status. We used a multivariable logistic model to predict receipt of primary surgery versus radiotherapy based on the aforementioned covariates. Results: Of the 16,034 patients identified, 5,894 (36.7%) underwent primary surgery while 10,149 (63.3%) received primary radiotherapy. Black patients were less likely to receive primary surgery as compared to White (OR 0.80; 95% CI [0.66-0.96]). Compared to privately insured patients, those who were uninsured or covered by Medicaid, Medicare, or other government insurance were also less likely to receive primary surgery (OR 0.70; 95% CI [0.56-0.86], OR 0.77; 95% CI [0.65-0.91], OR 0.85; 95% CI [0.75-0.96], and OR 0.72; 95% CI [0.56-0.92], respectively). Patients receiving treatment at an academic/research cancer program were more likely to undergo primary surgery when compared to those treated at comprehensive community cancer programs (OR 1.33; 95% CI [1.14-1.56]). Conclusions: Several sociodemographic factors appear to impact primary treatment for patients with HPV+ OPSCC. Specifically, Black and non-privately insured patients are significantly less likely to receive primary surgery compared to White or privately insured patients, respectively. Our findings help further illuminate important causes of treatment disparities for this patient population.

66. Real Time MRI for Tongue Cancer Patients: A Literature Review

Celeste S. Kim, BS, Los Angeles, CA; Liyang Tang, MD, Los Angeles, CA; Uttam K. Sinha, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the advantages and limitations of using real time MRI for the study of speech in tongue cancer patients.

Objectives: We aim to describe the main modalities available for post-treatment imaging and to emphasize the potential role of real time MRI (rtMRI) in analyzing speech function in tongue cancer patients. Study Design: Literature review. Methods: PubMed was searched for articles on rtMRI and speech. Search terms included real time, MRI, and speech. Articles that were not in English, those without full text, and those not focused on everyday speech were excluded. Results: Real time MRI allows for real time acquisition of dynamic movements, including those involved in speech. Although other imaging modalities, including ultrasound, CT, videofluoroscopy, and electromagnetic articulography are available, rtMRI has features that allow for a more detailed study of speech. There have been technological advancements in rtMRI that provide high spatial resolution and allow for temporal resolutions that are comparable to other real time imaging modalities, with some studies citing up to 83 frames per second. Real time MRI also provides visualization of the entire vocal tract, including
individual tongue muscles. Patients are not required to provide perfectly synchronized repetitions, and multiple views (i.e., sagittal, coronal) are available without moving the patient. There have also been advances in tagging techniques that allow for longer tag persistence, and consequently allow for longer dynamic images. Conclusions: Advancements in recent real time MRI technology have allowed for more detailed study of natural speech production. There is potential for rtMRI to be further incorporated into the study of speech production in post-treatment tongue cancer patients. Additional studies are needed to explore the role of rtMRI in guiding and improving speech rehabilitation.

67. Shared Decision Making between Parents, Children, and Surgeons during Pediatric Head and Neck Tissue Expansion

Ami Lesha, Boston, MA; Andrew Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to learn more about tissue expansion as a technique that allows for expansion of healthy adjacent tissues when simple flap reconstruction is not feasible or would yield inferior aesthetic results.

Objectives: To present 3 pediatric scalp or mastoid tissue expansion cases that highlight the potential social challenges of using this technique in school age children. Study Design: Case series with literature review. Methods: Case series with chart review involving 3 patients, ages 7-12 years, who underwent head and neck tissue expansion. A literature review was conducted to examine standard protocols for pediatric tissue expansion. Results: Two girls and one boy underwent tissue expansion procedures in the postauricular, temporal, or parietal scalp. Indications for expansion included microtia and congenital nevus sebaceous. All three children tolerated implantation of the expanders well, however each experienced pain during the expansion process. All requested that expansion schedules be altered, eventually asking that the process be terminated early. All such requests were honored and all three children obtained successful aesthetic and functional results. A literature review revealed that nearly all reports of expansion in school age children were from China and for the indication of microtia. Protocols typically involve three times weekly expander fills; data describing the comfort level of patients or the consistency their assent to such protocols are not available. Conclusions: Head and neck tissue expansion in children is most commonly related to microtia reconstruction. The process of expansion can be uncomfortable and more data is needed in regards to whether it is possible to achieve reconstructive goals while still honoring patient autonomy.

68. CXCL17 as a Prognostic Biomarker for Aggressive Cutaneous Squamous Cell Carcinoma

Janmaris Marin Fermin, MD, Shreveport, LA; Ameya Asarkar, MD, Shreveport, LA; Maksudul Alam, PhD, Shreveport, LA; Xin Gu, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA; Alok Khandelwal, PhD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand CXCL17 expression patterns and its prognostic value in aggressive cutaneous squamous cell carcinoma.

Objectives: To investigate the correlation of CXCL17 and clinicopathological factors associated with recurrence, metastasis, and disease specific death in cutaneous squamous cell carcinoma. Study Design: Case control study. Methods: A retrospective chart review was conducted to identify patients with cutaneous squamous cell carcinoma. Tissue samples were immunostained for human CXCL17/VCC-1. Risk factors such has depth of invasion, perineural invasion, tumor diameter, location and differentiation were obtained from chart review/clinical databases and correlated with the expression of CXCL17. Results: Among 42 subjects included in the analysis, the histoscore of CXCL17 expression in cytoplasm and nucleus was higher in the malignant group compared to the normal skin group (p=0.01 and p=0.03, respectively). Interestingly, the histoscore of CXCL17 expression was associated with perineural invasion (p=0.01) suggesting a role for CXCL17 in disease aggressiveness. Conclusions: Our results indicate a positive correlation between CXCL17 and cSCC aggressiveness. Increased expression of CXCL17 was associated with perineural invasion, a principal risk factor for recurrence, metastasis, and disease specific death in cSCC patients. These results suggest that CXCL17 plays a role as a prognostic marker and warrants further exploration as a potential target for treatment in aggressive cSCC.

69. Frailty Is Independently Associated with Worse Outcomes and Increased Resource Use following Procedures to Treat Sinonasal Cancer

Morcos N. Nakhla, MS, Los Angeles, CA; Rodell T. Santuray, MD, Los Angeles, CA; Peyman Benharash, MD, Los Angeles, CA; Jeffrey D. Suh, MD, Los Angeles, CA; Jivianne T. Lee, MD, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should understand the impact of frailty on clinical outcomes and resource utilization following surgery to treat sinonasal cancer.

Objectives: Frailty has been associated with worse outcomes following many operative procedures. We aimed to validate these findings among patients undergoing surgery for sinonasal cancer (SNC) using a nationwide database. Study Design: Retrospective cohort study. Methods: Inpatient hospitalizations were identified for patients undergoing surgery for SNC.
using the 2005-2017 National Inpatient Sample database. The Johns Hopkins Adjusted Clinical Groups (ACG) frailty defining diagnosis indicator was used to designate frailty. Multivariate regression models were used to assess the association of frailty with clinical outcomes. **Results:** Of an estimated 15,872 patients, 9.1% (1,437) were frail. Frail patients were older (64 vs. 61 years; \( p<0.001 \)) and had a greater burden of comorbidities (4.1 vs. 2.8; \( p<0.001 \)) as measured by the Elixhauser comorbidity index. Frailty rate increased significantly throughout the study period (\( p<0.001 \)). Although in-hospital mortality rate did not change (\( p=0.630 \)), both the rate of complications (\( p=0.010 \)) and non-home discharge (\( p=0.001 \)) increased significantly over time. Adjusting for patient and hospital characteristics, frailty was associated with significantly greater odds of non-home discharge (AOR:4.0; \( p<0.001 \)) and complications (AOR:2.6; \( p<0.001 \)), including respiratory (AOR:2.8; \( p<0.001 \)) and infectious (AOR:2.6, \( p<0.001 \)) complications, but not mortality (AOR:2.7; \( p=0.11 \)). Frailty was also associated with significantly increased length of stay (\( \beta=6.1 \) days; \( p<0.001 \)) and hospitalization costs (\( \beta=$17,628; p<0.001 \)). While higher volume centers did not have significantly different clinical outcomes, they were associated with increased cost (\( \beta=$5,427; p=0.004 \)). **Conclusions:** Frailty is independently associated with worse outcomes and increased resource use among adult patients undergoing surgery for SNC. Thus, efforts to mitigate the impact of frailty should be further explored.

70. **Proliferative Myositis: An Uncommon Cause of Recurrent Trismus and Facial Swelling**

**Kevin James Quinn, MD, Richmond, VA; Lexie Lulu Wang, MD, Richmond, VA; Evan Reiter, MD, Richmond, VA**

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the clinical presentation of proliferative myositis and incorporate it into their differential diagnoses for patients presenting with trismus and facial swelling of unclear etiology.

**Objectives:** 1) Present an illustrative case of a patient with trismus and facial swelling of unclear etiology; 2) review the typical imaging and histopathologic findings of proliferative myositis; and 3) review the treatment for proliferative myositis with an emphasis on avoidance of unnecessary surgical intervention. **Study Design:** Case report. **Methods:** Chart and imaging review. **Results:** A 56 year old otherwise healthy female presented with a 6 month history of intermittent left sided facial swelling and progressive trismus. She had been treated with several courses of antibiotics without resolution. Evaluation with Panorex imaging was not suggestive of a dental etiology. CT imaging demonstrated diffuse thickening of the temporalis muscle with mild surrounding fat stranding with no discrete mass or fluid collection. Subsequent MRI revealed generalized soft tissue edema and blurring of fat planes involving the infratemporal fossa, retromaxillary, buccal, parapharyngeal, and masticator spaces with enhancement extending to the level of the inferior aspect of mandibular ramus but sparing the bone. A transoral incisional biopsy of the left masseter muscle revealed prolific inflammatory involvement of skeletal muscle fibers with associated necrosis, with rare chronic perivascular inflammation. Based upon clinical, radiographic, and clinical findings suggested of proliferative myositis, she was started on oral prednisone with improvement in both her trismus and swelling. **Conclusions:** Patients presenting with nonspecific trismus and facial swelling in the absence of infection or neoplasm can pose a diagnostic challenge. Proliferative myositis is an uncommon pathology but is important to recognize as it is a benign process that resolves spontaneously or with conservative intervention.

71. **Aneurysmal Bone Cysts of Craniofacial Bones: A Systematic Review**

**Rafey Rehman, BS, Rochester, MI; Antonio Dekhou, BS, Troy, MI; Muhammad Osto, BS, Detroit, MI; Jacob Agemy, BS, Dearborn, MI; Brian Yuhan, MD, Maywood, IL; Eric Thorpe, MD, Maywood, IL**

**Educational Objective:** At the conclusion of this presentation, the participants should be able to summarize the clinical characteristics, imaging findings, management, and outcomes of aneurysmal bone cysts originating in the craniofacial bones.

**Objectives:** Aneurysmal bone cysts (ABCs) are blood filled, locally destructive, benign bone tumors. Our objective was to conduct a systematic review outlining patient demographics, clinical characteristics, management, and outcomes of those with aneurysmal bone cysts of the craniofacial bones. **Study Design:** Systematic review. **Methods:** Following PRISMA guidelines, a systematic review was conducted. Using PubMed, Cochrane, and Embase databases, 116 studies were included. Data including patient demographics, clinical characteristics, treatment strategies, and patient outcomes were collected. **Results:** A total of 125 patients from 116 studies were identified. Age ranged from 10 months to 90 years, with a mean age of 18.8 years. The most commonly affected craniofacial locations were the mandible (n=31, 24.8%), skull base (n=25, 20.0%), and temporal bone (n=20, 16.0%). The most common presenting symptoms included a nontender mass (n=43, 34.4%), a tender mass (n=31, 24.8%), and generalized headache (n=31, 24.8%). Imaging modalities included CT and MRI (n=77, 61.6%), CT alone (n=31, 24.8%), and MRI alone (n=8, 6.4%). All patients underwent surgical resection, with one patient requiring adjuvant radiation in addition to surgery. 119 patients were disease and symptom free without evidence of recurrence (17.4 month mean followup). **Conclusions:** The current literature's characterization of ABCs in craniofacial bones is limited by case reports and case series. Given the rarity of these tumors, head and neck surgeons must rely on systematic reviews such as the present analysis to guide management.
Educational Objective: At the conclusion of this presentation, the participants should be able to understand the characteristics of, and factors influencing incidental parathyroidectomy pediatric patients undergoing thyroidectomy.

Objectives: Incidental parathyroidectomy is a relatively common occurrence in thyroidectomy which may lead to hypoparathyroidism and postoperative hypocalcemia but has not previously been studied in the pediatric population. This study examines the rate of incidental parathyroidectomy, identifies risk factors, and investigates long term complications in children undergoing thyroidectomy. **Study Design:** A retrospective chart review was conducted of the last 100 patients undergoing primary thyroidectomy at a high volume tertiary care children's hospital. **Methods:** Pathology reports were reviewed to determine incidental parathyroid gland tissue. Additional data collected included patient demographics, type of procedure, underlying thyroid pathology, as well as immediate and long term postoperative clinical outcomes. **Results:** Out of a total of one hundred patients undergoing thyroidectomy, 34 had incidental parathyroid tissue in the surgical specimen (34%). Incidental parathyroidectomy was positively associated with thyroidectomy for a diagnosis of malignancy, concomitant parathyroid auto-transplantation, and lymph node dissection, particularly central neck dissection (35%, p=0.003). After a median followup of one year, there was no statistically significant difference in use of calcitriol between the two groups (18% vs 14%, p=0.6). There were no differences in age, sex, race, medical history nor postoperative complications between those with and without incidental parathyroidectomy. **Conclusions:** Incidental parathyroidectomy was relatively common in our pediatric thyroidectomy series. Thyroid malignancy and lymph node dissection were associated with higher rates of incidental parathyroidectomy. While most published articles report long term complication outcomes at 6 months, a median followup period of one year in this study did not find any association between incidental parathyroidectomy and persistent hypoparathyroidism.

Objectives: To investigate the incidence of synchronous malignancies during triple endoscopy in patients with head and neck cancer. **Study Design:** A retrospective chart review of patients from our medical center was performed. **Methods:** Patients with a primary head and neck squamous cell carcinoma who underwent triple endoscopy were included. Operative, radiographic, and pathologic reports were reviewed to evaluate for the presence of simultaneous malignancies in the aerodigestive tract diagnosed through endoscopy. Relevant medical history, including tobacco and alcohol use, and tumor characteristics were recorded. Univariable and multivariable regression analyses were conducted to assess for associations with synchronous malignancy on triple endoscopy. **Results:** 215 patients were reviewed, 164 of which had biopsy positive head and neck cancer and underwent simultaneous flexible bronchoscopy and esophagoscopy. Simultaneous lesions were found in 9 patients (5.5%) on triple endoscopy. Of the simultaneous lesions, two were identified on esophagoscopy and bronchoscopy; the remaining seven were found on direct laryngoscopy. Clinical comorbidities including smoking and alcohol history, tumor p16 status, and tumor stage were not associated with presence of simultaneous lesions. **Conclusions:** This study shows the incidence of synchronous lesions on triple endoscopy to be closer to 5%. While endoscopic examination can be useful in the anatomic characterization of head and neck malignancies, the low incidence of synchronous malignancies suggests that the need for bronchoscopy and esophagoscopy may be considered on a case by case basis.

Objectives: Accessory parotid glands (APG) arise from salivary gland tissue anatomically distinct from the main parotid gland. Different surgical approaches have been described, yet no consensus on optimal surgical management exists. The purpose of this study is to report a 40 year single institution experience with surgical treatment of APGs lesions. **Study Design:** Retrospective case series at a single tertiary center of all APGs undergoing surgical treatment between 1980 to 2020. **Methods:** Retrospective chart review was performed to identify presenting characteristics, workup, pathology, surgical approach and outcomes. **Results:** Forty-five patients were identified with a median age of 52 years. Twenty-nine
undergone excision by a Mohs surgeon, resulting in a scar that may be difficult to identify for SPECT/CT radioisotope quality patient care. For instance, many lesions that are referred to head and neck surgeons for SLNB have previously undergone surgery, dermatology, pathology, and nuclear medicine that can be challenging to coordinate and achieve consistency for significant and imperative clinical implications in the post-treatment surveillance of head and neck cancers.

Objectives: Most commonly affecting the mandible, osteoradionecrosis (ORN) is a well known complication of radiation therapy for head and neck cancer. To date, only a few reports have described ORN affecting the hyoid bone. We aim to define the clinical implications of this adverse effect. Study Design: Retrospective case series. Methods: Herein, we describe a retrospective case series of previously irradiated patients who presented with sudden airway compromise, found to have underlying pathological fractures of the hyoid bone secondary to osteoradionecrosis. Results: Six patients within the post-treatment period (range: 3-9 months) following concurrent chemoradiation for oropharyngeal squamous cell carcinoma presented with acute onset dyspnea. Four patients required emergent intubation. Computed topography (CT) imaging was remarkable for local post-treatment changes, severe airway luminal narrowing, and pathological fractures of the hyoid. All six patients were urgently taken to the operating room for direct laryngoscopy and tracheostomy. Intraoperatively, exposed necrotic hyoid bones were observed in five patients. No gross or histological evidence of tumor recurrences were noted. Conclusions: The hyoid arch and its associated musculature strongly influence upper airway resistance and patency. Osteoradionecrosis and pathological fractures may compromise its physiological function and lead to acute airway compromise. Although rare in comparison to mandibular incidence, ORN of the hyoid bone may hold significant and imperative clinical implications in the post-treatment surveillance of head and neck cancers.

Educational Objective: To better define the clinical and physiological implications of osteoradionecrosis affecting the hyoid bone and illustrate the potential acute airway compromise as a result of its pathological fracture.

75. Osteoradionecrosis of the Hyoid Presenting as Acute Airway Compromise

Luke Stanisce, MD, Camden, NJ; Zoe Begun, BS, Camden, NJ; Nadir Ahmad, MD, Camden, NJ; Gregory J. Kubicek, MD, Camden, NJ; Yekaterina Koshkareva, MD, Camden, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the challenges and solutions for sentinel lymph node biopsies for head and neck melanoma.

Objectives: Sentinel lymph node biopsies (SLNB) for head and neck melanoma require a multidisciplinary team including surgery, dermatology, pathology, and nuclear medicine that can be challenging to coordinate and achieve consistency for quality patient care. For instance, many lesions that are referred to head and neck surgeons for SLNB have previously undergone excision by a Mohs surgeon, resulting in a scar that may be difficult to identify for SPECT/CT radioisotope injection. Furthermore, many patients—particularly the immunocompromised—present with multiple skin lesions, making identification of the target lesion difficult. Finally, lymphatic drainage of the head and neck regions is complex due to multiple lymph node basins. Therefore, close communication between different specialties within a multidisciplinary melanoma team is crucial to performing reliable SLNB for melanoma. Here, we describe the feasibility of such an approach to SLNB for head and neck melanoma. Study Design: Prospective study. Methods: 10 patients with head and neck cutaneous melanoma requiring SLNB with no clinical or radiologic nodal or distant metastases were enrolled. Results: All referring providers filled a worksheet with photos of the patient and lesion in a standardized view as well as instructions to identify the lesion using anatomic landmarks and a gridding system. After the surgeon marked the lesions of interest before the operative area, the patients were transported to nuclear medicine for radioisotope injection. The nuclear medicine physician identified the targets for SLNB on the SPECT/CT which were then marked using a standardized grid system and measured distances from known anatomic landmarks. After injection of indocyanine green (ICG), the surgeon confirmed the SLNB with an ICG scope as well as a gamma probe before sending the specimen for pathology. All sentinel lymph nodes were successfully identified, and no complications were observed. Conclusions: Successful SLNB for head and neck melanoma requires a standardized workflow and multidisciplinary team approach.
Objectives: This study seeks to better understand underlying factors predictive of unplanned hospital admission following outpatient parotidectomy. **Study Design:** Retrospective database review. **Methods:** Cases with primary current procedural terminology (CPT) codes for parotidectomy were collected from the National Surgical Quality Improvement Program from 2011-2018. Only nonemergent elective outpatient cases with a single CPT code were included. Unplanned admissions were defined as cases with a hospital stay of at least one day. Univariate analysis and multivariate logistic regression were applied to compare differences in patient demographics and comorbidities. **Results:** 6,052 parotidectomy cases met inclusion criteria, of which 2,925 (48.3%) were unplanned admissions. Unplanned admissions were more likely to be older (mean age 58.2 vs 55.7 years, p<0.001), female (55.3%, p=0.013), and white (72.5%, p<0.001). Superficial parotidectomy with nerve dissection was the most common procedure that had an unplanned admission (66.3%, p<0.001). Obesity, hypertension, diabetes, dyspnea, bleeding disorder, chronic obstructive pulmonary disease, and American Society of Anesthesiologists classification III-IV were significantly associated with unplanned admission (p<0.05). Multivariate analysis showed older age (OR 1.01, p=0.002), female gender (OR 1.18, p=0.002), and presence of a bleeding disorder (OR 1.39, p=0.001) to predict admission. Compared to superficial parotidectomy without nerve dissection, total parotidectomy (OR 4.01, p<0.001) and superficial parotidectomy with nerve dissection (OR 3.13, p<0.001) were associated with unplanned admission. **Conclusions:** Older age, female gender, presence of a comorbid bleeding disorder, and a more extensive procedure were significant risk factors for predicting unplanned admission after parotidectomy.

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**78. Transoral Excision of a Large Accessory Parotid Gland Tumor**  
Rohith Subash Voora, BS, San Diego, CA; Joshua Stramiello, MD, MD, San Diego, CA; Emily Funk, MD, San Diego, CA; Joseph Califano, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the pros and cons of a transoral approach for APG tumor excision and its comparative efficacy to a traditional transcutaneous approach.

**Objectives:** To report the experience of transoral excision of a large accessory parotid gland tumor. **Study Design:** Case report. **Methods:** The electronic medical record was queried for a detailed operation report and imaging studies. **Results:** Accessory parotid gland (APG) tumors account for 1-7% of all parotid gland neoplasms but are more likely to be malignant than main parotid gland tumors. Four main approaches to resection have been described with varying facial nerve outcomes. We report a case of transoral excision of a 4 cm APG pleomorphic adenoma without postoperative facial nerve injury. A transoral approach is known to mitigate patients’ cosmetic concerns, however, prior reports utilized endoscopic assistance on patients with smaller tumors. **Conclusions:** Large APG tumors can be excised through a transoral approach without undue risk to the distal facial nerves but may not be appropriate for malignant neoplasms or difficult dissections.

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**79. Use of Crowdfunding to Support Patients with HPV Related Oropharyngeal Cancer**  
Deborah X. Xie, MD, Baltimore, MD; Marietta Tan, MD, Baltimore, MD; C. Matthew Stewart, MD PhD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) describe motivations for GoFundMe campaigns among patients with HPV related oropharyngeal cancer; and 2) understand how GoFundMe campaigns may reflect systemic barriers of healthcare cost and access faced by patients.

**Objectives:** With the ever increasing burden of healthcare costs, many people are turning to crowdfunding for financial support. For example, GoFundMe raises over $650 million per year for medical expenses. We analyzed how such crowdfunding supports patients with human papillomavirus (HPV) related oropharyngeal cancer. **Study Design:** Observational. **Methods:** GoFundMe was searched for “HPV cancer”. US based fundraisers supporting individuals with oropharyngeal cancer were included. Campaigns were reviewed for fundraising goals, donations, patient demographics, and disease characteristics. Inactive fundraisers were excluded. Differences in groups were calculated with Mann-Whitney tests. **Results:** Of 227 search results, 63 fundraisers from 2014-2020 met criteria for inclusion. Campaigns had a median goal of $10,000 [interquartile range (IQR) $8,750-$24,500] and raised a median of $4,398 (IQR $2,155-$10,689). There was a higher fundraising goal in states which did not expand Medicaid under the Affordable Care Act [median $17,500 (IQR $10,000-$30,000)] compared to those which did [median $10,000 (IQR $5,000-$20,000), p=0.03]. Treatment costs and loss of income were common motivations for starting campaigns. Regarding disease and treatment specifics, stage III or stage IV disease (likely based on AJCC 7th edition) was specified in 38% of patients. Three individuals were undergoing alternative treatments such as ozone therapy and cannabis. Ten campaigns included educational content including...
HPV-CÎ©s role in disease pathogenesis or vaccination/prevention. **Conclusions:** Crowdfunding may offset the costs associated with treatment and lost wages for patients with HPV related oropharyngeal cancer. Though fundraisers may assist these individuals, these findings also highlight systemic barriers of healthcare cost and access faced by patients.

**Laryngology/Bronchoesophagology**

**80. Tracheoesophageal Puncture Failure: A Scoping Review of Patient Characteristics and Etiologies**
Shaghayegh S. Azar, BS, Los Angeles, CA; Karuna Dewan, MD, Palo Alto, CA; Dinesh K. Chhetri, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the risk factors that predispose TEP patients to prosthesis failure.

**Objectives:** Tracheoesophageal prosthesis (TEP) failure negatively affects quality of life due to poor voice and repeat interventions to restore function. We performed a scoping review to characterize the common patient characteristics associated with TEP failure and determine the effects of radiation therapy on TEP failure. **Study Design:** Scoping review of all English language articles from 1980 to 2020 addressing causes of TEP failure using PubMed. **Methods:** This review followed the population, intervention, comparison, outcome and study (PICOS) guideline. A scoping review, rather than a systematic review, was performed due to the heterogeneity of published data. A comprehensive search strategy using PubMed's MeSH subject headings and keywords was created. 544 peer reviewed journal articles were reviewed for inclusion by two independent reviewers. Discrepancies in article selection were settled by a third, independent reviewer.

**Results:** TEP failure was defined as the inability to maintain a usable tracheoesophageal fistula tract. Preliminary analysis revealed the following common causes for TEP failure: biofilm, fungal growth, granulation tissue, acid reflux, and esophageal dysmotility. Common reasons for closure of the tracheoesophageal fistula included poor speech quality, difficulty in managing the fistula, loss of manual dexterity, and persistent leakage. No difference in the failure rate between primary and secondary TEP placement was identified. History of radiation therapy was associated with TEP complications, but not with increased failure rates. **Conclusions:** Available literature on etiologies of TEP failure is incredibly heterogeneous making reliable comparison difficult. It is imperative to identify patient characteristics that would complicate TEP use and predispose to failure.

**81. A Case of Congenital Failure of Cricoid Ring Cannulation**
Jerlon Chiu, MD, Stony Brook, NY; Melissa Mortensen, MD, Albany, NY; Roy Qu, BS, Stony Brook, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe a case report of a patient with a novel failure of cricoid canalization.

**Objectives:** To present a case report of congenital posterior glottic stenosis due to failure of cricoid ring cannulation presenting in an elderly patient. **Study Design:** Case report. **Methods:** Medical documentation, laboratory data, imaging, and operative reports of a single patient were reviewed. **Results:** We report a novel cricoid failure of canalization defect discovered in a 71 year old female with a medical history of gastroesophageal reflux, postnasal drip, and a distant history of endotracheal intubation for Guillain-Barre syndrome, tracheostomy and decannulation, presenting with persistent dysphonia and dyspnea. On stroboscopy, she was found to have a posterior glottic band and tracheal stenosis. Computed tomography demonstrated the posterior glottic band was cartilaginous and connected the right and left cricoid cartilage, forming a 0.2 cm posterior airway lumen. The patient underwent suspension microlaryngoscopy with CO2 laser excision of the partially calcified cartilage. Final pathology was consistent with a cricoid canalization defect. Congenital posterior glottic stenosis (PSG) is rarely diagnosed after childhood, however, this case illustrates the possibility of subclinical congenital PSG in adults that may only become symptomatic after airway manipulation and untreated laryngopharyngeal reflux. **Conclusions:** Although congenital anomalies present rarely in adulthood, they should be considered in the differential for laryngotracheal stenosis.

**82. A Method of Physiologic and Mathematical Characterization of Subglottic Stenosis Using Pulmonary Function Studies and Signal Analysis of Imaging Data**
Tyler Crosby, MD, New Orleans, LA; Michael Dunham, MD, Baton Rouge, LA; Lacey Adkins, MD, Baton Rouge, LA; Andrew McWhorter, MD, Baton Rouge, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) describe current methods to characterize subglottic stenosis and their limitations; and 2) have a general understanding of the principles of signal analysis and how they can be used to detect and describe features in the geometry of the airway.

**Objectives:** We sought to apply wavelet signal analysis to characterize the radiographic airway geometry of stenotic airways and correlate this characterization to physiologic function as quantified by spirometry. **Study Design:** Retrospective observational study. **Methods:** Charts were reviewed to identify patients with recurrent laryngotracheal stenosis and serial
spirometry, and recorded spirometric measures were tabulated. From this population, we identified patients with CT imaging of the laryngotracheal airway. 3D models of the airway lumen were generated and used to provide measurements of cross-sectional diameter, area, and circumference along the length of the airway. Wavelet analysis then characterized the stenosis by location, feature length and degree of stenosis. These measures were then correlated to the previously recorded spirometric data. Results: Our wavelet analysis method successfully produces a heatmap that can accurately and automatically localize the stenosis and provide a measure of stenosis length and severity. Conclusions: The challenges in the management of laryngotracheal stenosis lie in when and how to intervene. Treatment decisions can be guided by endoscopic assessment and spirometric measures, but still rely heavily on clinical experience and judgment, and patient reported changes in symptoms. We provide a new tool for objective assessment of laryngotracheal stenosis to better characterize the disease and guide management.

83. Examining the Relationships between Subjective Ratings and Objective Measures of Vocal Fold Bowing during Flexible Laryngoscopy
James A. Curtis, PhD CCC-SLP BCS-S, New York, NY; James C. Borders, MS CCC-SLP, New York, NY; Andrew Titter, MD, New York, NY; Michelle S. Troche, PhD CCC-SLP, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the relationship between subjective and objective ratings of vocal fold bowing; and 2) describe quantitative differences in bowing index scores between subjective, categorical ratings of vocal fold bowing.

Objectives: Vocal fold bowing has been found to influence voice, cough, and swallowing in patients with dysphonia and dysphagia. The current gold standard to measure vocal fold bowing is the Bowing Index (BI), yet most clinicians rely on subjective categorical ratings. Therefore, this study examined the relationships between subjective and objective ratings of vocal fold bowing. Study Design: Cross-sectional secondary analysis. Methods: Flexible laryngoscopy was used to analyze vocal fold bowing in 47 patients with neurodegenerative disease and suspected dysphonia or dysphagia. Subjective ratings of vocal fold bowing were blindly assessed using a 4 point ordinal rating scale. Blinded objective ratings of vocal fold BI were made with ImageJ analysis software. Statistical analyses were used to 1) examine the correlation between subjective categorical ratings and objective quantitative ratings of vocal fold bowing; and 2) examine mean differences in BI scores across subjective rating categories. Results: Spearman's correlation revealed a strong positive correlation between subjective and objective ratings of vocal fold bowing, r = .706, p < .0005. One way ANOVA revealed significant differences in BI across all subjective rating categories, F (3, 43) = 19.849, p < .0005, η² = 0.58, with mean (standard deviation) BI for none, mild, moderate, and maximal bowing being 0.0 (0.0), 9.5 (0.03), 13.0 (0.03), and 16.8 (0.03), respectively. Conclusions: Vocal fold bowing is a clinically important finding derived from endoscopic evaluations of voice and swallowing. Results from this study demonstrate that subjective, categorical ratings provide meaningful information related to vocal fold bowing and are consistent with current gold standard techniques of vocal fold bowing.

84. An Unusual Case of Bilateral Vocal Cord Granuloma and Anterior Glottic Web after Vocal Cord Papilloma Excision
Benjamin T. Ostrander, MD MSE, La Jolla, CA; Vanessa K. Yu, BS, San Diego, CA; Andrew Vahabzadeh-Hagh, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize a possible increased risk of granuloma in the setting of recurrent respiratory papillomatosis treated with the laryngeal microdebrider and CO2 laser.

Objectives: Granulomas are thought to occur as a result of mechanical trauma and inflammation, including intubation, phonotrauma, and reflux, but their formation has not been associated with microdebrider use. Here we report a case of delayed large vocal process granulomas and anterior glottic web after treatment of vocal cord papillomas with a microdebrider and CO2 laser. Study Design: Case report and literature review. Methods: We investigate a unique presentation of vocal process granuloma after treatment of papillomas with a microdebrider and CO2 laser in a patient with RRP. Results: 28 year old male who was referred for 9 months of dysphonia. Laryngoscopy revealed bilateral exophytic lesions studding each true vocal cord. The lesions were removed using a microdebrider and CO2 laser, with care taken to avoid excessive trauma. Pathology confirmed squamous papilloma. Four months later, he re-presented with multiple recurrent supraglottic papillomas, but no glottic lesions. He was brought back to the OR one month later, revealing bilateral false vocal cord and epiglottal lesions, as well as distinct inflammatory lesions overlying the vocal processes. These were removed with the microdebrider and CO2 laser. Pathology confirmed granuloma and recurrent papilloma. At most recent followup, the patient showed improved voice and no recurrence. Conclusions: There is a possible increased risk of granuloma in the setting of RRP. Risk factors include mechanical trauma from frequent laryngeal surgery with intubation, poor compensatory voice use resulting in phonotrauma, inflammation from HPV, and LPR. Sources of mechanical and inflammatory trauma should be minimized, with consideration of voice therapy, antireflux medications, and steroid injection.
85. **Improvements in Cognition after Surgical Management of Obstructive Sleep Apnea**
Emily Sagalow, BS, Philadelphia, PA; Matthew Stewart, BS, Philadelphia, PA; Nicolas Zingas, BS, Philadelphia, PA; Maurits Boon, MD, Philadelphia, PA; Colin Huntley, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how treatment of obstructive sleep apnea (OSA) with surgical intervention impacts cognition.

**Objectives:** To determine changes in cognition after upper airway stimulation (UAS) and expansion sphincter pharyngoplasty (ESP) in patients with obstructive sleep apnea (OSA). **Study Design:** Prospective study. **Methods:** Patients diagnosed with OSA who failed continuous positive airway pressure (CPAP) therapy undergoing UAS or ESP were evaluated. Cognition was assessed once preoperatively and once postoperatively. We utilized three NIH Toolbox assessments to evaluate components of cognition including processing speed, attention, executive function, and working memory. Only patients who received preoperative and postoperative tests were included. **Results:** Of 67 patients who underwent ESP or UAS, 11 (16.9%) completed both preoperative and postoperative cognition testing. Three (27.3%) underwent UAS and 8 patients (72.7%) underwent ESP. Average preoperative AHI was 29.6. Average postoperative AHI was 19.1. Overall cognition showed significant improvement across the whole cohort based on comparison between pre and postoperative test scores (p=0.007). When separated by surgery, those receiving ESP had improvement in all three cognition categories combined (p<0.001), including processing speed (p=0.031) and attention/executive function (p=0.008), whereas those receiving UAS did not have significant improvements in any categories. **Conclusions:** Patients who are treated with UAS or ESP for obstructive sleep apnea showed significant improvement in their cognitive abilities. More data, specifically for those who underwent UAS and including increased number of patients enrolled, are needed to confirm these findings. The remaining enrolled patients have undergone preoperative, but not postoperative testing, and will be added once they complete postoperative testing.

86. **Characterizing Vocal Fold Bowing and Its Effects on Cough and Swallowing Function in Cerebellar Ataxia**
Andrew Geoffrey Tritter, MD, New York, NY; James A. Curtis, PhD CCC-SLP BCS-S, New York, NY; James C. Borders, MS CCC-SLP, New York, NY; Sheng-Han Kuo, MD, New York, NY; Michelle S. Troche, PhD CCC-SLP, New York, NY

**Educational Objective:** Attain a better appreciation for the relationship between vocal fold bowing and cough/swallowing function in cerebellar ataxia.

**Objectives:** Cerebellar ataxia (CA) can result in progressive deficits of airway protection and increased risk for aspiration pneumonia. The relationship between vocal fold (VF) bowing and swallowing/cough function has been described in several neurodegenerative conditions; however, this relationship has not been tested in patients with CA. We aimed to describe the prevalence of vocal fold bowing in CA and its relationship to swallowing and cough outcomes. **Study Design:** Retrospective cohort analysis. **Methods:** Twenty-four people with CA completed instrumental assessments of VF bowing, swallowing, and cough. VF bowing was measured by calculating the bowing index (BI) as observed on flexible endoscopy. Swallowing was also assessed using flexible endoscopy. Reflex and voluntary cough were assessed during spirometric testing. Statistical analyses were used to: 1) characterize the frequency of none, mild-moderate, and severe BI in CA; 2) assess the relationship between disease severity and BI; and 3) examine the influence of BI on swallowing and cough functional outcomes. **Results:** Three (13%) participants exhibited "severe" bowing, 20 (83%) exhibited mild to moderate, and one (4%) demonstrated no bowing. There was a small, statistically nonsignificant correlation between disease severity and BI (r = 0.25, p = .28). BI did not influence swallowing safety or efficiency, nor did it influence reflex or voluntary cough peak expiratory flow rate or cough expiratory volume (p > .05). **Conclusions:** VF bowing is prevalent in patients with CA, though not significantly correlated with disease severity. No relationship was identified between BI and swallowing/cough function. These results suggest that BI may not be a primary contributor to airway protective deficits in CA.

87. **The Association between Arachnoid Granulations and Pulsatile Tinnitus**
Michael J. Bauschard, MD MS, Richmond, VA; Kaitlyn Reichl, BS, Richmond, VA; Leandro Socolovsky, BA, Richmond, VA; Aristides Sismanis, MD, Richmond, VA; Daniel Coelho, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the association between dural venous sinus arachnoid granulations and pulsatile tinnitus.

**Objectives:** To determine the relationship, if any, between dural venous sinus arachnoid granulations and pulsatile tinnitus. **Study Design:** Retrospective case control. **Methods:** Between Oct 1999 and March 2020, all magnetic resonance imaging (MRI/MRV) studies ordered in patients with and without tinnitus (pulsatile and non-pulsatile) were assessed for the presence of dural venous sinuses arachnoid granulations (AG). Demographic variables including location of AG, patient age, gender,
race, BMI, and history of idiopathic intracranial hypertension (IIH) or obstructive sleep apnea (OSA) were recorded.

**Results:** A total of 651 patients with tinnitus met inclusion criteria. AGs were found in 18/250 (7.2%) of PT patients, but only 1/401 (0.25%) of NPT patients (OR 31.0, CI 4.1 - 234, p < .001). For patients with PT, the AGs were more likely to be located in the lateral sinuses (i.e., sigmoid, transverse) than in patients without tinnitus. (97% vs. 80%, p = 0.022). Patients with PT were more likely to have a higher BMI, be female, non-white, and have an existing diagnosis of IIH.

**Conclusions:** This study reports the first known association between AG and PT, although the exact relationship (causative vs. correlative) remains unclear. Given the role AGs play in both CSF reabsorption and the glymphatic system, such findings may shed insight into the mechanism of PT in patients with intracranial hypertension.

88. **Pathogenesis of Primary Acquired Cholesteatoma: Systematic Review and Updates in Research**

Nathaniel Breslin, BA, Gainesville, FL; Adam Snoap, MD, Gainesville, FL; Rex Haberman, MD, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the major theories explaining the pathogenesis of primary acquired cholesteatoma and the evidence for each theory present in the literature.

**Objectives:** Acquired cholesteatomas are classified as primary, arising from an intact tympanic membrane, or secondary, which is the result of an insult to the tympanic membrane. Despite extensive research on primary acquired cholesteatoma, the pathogenesis of this disease has been subject to widespread debate among otologists. The pathogenesis is explained through four major theories: retraction, metaplasia, hyperplasia, and migration. A systematic review of the literature was performed to evaluate the evidence for each theory. **Study Design:** Systematic review. **Methods:** Embase, NCBI, Cochrane, and Web of Science were systematically reviewed in order to identify the support for each theory of primary acquired cholesteatoma pathogenesis. Emphasis was placed on finding experimental studies published from 1980 to 2020. **Results:** Out of 637 candidate studies, 16 were included in our study. After review, we conclude that no theory fully explains primary acquired cholesteatoma formation. However, it is likely a multifactorial process that involves an interplay between at least 2 theories (retraction and hyperplasia) presented in this paper. 8/16 studies we reviewed supported hyperplasia as most likely, and 5/16 studies we reviewed supported retraction as most likely. **Conclusions:** Further research is needed to definitively determine the pathogenesis of primary acquired cholesteatoma.

89. **Evaluation of Diagnostic Imaging for Pulsatile Tinnitus among Otolaryngologists: A Single Institution Retrospective Review**

Caitlin Cavarocchi, MM, Philadelphia, PA; Austin C. Cao, BA, Philadelphia, PA; Tiffany P. Hwa, MD, Philadelphia, PA; Michael J. Ruckenstein, MD, Philadelphia, PA; Douglas C. Bigelow, MD, Philadelphia, PA; Jason A. Brant, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to report on the potential imaging modalities and diagnostic yield of those modalities in the workup of pulsatile tinnitus. Participants should identify factors associated with increased diagnostic yield from imaging workup. Participants should also be able to note variations in approach to diagnostic imaging among otolaryngologists.

**Objectives:** To assess the impact of imaging modality on diagnosis and treatment of pulsatile tinnitus (PT). **Study Design:** Retrospective chart review. **Methods:** The electronic medical record was queried for adults with PT evaluated at a tertiary care center from 2009-2020. Charts were reviewed for clinical data, radiographic findings, and treatment data. Patients without otolaryngology evaluation were excluded. **Results:** Of 975 records, 158 subjects were included. 73% were female; mean age was 51 years. Symptom laterality was 38.6% right sided, 42.4% left sided, and 19% bilateral. 83% of patients had normal exams; six had audible bruits. Most were referred for multimodality imaging at initial consultation (68.8%). The most commonly ordered studies were CT temporal bone (CTTB;55.7%) and MRI brain (38.0%). Overall diagnostic yield for identification of a causative diagnosis from imaging was 40%. The highest diagnostic yield was from CTTB (31.8%; sigmoid sinus dehiscence and superior canal dehiscence) and MRI brain (33.3%; arteriovenous malformation and aneurysm). The lowest yield studies were CT head (1.23%) and CTA neck (0%). Five patients with an audible bruit had a correlate on imaging (p=0.1). Patients with left pulsatile tinnitus were more likely to identify a causative diagnosis (17.7% for right sided symptoms vs 24.7% for left sided symptoms; p=0.03). **Conclusions:** Patients in our cohort received a wide variety of imaging studies at initial consultation with otolaryngology. The studies with the highest diagnostic yield were CT temporal bone and MRI brain. Further investigation is needed to standardize an evidence based approach to workup of pulsatile tinnitus.
Objectives: Our objective is to perform an evidence based systematic review characterizing otologic disease in AERD. Study Design: Systematic review. Methods: A search of PubMed/Medline, Embase, and Cochrane Library for articles published was performed with the following search terms: Samter, aspirin exacerbated respiratory disease, otitis, otologic, ear. Studies meeting inclusion criteria were queried for demographics, otologic manifestations, diagnosis, common clinical and radiological findings, and medical and surgical management. Results: Seven articles encompassing 52 patients met inclusion criteria. The most common presenting otologic features were otitis media with effusion (87.9%), hearing loss (87.9%-72.4% conductive, 13.8% mixed, 6.9% sensorineural), TM perforation (72.7%), and otorrhea (72.7%). Most patients underwent sinus surgery (78.8%), aspirin desensitization (45.5%), intratympanic steroids (36.4%), myringotomy +/- tympanostomy tubes (33.3%), and mastoidectomy (33.3%). The most efficacious treatments for otologic disease include topical antibiotics (88.9% success), systemic steroids (87.5%), intratympanic steroids (72.7%), and myringotomy +/- tympanostomy tubes (72.7%). Conclusions: The most efficacious treatments for otologic manifestations of AERD include topical antibiotics, systemic steroids, intratympanic steroids, and myringotomy/tympanostomy. Additional studies are required to identify a more prominent clinical benefit.

91. Case Control Study of Vitamin D in BPPV Patients: Locoregional Analysis from a Southeastern Institution
Leah H. Cobb, MSc, Charleston, SC; Victoria O. Bailey, BSc, Charleston, SC; Yuan F. Liu, MD, Charleston, SC; Michael T. Teixido, MD, Wilmington, DE; Habib G. Rizk, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the implications of vitamin D on benign paroxysmal positional vertigo (BPPV) outcomes in a population representative of the southeastern region of the United States. Participants should also be able to discuss the limitations of this research and the varied conclusions across literature on this topic.

Objectives: To determine the correlation, if any, between vitamin D levels and BPPV outcomes in a Southeastern medical institution. Study Design: Case control study with followup phone surveys. Methods: Patients diagnosed with BPPV between 05/2017-05/2020, with a positive Dix-Hallpike and 25-OH-D levels within 6 months of diagnosis, were selected for inclusion in the study (n=174). Our patient cohort was then compared to age, sex, and gender matched locoregional data. Effect size analyses (Cohen's d) determined the influence of 25-OH-D, gender, and age on BPPV occurrence, recurrence, and severity. Results: Race and gender did not appear to have a significant influence on 25-OH-D levels, with the exception of males 50-60 years old with BPPV having significantly less vitamin D than the locoregional controls (22.1 ± 7.5 vs. 33.9 ± 13.4 ng/mL, respectively, with d=1.087 [0.148, 2.026]). On the other hand, in the BPPV group, patients with lower vitamin D tended to have more than 1 recurrence (d=0.571, [0.139,1.001]). Conclusions: Low levels of vitamin D seem to correlate to or predict an increased risk of BPPV in males 50-60 years old. Based on our findings, vitamin D did not serve as a strong predictive factor for BPPV in other age groups. This may be due to unaccounted vitamin D supplementation within the BPPV cohort, as it is a common over the counter drug, or other unknown confounding factors. Furthermore, vitamin D may have some utility as a prophylactic supplement to prevent or reduce BPPV recurrence, as low levels of vitamin D were related to increased recurrence rates (d=0.571).

92. Health Disparities in Inpatient Cochlear Implantation
Samer T. Elsamna, BA, Newark, NJ; Ibraheem Shaikh, BS, Newark, NJ; Yu-Lan Mary Ying, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize what non-clinical factors are associated with the receipt of cochlear implants in inpatient patients with sensorineural hearing loss.

Objectives: Patients hospitalized for commonly performed outpatient procedures represent the frailest of patients. We sought to determine if there are non-clinical factors associated with receipt of cochlear implants (CI) in these high risk patients. Study Design: Retrospective study of a national inpatient database. Methods: Data from 2002-2013 in the National Inpatient Sample (NIS) database was analyzed. Patients with a diagnosis of sensorineural hearing loss (SNHL) loss were identified and divided into two cohorts: CI and no CI. Cohorts were propensity score matched by clinical factors. Non-clinical factors were then compared between the two groups using chi square analysis. Odds ratios (OR) were obtained through logistic regression analyses. Results: 38,034 inpatient cases of SNHL were identified and 1241 (3.3%) received CI. In our matched cohort, there was bimodal age distribution (0-2 years, 72-76 years). 60.5% of cases were in the first half of available years (2002-07). Most cases were white (56.9%), female (51.2%), privately insured (39.9%), in the northeast (NE) region (33.3%), and at public (74.8%), academic (79.2%), urban (93.8%) hospitals. Factors associated with increased...
chance of receiving a CI include Asian race (OR: 3.45), academic hospital (OR: 3.17), NE region (OR: 2.8) and age groups <80 years old. Private hospitals were associated with reduced odds (OR: 0.6). Income and insurance did not impact receipt of CI. **Conclusions:** Patients with high comorbidities are at increased risk of developing SNHL needing CI and inpatient admission for CI surgery. This is the largest inpatient sample population utilized to delineate non-clinical factors associated with receiving CI in SNHL. This may shed light on disparities that affect access to cochlear implants in the US.

93. Health Disparities in Inpatient Mastoidectomy for Mastoiditis

Samer T. Elsamna, BA, Newark, NJ; Ibraheem Shaikh, BS, Newark, NJ; Yu-Lan Mary Ying, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify what socioeconomic and hospital factors are associated with the receipt of mastoidectomy following mastoiditis.

**Objectives:** Mastoidectomy is the gold standard of treatment for coalescent mastoiditis. While the progression of mastoiditis may be explained by underlying morbidity, we sought to determine if there are any disparities associated with the receipt of mastoidectomy procedure performed in the inpatient setting. **Study Design:** Retrospective study of a national inpatient database. **Methods:** Data was procured from the National Inpatient Sample (NIS) database with cases from 2003-2013. All patients with an admitting diagnosis of mastoiditis were identified. Patients were divided into two cohorts: mastoidectomy and no mastoidectomy. Cohorts were propensity score matched by different clinical factors. Non-clinical factors were then compared between the two groups using chi square analysis and odds ratios (OR) were obtained through logistic regression analyses. **Results:** We identified 5799 cases of mastoiditis and 1327 (22.9%) cases received mastoidectomy procedures. Most cases were white (60.7%), female (50.2%) patients, in low income areas (bottom quartile, 30.8%) with private insurance (37.3%), and were done at academic (68.5%), public (64.1%) hospitals in urban (92.4%) areas. Asian race (OR: 1.8), urban hospitals (OR: 2.13), and academic hospitals (OR: 2.03) were factors associated with increased odds of receiving a mastoidectomy. High income areas (OR: 0.63 and 0.57 for third and fourth quartiles, respectively) and Hispanic race (OR: 0.62) were associated with reduced odds. **Conclusions:** This is the largest inpatient sample population utilized to delineate non-clinical factors associated with mastoidectomy performed for mastoiditis diagnosis. Socioeconomic factors and hospital characteristics impacted receiving mastoidectomy. Further study of these sociologic factors may help in explaining the disparities present in the treatment of mastoiditis in the inpatient setting.

94. Imbalance and Vertigo across the Lifespan: Diagnostic Findings in a Specialty Pediatric and Adult Multidisciplinary Vestibular Clinic

Alana Ferreira, BA, Philadelphia, PA; Alanna M. Windsor, MD, New York, NY; Tiffany P. Hwa, MD, Philadelphia, PA; Erin Field, PA-C, Philadelphia, PA; Michael J. Ruckenstein, MD, Philadelphia, PA; Robert C. O'Reilly, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss multidisciplinary vestibular evaluation in pediatric and adult patients. Additionally, participants should be able to note the prevalence of vestibular diagnoses by decade, as well as discuss the trajectory of common vestibular diagnoses across the lifespan.

**Objectives:** 1) To evaluate final diagnoses of pediatric and adult patients presenting to a multidisciplinary vestibular clinic with imbalance; and 2) to evaluate diagnostic trends by age group across the lifespan. **Study Design:** Retrospective chart review. **Methods:** Review of electronic health record for patients presenting to an adult or pediatric multidisciplinary vestibular clinic from 2017-2020, including clinical data, physical therapy evaluation, and audiovestibular testing. **Results:** 1,934 patients, aged 1-95, were evaluated. Most patients were female (n=1188,61%); the largest cohort was in the fifth decade of life (n=321,16.6%). 76.4% of patients were assigned a diagnosis after multidisciplinary evaluation. Among ages 1-5, benign recurrent vertigo of childhood (BRVC; n=25,25.5%) and global developmental delays (n=20,21.3%) were most common. Vestibular migraine (VM) was the most common pathologic diagnosis in ages 6-20 (n=110,39%) and 31-50 (n=69,17.4%) irrespective of gender but was more prevalent in females (20.9% vs 14.1%; p<0.0001). Among females, the number of patients diagnosed with VM peaked in ages 11-20 and 41-60. Prevalence of benign paroxysmal positional vertigo (BPPV) rose throughout the lifespan, peaking at 61-70 years. Meniere's disease (MD) did not occur within the first decade of life, but steadily increased thereafter, peaking in the 51-60 age group. **Conclusions:** Multidisciplinary vestibular evaluation yields a diagnosis among most patients presenting with imbalance. Vestibular diagnoses vary across the lifespan, with migraine disease peaking in adolescence and middle age. BRVC and developmental disorders predominate in early childhood, while diagnoses of BPPV and MD rise significantly from the second through sixth decade of life.
95. **Understanding Risk Factors Associated with Unplanned Admission following Outpatient Tympanoplasty**
   Jeff Gao, BS, Newark, NJ; Christopher C. Tseng, BS, Newark, NJ; Gregory L. Barinsky, PharmD, Newark, NJ; Christina H. Fang, MD, Newark, NJ; Wayne D. Hsueh, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize factors associated with unplanned admission after outpatient tympanoplasty.

**Objectives:** To investigate risk factors associated with unplanned admission following outpatient tympanoplasty. **Study Design:** Retrospective database review. **Methods:** The National Surgical Quality Improvement Program was queried for all patients who underwent elective outpatient tympanoplasty (CPT 69631) between 2011-2018. Non-elective, planned inpatient, and emergent cases were excluded. Cases with any other concurrent codes, except for grafting or microscope usage, were excluded. Unplanned admission was defined as a total hospital stay of greater than 0 days. Univariate and multivariate analyses were performed to examine risk factors for unplanned admission. **Results:** Of 5,266 outpatient tympanoplasty cases, 90 cases (1.7%) had an unplanned admission. Patients who had unplanned admission were more likely to be female (67.8% vs. 56.9%, p=0.039), have hypertension (36.7% vs. 24.6%, p=0.009), dyspnea (6.7% vs. 2.1%, p=0.002), and American Society of Anesthesiologists class III-IV (28.9% vs. 17.5%, p=0.001). Age, obesity, diabetes, chronic steroid use, bleeding disorders, chronic obstructive pulmonary disease, congestive heart failure, and smoking status were not significantly associated with unplanned admission. Accounting for other patient demographics and clinical characteristics, multivariate analysis showed that female gender (OR 1.77, p=0.022) and dyspnea (HR 2.78, p=0.040) were significant independent predictors of unplanned admission, while Asian race (OR 0.42, p=0.032) was a protective factor. **Conclusions:** Independent risk factors associated with unplanned admission following outpatient tympanoplasty include female gender and dyspnea. Optimization of patients with these risk factors preoperatively may help to reduce the cost burden of unanticipated admission following outpatient tympanoplasty.

96. **A First Report of Hereditary Congenital Absence of Stapes Superstructure in Five Generations of Patients**
   Ryusuke Hori, MD PhD, Tenri, Nara; Tsuyoshi Kojima, MD PhD, Tenri, Nara; Yusuke Okanoue, MD, Tenri, Nara; Shuya Otuki, MD, Tenri, Nara; Koki Hasebe, MD, Tenri, Nara; Hirotaka Yamamoto, MD, Tenri, Nara

**Educational Objective:** At the conclusion of this presentation, the participants should be able to know clinical and otological findings in multiple members of a family with congenital absence of the stapes superstructure. The knowledge gained from this presentation is useful for better medical treatment of hereditary ossicular anomalies in the future.

**Objectives:** To present clinical and otological findings in multiple members of a family with congenital absence of the stapes superstructure. **Study Design:** Retrospective medical records review. **Methods:** The eligible patients in the current study were eleven members in the family presented with a conductive hearing impairment associated with congenital absence of the stapes superstructure between the years 1976 and 2019. **Results:** We interviewed key persons in the family and created a family pedigree spanning five generations. Almost all members of the first and second generation have died, but all members of the third, fourth and fifth generation members are alive. Among family members, bilateral and unilateral hearing impairment were confirmed for both males and females. Absence of the stapes superstructure was confirmed by exploratory tympanotomy in eleven ears of nine members. In all surgical cases, the stapes footplate was fixed in the oval window. A small protruding part, which seems to be the base of the stapes crus, was found on the footplate. The malleus and incus were normal and their movement was good, but the stapedius tendon was attached to the lenticular process of the incus, which was displaced toward the back and the stapes footplate. A small fenestra stapedotomy was performed, then piston prosthesis was placed. All patients’ postoperative hearing improvement were satisfactory. **Conclusions:** This is a first report of hereditary congenital absence of stapes superstructure. The speculated inheritance pattern was autosomal dominant. To investigate the genes responsible for this anomaly found in the family, six blood samples were taken, and gene analysis is being carried out.

97. **Paraganglioma of the Vertical Facial Nerve Mimicking Temporal Bone Pseudotumor: A Rare Cause of Facial Paralysis**
   Tiffany P. Hwa, MD, Philadelphia, PA; Jennifer Douglas, MD, Philadelphia, PA; Amy Schettino, MD, Philadelphia, PA; Justin Shinn, MD, Philadelphia, PA; Ara Chalian, MD, Philadelphia, PA; Douglas C. Bigelow, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the neoplastic differential of acute facial paralysis. Additionally, participants should familiarize themselves with the possibility of primary paraganglioma of the facial nerve and the appropriate workup subsequent to this diagnosis.
Objectives: To report a case of paraganglioma arising from the vertical facial nerve mimicking pseudotumor of the temporal bone. Study Design: Case report. Methods: A 58 year old female with history of rapidly progressive left facial paralysis and sensation of left ear fullness beginning approximately 1 year prior to presentation. She was otherwise asymptomatic with a normal exam except for complete left facial paralysis. A CT temporal bone and MRI IAC were performed, demonstrating a 2 cm enhancing mass centered on the mastoid temporal bone with enhancement from the second genu to stylomastoid foramen and focal erosion of the posterior fossa cortex. This was felt to be suspicious for lymphoproliferative disorder, Langerhans cell histiocytosis, or, less likely, atypical cholesteatoma. Results: After extensive counseling regarding her options for management, the patient opted for surgical intervention and underwent a left transtemporal extradural resection with decompression of the facial nerve and sigmoid sinus. She was concurrently reconstructed with sternocleidomastoid rotational flap reconstruction, full thickness skin graft, and greater auricular to facial nerve cable graft. There were no complications postoperatively, and the final pathological diagnosis was consistent with paraganglioma. The patient was recommended for further serologic workup, gallium dotatate scanning, and genetics consultation for paraganglioma. Conclusions: In this report, we contribute our experience to and review the current literature on primary facial canal paraganglioma, an exceedingly rare cause of facial paralysis. In this case, imaging findings were most consistent with temporal bone pseudotumor, and the diagnosis was not elucidated until microscopic evaluation by surgical pathology.

98. Pseudogout of the Temporomandibular Joint with Erosion of the Temporal Bone: An Atypical Cause of Chronic Otorrhea and Otalgia
Tiffany P. Hwa, MD, Philadelphia, PA; Evan Cretney, MD, Philadelphia, PA; Leila Mady, MD, Philadelphia, PA; Ara Chalian, MD, Philadelphia, PA; Douglas C. Bigelow, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the etiology and pathogenesis of calcium pyrophosphate disease (CPPD) of the temporomandibular joint. Participants should be able to describe possible otolaryngologic manifestations of this disease and discuss the role of surgery as it pertains to otolaryngologists.

Objectives: To report an unusual case of calcium pyrophosphate deposition (CPPD) of the temporomandibular joint (TMJ) causing severe otologic symptoms. Study Design: Case report. Methods: An 83 year old female with history of left ear/parotid mass presented to our clinic with a 5 year history of progressively worsening pain, trismus, odynophagia, left conductive hearing loss, and purulent otorrhea. She was found to have an obstructive mass of the external auditory canal and an ipsilateral profound mixed hearing loss. CT of the temporal bone and MRI IAC were performed, demonstrating a mixed lytic/sclerotic mass centered in the left TMJ with extension into the temporal bone and mass effect on the ossicles, suspicious for CPPD. Results: After extensive counseling regarding her options for management, the patient opted for surgical intervention and underwent a left infratemporal preauricular approach to the middle cranial fossa, infratemporal fossa, temporal bone, and glenoid fossa with extradural resection of the temporal bone CPPD without extensive resection in the TMJ. She underwent concurrent reconstruction with a rotational temporalis muscle flap with ear closure and was managed on long term IV antibiotics postoperatively. Postoperatively, the patient reported resolution in her pain and drainage with concomitant improvement in her trismus and odynophagia. Conclusions: While there are numerous reports in the literature of complete resection with replacement of the TMJ for CPPD, we report the first case of temporal bone extension leading to severe symptomatology. Targeted resection of the diseased tissues without complete replacement of the TMJ can lead to significant improvement in symptomatology.

99. Impact of Hyperbaric Oxygen Therapy on Eustachian Tube Function
Bria Cherise Johnson, BA MS, Washington, DC; Adnan S. Hussaini, MD, Washington, DC; Navin R. Prasad, BS, Washington, DC; Kelly Johnson-Arbor, MD, Washington, DC; Gregory J. Milmoe, MD, Washington, DC; Jeffrey Kim, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand eustachian tube (ET) and middle ear function changes over the course of HBOT and the clinical risks for the development of otic barotrauma (OBT).

Objectives: To learn how HBOT affects eustachian tube (ET) and middle ear (ME) function and the clinical risk factors for otic barotrauma (OBT). Study Design: A prospective observational study of 24 patients (age range:19 to 77; 41.7% female) undergoing HBOT evaluating ME changes during treatment and risk factors for OBT. Methods: After the completion of initial otologic history pertaining to prior barotrauma, ET dysfunction questionnaire (ETDQ7) and 226 Hz tympanometry before and after each HBO session were obtained. Results: ET dysfunction defined by ETDQ7 >14 was present in 6/6 patients with a history of ear popping, 4/6 (66.6%) with a history of tinnitus, and 10/15 (67%) with a history of ear discomfort when flying. The mean ETDQ7 score for the entire cohort was 9.8. Seven out of 24 patients (29.1%) reported ETDQ7>14 during the course of HBOT. Tympanometry showed that the middle ear pressure increased by a mean of 30.5 daPa after decompression at the end of HBOT session. 3 out of 24 patients (12.5%) had changes in their tympanograms from type A to type C. One patient required ear tube placement during HBOT. While 3 patients with type C tympanogram had ETDQ7>14, the patient requiring ear tube placement had ETDQ7 = 7. Conclusions: HBOT alters middle ear pressure...
during compression and decompression and is well tolerated except in a few cases of OBT. ETDQ7 did not correlate with type C tympanogram and may not predict OBT during HBOT. A positive history of ear popping and discomfort may be a better, positive predictor ET dysfunction during HBOT.

100. **Minimally Invasive Incision Technique for New Active Bone Conduction Implants**  
Emily Kay-Rivest, MD MSc, New York, NY; David R. Friedmann, MD MSc, New York, NY; Daniel Jethanamest, MD, New York, NY; J. Thomas Roland Jr., MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, participants will be able to describe and implement a minimally invasive short incision surgical technique for the placement of active bone conduction hearing implant and discuss the early outcomes of this device.

**Objectives:** To describe a novel incision and surgical approach for a new transcutaneous, active bone conductive implant and report early wound and audiologic outcomes.  
**Study Design:** Retrospective chart review of patients undergoing implantation of an active transcutaneous piezoelectric bone conduction hearing device (Cochlear Osia 2 System).  
**Methods:** A new surgical approach was devised and used in a continuous series of patients undergoing implantation, utilizing a small skin incision overlying the final implant position with bone bed reduction for implant seating as an alternative to previously described techniques. Indications for surgery, intraoperative findings, complications, device placement, postoperative wound outcomes and early audiologic evaluations were investigated.  
**Results:** Eleven patients with conductive hearing loss, mixed hearing loss, or single sided deafness were implanted. The minimally invasive surgical approach was successfully used in all cases, including those with abnormal anatomy such as congenital aural atresia, post-surgical mastoid cavities and existing skull base surgical defects. Two patients were converted from a previously existing percutaneous bone conduction implant system. No postoperative wound infections or wound dehiscences were identified; one patient developed a small seroma that resolved without procedural intervention. No skin flaps were thinned and patients required varying magnet strengths at the time of activation. All implants showed successful osseointegration and all patients underwent successful processor activation at a mean of 45 days postoperatively.  
**Conclusions:** A minimally invasive incision with bone bed reduction and tight pocket technique appears to be a safe and effective approach for the implantation of this new active bone conduction device across a variety of anatomic conditions.

101. **Temporal Bone Osteoradionecrosis: An 18 Year, Single Institution Experience**  
Benjamin D. Lovin, MD, Houston, TX; Mike Hernandez, MS, Houston, TX; Hunter Elms, MD, Durham, NC; Amy C. Moreno, MD, Houston, TX; Marc Nader, MD, Houston, TX; Paul W. Gidley, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the presentation of temporal bone osteoradionecrosis (TBORN), understand the risk factors for developing diffuse disease, and apply appropriate management strategies.

**Objectives:** To report the results of the largest single institution review of TBORN and characterize the disease's natural history, prognostic factors, management, and outcomes.  
**Study Design:** Retrospective review.  
**Methods:** A review at a tertiary referral cancer center was conducted to identify subjects with TBORN. Pertinent data was extracted. Descriptive statistics summarized patient, tumor, and treatment characteristics. Bivariate analyses explored the association between patient characteristics and the time to TBORN diagnosis and risk of developing diffuse disease.  
**Results:** 145 temporal bones (TBs) from 128 patients were identified. Mean time to diagnosis after radiation was 10 years. Age 50 years and older was associated with earlier diagnosis. The periauricular skin, parotid, and nasopharynx were the most common malignant sites. The most common symptoms were hearing loss, otorrhea, and otalgia; bone exposure was most frequent in the anterior and inferior ear canal. At initial diagnosis, 76% of TBs had localized and 24% had diffuse disease; 37% progressed to diffuse disease. Diabetes, use of 3 dimensional conformal radiotherapy (3D-CRT), and periauricular skin malignancy were risk factors for progression on multivariate analysis. Surgery and conservative management had 87% and 19% success rates for diffuse disease, respectively. Conservative measures were always unsuccessful when ORN spread past the mastoid or infratemporal fossa.  
**Conclusions:** TBORN is a late complication of head and neck radiation and occurs earlier in older patients (≥ 50 years). Diffuse disease is less common than localized disease but more frequent with diabetes, periauricular skin malignancies, and 3D-CRT. Conservative management is appropriate for localized disease; diffuse disease often necessitates surgery. Prognostic factors were identified and a novel staging system with treatment guidelines is proposed.

102. **Isolated Otologic Involvement of IgG4 Related Disease: A Case Report and Review of Literature**  
Hugh P. Mallany, BMSc, Biddeford, ME; Vincent Anagnos, DO, Philadelphia, PA; Tiffany Chao, MD, Philadelphia, PA; Kathleen Montone, MD, Philadelphia, PA; Steven Eliades, MD PhD, Philadelphia, PA

**Educational Objective:** The educational objective of this case report is to provide insight into the evolving clinical entity of IgG4-RD, specifically with isolated otological involvement. With very few manifestations of this disease process reported in
the literature, this article plans to provide additional examples of clinical presentations for this condition. Furthermore, it encourages otolaryngologists to keep this rare process on the differential diagnosis in cases of atypical and refractory otologic complaints even with the lack of other systemic findings.

Objectives: Immunoglobulin G-4 related disease (IgG4-RD) is a systemic autoimmune disease that typically involves multiple organ systems including the pancreas, lungs and liver. While involvement within the head and neck region is relatively rare, conditions such as Mikulicz disease, Riedel's thyroiditis, and chronic sclerosing sialadenitis are all well characterized IgG4 related processes. Additionally, isolated otologic involvement of IgG4-RD is incredibly rare as only a few case reports are available in the literature. In this article, we report a case of a 26 year old female with a history of recurrent left sided middle ear infections who presented to tertiary care hospital with acutely worsening hearing loss, otalgia, and headache. Computer tomography (CT) of the temporal bone showed evidence for coalescent mastoiditis with sigmoid sinus thrombosis. She was taken urgently to the operating room for mastoidectomy. Intraoperatively, a tan rubbery friable material appeared to be filling the mastoid cavity without signs of infection or purulence. Histopathologic and microbiologic analysis demonstrated an increase in plasma cell infiltrates suspected of IgG4-RD of the lateral skull base. Further medical workup failed to establish an alternative diagnosis and whole body imaging failed to find any involvement of other organs. Medical treatment consisted of postoperative high dose glucocorticoid, rituximab, and apixaban and close followup with rheumatology, hematology and oncology providers. This case report and review of the literature is intended to provide further insight into the diagnosis and treatment of isolated IgG4-RD within the head and neck region. Study Design: Case report. Methods: N/A. Results: N/A. Conclusions: N/A.

103. Fully Automated Measurement of Cochlear Duct Length from Clinical Temporal Bone Computed Tomography

Caio A. Neves, MD, Brasilia, DF; Emma D. Tran, BS, Stanford, CA; Nikolas H. Blevins, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how convolutional neural networks can be used to automatically segment the cochlea from clinical temporal bone CTs, and how this 3D segmentation can be used to automatically measure the cochlear width, diameter and duct length without manual intervention. Participant should also be able to compare the advantages of an automated measurement of the CDL compared to previously proposed manually or semiautomated measurements which can often rely on estimations.

Objectives: To present and validate a novel fully automated method to measure cochlear dimensions including cochlear duct length (CDL). Study Design: Cross-sectional study. Methods: The computational method uses 1) a convolutional neural network (CNN) to segment the cochlea and otic capsule; and 2) geometric analysis to measure anti-modiolar distances from the round window to the apex. The CNN was trained using 165 manually segmented clinical CTs. A different 159 CTs were then measured for cochlear diameter and width (A- and B-values) and CDL using the automated system. The results were compared with existing approaches and historical data. In addition, pre- and post-implantation scans from 24 cochlear implant recipients were studied to compare predicted vs actual array insertion depth. Results: Measurements were successfully obtained in 98.1% of scans. The mean CDL to 90° was 35.52mm (SD, 2.06; range, [30.91-40.50]), the mean A value was 8.88 mm (0.47; [7.67 - 10.49]), and mean B value was 6.38 mm (0.42; [5.16 - 7.38]). Cochlear quadrant lengths were similar to prior anatomic studies. The R2 fit of the automated to manual measurements in the implant database were 0.84 for CDL, 0.92 for A value, and 0.78 for B value. For anti-modiolar arrays, the distance between the imaged and predicted array tip location was 0.85mm (0.85; [0.13 - 3.6]). Conclusions: Our method provides a fully automated means of cochlear analysis from clinical CTs. The distribution of CDL, dimensions, and cochlear quadrant lengths is similar to those from historical data. This approach requires no radiographic experience and is free from user related variation. These factors support its utility for individualized surgical planning.

104. Hearing Preservation with the Transcrusal Approach for Petroclival Lesions

Evan J. Patel, BS, New York, NY; Emily Kay-Rivest, MD, New York, NY; Sean O. McMenomey, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the potential for hearing preservation after the transcrusal approach for petroclival lesions.

Objectives: To evaluate hearing outcomes of the transcusral, transpetrosal approach for resection of petroclival lesions and compare them to the retrolabyrinthine approach. Study Design: A retrospective chart review in a single tertiary care center. Methods: Patients with petroclival lesions who underwent surgical resection via a transcusral or retrolabyrinthine approach were included. Demographic information from each group was collected, as well as pre and postoperative pure tone averages (PTAs) and word recognition scores (WRSs). Finally, surgical complications, duration of hospital stay and need for adjuvant radiosurgery were recorded and compared between groups. Results: There were 19 patients that met inclusion criteria, 5 having undergone a transcusral approach and 14 a retrolabyrinthine approach. Age, sex, tumor size and preoperative pure tone averages (PTA) and word recognition scores were similar between the two cohorts. Postoperative PTAs were comparable between the transcusral and retrolabyrinthine cohorts of patients. Mean post-surgical WRSs were
also similar between the transcral (mean 70.0%, SD 47.6) and retrolabyrinthine (mean 52.5%, SD 46.5) cohorts (P = .56). Number of days spent in hospital were no different between groups (5 and 5.9 days respectively, (P = .51). Adjuvant radiation therapy was required after three (60%) transcral and ten (71%) retrolabyrinthine surgeries (P = .64).

**Conclusions:** The transcral approach can be utilized in select patients with petroclival lesions in order to maximize visualization while still preserving hearing. Postoperative hearing outcomes are comparable between patients who underwent a retrolabyrinthine approach.

105. **Hearing Loss in Patients with MYH9 Related Disease: A Systematic Review and Introduction of a Case Study**  
Dhiraj Krishna Peddu, MD-C BA, Piscataway, NJ; Yu-Ian Mary Ying, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the characteristics and progression of hearing loss in MYH9-RD patients and compare the literature findings to the unique sequential sudden bilateral SNHL seen in our case study.

**Objectives:** To review the characteristics and progression of hearing loss in MYH9 related disease (MYH9-RD) patients and present a unique case of sequential sudden bilateral sensorineural hearing loss (SNHL) in an MYH9-RD patient. MYH9-RD is a rare autosomal dominant platelet disorder. Patients with this disorder have a variable risk of developing SNHL.

**Study Design:** Systematic review and case presentation.  
**Methods:** A comprehensive literature search for scientific articles in PubMed, Scopus, and Web of Science that reported hearing loss outcomes in MYH9-RD patients.  
**Results:** Initial search yielded 270 studies. 8 studies with a total of 23 patients met inclusion criteria and were utilized for data analysis. MYH9-RD patients typically present with progressive bilateral SNHL. Mean age of onset of hearing loss was 17.1 years and progressed to severe-profound SNHL over a mean period of 14.4 years. 17 of the 23 patients received cochlear implant (CI) at a mean age of 37.9 years. In comparison, our study patient presented initially with bilateral progressive SNHL as a teenager and developed sequential sudden bilateral SNHL at the age of 31. She is now a successful bilateral CI user.  
**Conclusions:** This is the first systematic investigation of the relationship between MYH9-RD patients and SNHL. Hearing loss in MYH9-RD patients is generally characterized as progressive SNHL, however, our study patient presented with the unique feature of sequential sudden bilateral SNHL, potentially expanding the hearing loss sequela associated with the disorder. Further research is needed to explore the possible pathogenesis of sudden SNHL in MYH9-RD patients.

106. **WITHDRAWN - Auditory Brainstem Response Predictors of Hearing Outcomes after Middle Fossa Resection of Vestibular Schwannomas**  
Yin Ren, MD PhD, San Diego, CA; Catherine Merna, MD, Irvine, CA; Kareem O. Tawfik, MD, San Diego, CA; Marc S. Schwartz, MD, San Diego, CA; Rick A. Friedman, MD PhD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand factors that influence postoperative hearing preservation after middle fossa resection of vestibular schwannomas and describe predictors based on data from intraoperative auditory brainstem response monitoring.

**Objectives:** Analyze the relationship between intraoperative auditory brainstem response (ABR) signal changes and hearing outcomes in patients with vestibular schwannomas (VS) undergoing hearing preservation (HP) surgery via a middle cranial fossa (MCF) approach.  
**Study Design:** Prospective case series.  
**Methods:** Sixty consecutive adult patients with VS and word recognition score (WRS) ≥ 50% who underwent MCF tumor resection for HP (defined as postoperative WRS ≥ 550%) between November 2017 and September 2019 were reviewed. Preoperative and intraoperative ABR wave III latency, wave V latency and amplitude were independently recorded. Pre and postoperative pure tone average (PTA) and WRS were examined.  
**Results:** Average age was 46 years and mean tumor size was 9.2 mm (range, 3-17). HP rates were 56.7% for the cohort and 69.7% for tumors <10 mm. A complete loss of wave V was associated with an 82.9% increase in postoperative PTA (p<0.001) and 97.2% decrease in WRS (p<0.001), whereas a diminished wave V was correlated with 62.7% increase in PTA (p<0.001) and 55.7% decrease in WRS (p=0.006). A diminished or absent wave V, but not increased wave III/V latency or decreased wave V amplitude, was correlated with a decline in postoperative hearing class (r=0.735, p<0.001). Receiver operating curve analysis demonstrated that a stable wave V has the highest accuracy in predicting HP (sensitivity 82.6%, specificity 84.8%).  
**Conclusions:** Of the examined ABR characteristics, a stable wave V was the strongest predictor of HP after MCF resection of VS.

107. **Gene Expression Changes in the Cochlear Nucleus of the Fragile X Syndrome Mouse Model, a Potential Model for Hyperacusis**  
Hitomi Sakano, MD PhD, Rochester, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the technique of RNA-seq, what is FMRP, and synapse.
**Objectives:** Fragile X syndrome, caused by a trinucleotide repeat expansion of the fmr1 gene, is the most common hereditary cause of autism spectrum disorder. These patients also display hypersensitivity to auditory stimuli, i.e., hyperacusis. The mouse model, in which the fmr1 gene is knocked out, reproduces many of the clinical and histological features of fragile X syndrome, including hyperacusis and abnormal dendritic development in neurons. We show that the protein product of fmr1, fragile X protein (FMRP), is strongly expressed in the cochlear nucleus, suggesting that FMRP plays an important role in the auditory system. However, the role of FMRP in the auditory brainstem is currently unknown. We hypothesize that the hyperacusis phenotype in the fmr1 knock-out mouse may be due to altered gene expression in the cochlear nucleus. **Study Design:** We performed next generation transcriptome sequencing of cochlear nuclei from fmr1 knock-out and wildtype mice. **Methods:** We isolated mRNA from dissected cochlear nuclei of fmr1 knock-out and wildtype mice. Using RNA-seq next generation sequencing, we compare the transcriptome between knock-out and wildtype mice (n=3 each). Gene ontology analysis was performed with DAVID and Panther programs. **Results:** We find alterations 286 genes, 24% downregulated and 66% downregulated. These genes are enriched in pathways involved in neuron outgrowth and signaling. **Conclusions:** FMRP can affect the expression level of genes important for neuronal signaling. These genes may represent potential pathways for the development of hyperacusis. Future studies will be aimed at investigating the effects of these genes on hyperacusis.

**108. Long Term Localization Abilities following Cochlear Implantation in Cases of Unilateral and Asymmetric Hearing Loss**

Nicholas J. Thompson, MD, Chapel Hill, NC; Margaret T. Dillon, AuD, Chapel Hill, NC; Meredith A. Rooth, AuD, Chapel Hill, NC; Margaret E. Richter, BA, Chapel Hill, NC; Harold C. Pillsbury, MD, Chapel Hill, NC; Kevin D. Brown, MD PhD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the significant improvements in spatial hearing abilities (e.g., sound source localization) experienced by cochlear implant recipients with unilateral or asymmetric hearing loss as compared to preoperative performance, and understand that these abilities are maintained or improved with long term cochlear implant use.

**Objectives:** To determine the sound source localization abilities for subjects with unilateral hearing loss (UHL) or asymmetric hearing loss (AHL) up to 5 years after cochlear implantation. **Study Design:** Prospective clinical trial at tertiary academic center. **Methods:** Subjects with moderate to profound hearing loss in one ear and either normal hearing (UHL) or mild to moderate hearing loss (AHL) in the contralateral ear underwent cochlear implantation in the poorer hearing ear. Sound source localization was assessed in a sound booth with 180° arc of 11 speakers preoperatively and at 1, 2, 3, 4, and 5 years post-activation. Subjects reported the sound source for 200 ms noise bursts. Performance was calculated as the root means squared (RMS) error, where a lower value indicates better performance. **Results:** Thirty-nine subjects (20 UHL, 19 AHL) received a cochlear implant (CI) and completed the localization task at the 12 month interval (clinical trial endpoint), with significant improvements in localization ability as compared to preoperative performance (p<0.05). Twenty-two subjects returned for annual evaluation up to at least 5 years post-activation. Localization abilities at long term intervals were comparable to that observed at the 12 month interval, with some subjects demonstrating modest improvements with long term CI use. Subjects with AHL continued to have poorer localization (mean: 39°) than subjects with UHL (mean: 26°) at the 2 year interval (p=0.05). **Conclusions:** Subjects with UHL and AHL experience significantly improved spatial hearing following cochlear implantation. Localization abilities are maintained or improved upon through the first several years post-activation.


Kotaro Tsutsumi, BA, Irvine, CA; Khodayar Goshtasbi, MS, Irvine, CA; Pooya Khosravi, BS, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA; Mehdi Abouzari, MD PhD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the ability of a machine learning algorithm to predict occurrences of unplanned reoperation and surgical/medical complications following vestibular schwannoma surgery.

**Objectives:** To develop a machine learning (ML) algorithm for predicting unplanned reoperation and surgical or medical complications following vestibular schwannoma (VS) surgery. **Study Design:** Development of ML models using patients from a national database. **Methods:** The 2005-2017 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried to extract patients with VS undergoing surgical resection. All pre and perioperative variables available in ACS-NSQIP (n=114), except those directly related to our outcome variables, were used as input variables. A deep neural network model consisting of 7 layers was developed using the Keras open source library, with an 80:20 breakdown for training and testing. Feature importance of input variables were measured to elucidate their relative permutation effect in the ML model. **Results:** Of the 1783 patients with VS undergoing surgery, unplanned reoperation, surgical complications, and medical complications were seen in 8.5%, 5.2%, and 6.2% of patients, respectively. The best performing deep neural network model had average area under the curve of receiver operating characteristics (AUC-ROC) of 0.864 (reoperation), 0.812 (medical complications), and 0.714 (surgical complications). Accuracy, specificity,
and negative predictive values of the model for all outcome variables ranged 91.2-95.5%, while sensitivity and positive predictive values ranged 31.3-52.0%. Variables with high permutation importance included gender, discharge location, body mass index, and length of hospitalization. **Conclusions:** We developed a well performing ML algorithm to predict unplanned reoperation and surgical/medical complications following VS surgery. This may offer physicians insight into potential post-surgical outcomes and allow a more personalized treatment plan for VS patients.

110. **Cochlear Implantation Outcomes in Patients with TMPRSS3 Mutations**

Brady Jay Tucker, BA, Indianapolis, IN; Timothy Shin, MD, Indianapolis, IN; Kevin T. Booth, PhD, Iowa City, IA; Rick F. Nelson, MD PhD, Indianapolis, IN

**Educational Objective:** At the conclusion of this presentation, the participants should understand previously reported audiological outcomes and discern the utility of cochlear implantation (CI) in the treatment of TMPRSS3 associated autosomal recessive non-syndromic hearing loss (ARNSHL).

**Objectives:** To comprehensively review all prior reports and functional audiological outcomes of TMPRSS3 associated ARNSHL treated with CI. **Study Design:** Retrospective cohort study. **Methods:** The existing literature was comprehensively reviewed for all reported cases of TMPRSS3 associated ARNSHL treated with CI. All patients with confirmed TMPRSS3 mutations, sensorineural hearing loss (SNHL), and some form of objective audiological data were included in this review. Patient demographics, hearing loss characteristics, phenotypic presentation, identified mutations and CI outcomes were collected. All preoperative and postoperative data were analyzed to summarize CI outcomes as either favorable or poor. **Results:** Six articles detailing 23 cases of TMPRSS3 associated ARNSHL treated with CI were included for final review. There was an equal distribution of male and female patients in this cohort (53% and 47%). Four cases of congenital onset (2yo) hearing loss were identified. A mean (SD) age of 10.8 (9.1) was observed in those with early onset hearing loss. There were nearly twice as many patients with postlingual onset hearing loss as those with prelingual onset hearing loss (65% vs 35%). The mean (SD) age of CI was 27.9 (22.3). Preoperatively, the mean (SD) pure tone average (PTA) was 91.4 (9.8) dB and the mean percentage (SD) word score was 13.1% (13%). Postoperatively, the mean (SD) PTA was 30 (7.7) dB, and the mean percentage (SD) word and sentence scores were 60% (26.3%) and 62.3% (27.4%) respectively. In summary, the majority of reported cases yielded favorable rather than poor CI outcomes (81% vs. 19%). **Conclusions:** Ambiguity exists regarding CI utility in TMPRSS3 associated ARNSHL. Comprehensive review of all reported cases with recorded audiological data suggests favorable CI outcomes in this population.

111. **A Pediatric Pineal Region Tumor Presenting as Bilateral Hearing Loss**

Sophia Uddin, PhD, Chicago, IL; Terence E. Imbery, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify typical and atypical (auditory) presenting symptoms of pineal region tumors.

**Objectives:** Illustrate a case of a pineal region tumor presenting with the uncommon symptoms of hearing loss and tinnitus. **Study Design:** Case report. **Methods:** Chart and literature review. **Results:** A 13 year old male with no significant past medical history presented with a chief complaint of progressive, bilateral hearing loss and tinnitus. Audiometry revealed a bilateral, mild sensorineural hearing loss with very poor word recognition scores. Imaging revealed a pineal mass suggestive of a mixed germ cell tumor. He underwent chemotherapy which was complicated by growing teratoma syndrome and worsening auditory symptoms. After surgical resection, his auditory symptoms rapidly improved, and several months later, his hearing remains normal. **Conclusions:** Though uncommon, patients with pineal masses may present with a chief complaint of hearing loss and/or tinnitus. The very poor word recognition scores, out of proportion with the pure tone hearing loss, raised the suspicion of central pathology. The mechanism for auditory symptoms in these patients is unknown but may be related to mass effect on central auditory pathways, namely the inferior colliculi.

112. **Impact of Vertigo on United States Adults with Depression**

Aimee Layla Varnado, BS, Los Angeles, CA; Andre Anvari, BS, Pasadena, CA; Sheng Zhou, MD, Pasadena, CA; Bhavishya Clark, MD, Los Angeles, CA; Joni Doherty, MD PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the association between depression and vertigo, and also discuss the concomitant impacts of these disorders on health disparities and comorbidities.

**Objectives:** 1) Assess the relationship between vertigo and depression in a nationally representative sample of US adults; and 2) study health utilization patterns amongst adults with vertigo and depression. **Study Design:** Cross-sectional study. **Methods:** 245 million adults who responded positively to symptoms of depression were analyzed from the 2016 cycle of the National Health Interview Survey. Logistic regression was used to examine associations of health utilization and relevant comorbidities. **Results:** Among 42.8 ± 0.15 million adults with depression, 37.4% ± 0.96% also concurrently had vertigo. In contrast, 21.0% ± 0.41% of adults without depression had vertigo. Controlling for race, sex, geographic region,
employment status, and health insurance status, depression was significantly associated with having vertigo (OR: 2.12 ± 0.09). Individuals with both vertigo and depression were more likely to wait longer for appointments, experience delays in scheduling appointment, and not be able to find transportation to appointments. They further experienced an increased odds of having a variety of cardiac conditions compared to those without vertigo and depression. Conclusions: The vertigo prevalence in depressed patients is significantly high. These patients experience meaningful delays in care. Better interventional programs are necessary to address the disparities among individuals who suffer from vertigo and depression.

113. Complication Rate, Cost Analysis and Surgical Technique of Titanium Mesh Cranioplasty for Translabyrinthine Tumor Removal

Laura M. Wright, BS, San Antonio, TX; Evan Sanford, MD, Cookeville, TN; Christopher Bogaev, MD, San Antonio, TX; Brian Perry, MD, San Antonio, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the effectiveness of titanium mesh cranioplasty for translabyrinthine tumor removal.

Objectives: A common serious complication of the translabyrinthine approach for tumor removal is cerebrospinal fluid leak, which may occur as often as 30%. This adds significantly to morbidity and cost. The use of abdominal fat graft closure of the mastoid defect has reduced the CSF leak rate, but it remains the most common complication. Recently, titanium mesh cranioplasty has been added to the fat graft reducing the CSF leak rate. We sought to further investigate the CSF leak rate, as well as other potential complications from using titanium mesh as an adjunct to closure. Study Design: A retrospective chart review of all patients undergoing translabyrinthine surgery from 2010 to 2018 was performed at a private neurotology and neurosurgical practice. Methods: 144 patients were identified as undergoing translabyrinthine surgery and their charts reviewed for CSF leak, wound complications, tumor size, BMI and demographical data. A cost analysis was also performed to assess the cost effectiveness. Results: A CSF leak rate of 4.2% (n=6) was identified in our series, with 4/6 patients requiring reoperation to control the leak. Two patients had wound complications due to mesh exposure requiring reoperation. We also sought to determine the added cost when using titanium mesh, which amounted to approximately $2,200/case. Using a cost analysis program, this was shown to be cost effective. Conclusions: We believe the addition of titanium mesh cranioplasty to standard abdominal fat closure reduces complications and is cost effective.

Pediatric Otolaryngology

114. Pediatric Follicular Lymphoma Presenting as a Neck Mass: A Case Report

Jeffrey Mark Bergeron, MD, New Orleans, LA; Joshua Kay, MD, New Orleans, LA; Ryan D. Winters, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to give a description of the features of pediatric follicular lymphoma and include it in the differential diagnosis for a pediatric neck mass.

Objectives: Pediatric follicular lymphoma is a rare type of lymphoma that presents most commonly in adolescent boys. It usually has a very indolent course with an excellent prognosis, despite its frequent high histologic grade. We describe the presentation and disease course of an adolescent with pediatric follicular lymphoma presenting as a neck mass. Study Design: Case report. Methods: Case report of a 14 year old male who presented with a 3 month history of a non-tender neck mass in the submental area. Preoperative ultrasound showed a 1.5 cm cystic lesion. Results: The patient underwent routine excision of the mass. Permanent pathology was consistent with pediatric follicular lymphoma. Postoperative PET-CT showed no evidence of local or distant disease. The patient remained free of disease at the time of his last visit. Conclusions: Although the majority of neck masses in pediatric patients are congenital or infectious in origin, a malignant process should always be included in the differential. Surgical excision is usually curative in patients with pediatric follicular lymphoma.

115. Children with Chronic Rhinosinusitis Have Higher Rates of Chronic School Absenteeism

Brian T. Cheng, BA, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the patterns and predictors of chronic school absenteeism in children and young adults with chronic rhinosinusitis.

Objectives: Previous studies found childhood chronic rhinosinusitis (CRS) is associated with poor school performance and behavior; data are limited on school absenteeism. This study examined patterns and predictors of CRS with chronic school absenteeism. Study Design: Cross-sectional, retrospective study. Methods: Data were analyzed from the 1999-2015 Medical Expenditure Panel Surveys, a representative sample of US health status. The study cohort included all children and young adults ages 3-22 years. Logistic regression models were constructed to investigate association of CRS and chronic school absenteeism (≥ 18 school days per year due to illness). Results: Of 5137 children and young adults with CRS, 467 (87.1%) young children, 1019 (84.8%) children, 1188 (80.2%) adolescents, and 352 (49.8%) young adults with
Nodular Fasciitis of the Temporal Fossa with Involvement of the Facial Nerve in a Pediatric Patient
Rebecca A. Compton, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to familiarize with nodular fasciitis as an etiology for soft tissue mass in the head and neck region in children. Participants should be aware that such benign pathology may involve local neurovascular structures.

Objectives: To describe a case of nodular fasciitis of the left temporal fossa that was associated with the frontal branch of the facial nerve, ultimately requiring transection of the nerve with primary neurorrhaphy for successful removal. Study Design: Case report. Methods: Case report and review of literature. Results: We present a unique case of an enlarging, painless mass identified in the left temporal fossa region of a 17 year old boy. There was no history of preceding surgery, trauma, or illness. This was a 3 centimeter subcutaneous mass without associated cranial neuropathy preoperatively. Fine needle aspiration revealed spindle cells, and the diagnostic suspicion was soft tissue tumor. The patient underwent excision of the left temporal fossa mass in the operating room. The mass was located in a clean plane between the temporoparietal and temporalis fascia. The transverse facial artery was sacrificed in its course directly through the mass. The frontalis branch of the facial nerve was encased by the mass and required sectioning for complete excision. Primary neurorrhaphy was performed using a NeuraGen cuff. Final pathology demonstrated nodular fasciitis. The patient's facial nerve function improved to near baseline function at six months. Conclusions: Nodular fasciitis is marked by benign proliferation of fibroblasts typically arising from deep fascia. Local involvement of neurovascular structures in the head and neck have been described, but some have opted against complete excision to avoid facial nerve injury. This case demonstrates a successful outcome after complete excision of the nodular fasciitis and primary neurorrhaphy of the facial nerve.

Influence of Craniofacial Anomalies on Postoperative Complication Rates for Pediatric Tympanostomy Tube Placement
Antonio Dekhou, BS, Rochester, MI; Deanna Tran, BS, Southfield, MI; Nader Berry, BS, Dearborn Heights, MI; Adam Folbe, MD, Birmingham, MI; Nathan Gonik, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to compare postoperative complication rates in pediatric patients with underlying craniofacial anomalies versus otherwise healthy patients when undergoing tympanostomy tube placement.

Objectives: Tympanostomy tubes are placed by otolaryngologists to treat various ear pathologies. Craniofacial anomalies including cleft lip, cleft palate, DiGeorge syndrome, and Treacher Collins syndrome, among others, may predispose patients to postoperative complications which may affect treatment outcomes. Our objective is to analyze the complication rate in those with underlying craniofacial anomalies compared to otherwise healthy children. Study Design: Cross-sectional study. Methods: Our analysis utilized the Kids' Inpatient Database (KID). Children ranging from 6 months to 12 years of age with and without underlying craniofacial anomalies were included. Using the 2009 and 2012 data, we compared rates of postoperative complications between patients with and without craniofacial anomalies. In our analysis, we accounted for the complex sampling design of the KID and adjusted for Elixhauser comorbidities accordingly. Results: Of the 16,323 total discharges, 7,807 (47.83%) reported one or more craniofacial anomalies. Children with underlying craniofacial anomalies had higher odds of postoperative complications including chronic otitis media (p<0.0001), persistent tympanic membrane perforation (p=0.0033), focal atrophy at insertion site (p=0.0003), tympanosclerosis (p=0.0003), and mechanical complications (p=0.0018). However, those with underlying craniofacial anomalies had lower odds of developing acute otitis media compared to those without underlying craniofacial anomalies (p<0.0001). There was not enough evidence to conclude that craniofacial anomalies were significantly associated with postoperative complications of otorrhea, infection, or cholesteatoma. Conclusions: Our analysis identifies various postoperative complications in children with craniofacial anomalies compared to otherwise healthy children. It is crucial for otolaryngologists to account for these anomalies and minimize the postoperative risk during tympanostomy tube placement in various populations.

Tonsillectomy for Obstructive Sleep Disordered Breathing: Should They Stay, or Could They Go?
Norman R. Friedman, MD, Aurora, CO; Maxene Meier, MS, Aurora, CO; Regina Hoefner-Notz, RN, Aurora, CO; Kaitlyn Tholen, BS, Aurora, CO; Thanh Nguyen, MD, Aurora, CO; Lisa McLeod, MD, Aurora, CO
Educational Objective: At the conclusion of this presentation, the participants should be able to understand what pre and intraoperative factors are predictive of having a prolonged oxygen requirement or airway complication in children who undergo a tonsillectomy with or without adenoidectomy (T&A) for obstructive sleep disordered breathing.

Objectives: To identify if children undergoing a tonsillectomy ± adenoidectomy (T&A) for obstructive sleep disordered breathing (oSDB) that are off of oxygen within 3 hours of surgery and pass a sleep room air challenge (SRAC) are safe for discharge. Study Design: Prospective cohort clinical study. Methods: All children observed overnight undergoing T&A for oSDB were recruited. Data was summarized using means/standard deviations for continuous characteristics and frequencies/percentages for categorical characteristics. The primary analysis was performed on the entire cohort via logistic regression using oxygen status by three hours postoperatively as the outcome, with significance at p<0.05. A subanalysis was performed on those with PSG data. Results: A total of 484 patients were recruited. The mean age was 5.65 (SD=4.0) years. A total of 177 (57%) were male, 189 (39%) were obese, and 117 (24%) were less than 3 years of age. A total of 365 (75%) were off oxygen within 3 hours of surgery. A child with an awake SpO2 > 96% and no asthma was 2.3 (95% CI: 1.46,3.51) and 2.1 (95% CI: 1.23,3.48) times more likely to be off oxygen by 3 hours and has an 82% probability of being off oxygen by 3 hours (95% CI: 78%, 86%). A SpO2 nadir of < 80% (p=0.003) and awake mean SpO2 < 95.4% (p< 0.001) in a PSG were predictors of a POR. Conclusions: Age, obesity, and OSA severity were not predictive of oxygen status at three hours. Adopting a clinical algorithm of awake SpO2 > 96% and no asthma will preoperatively identify over 80% of children that are potentially safe for discharge.

119. The Truth Is Hard to Swallow: A Case of Nonaccidental Traumatic Esophageal Perforation
Emily K. Gall, MD, Boston, MA; Tania Hassanzadeh, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe a case of penetrating pharyngoesophageal perforation in an otherwise healthy infant and to review the available literature regarding the optimal evaluation and management of this potentially lethal problem.

Objectives: To describe the presentation and management of a case of nonaccidental traumatic upper esophageal perforation; to suggest a schema of imaging, evaluation, and management based on review of the current literature. Study Design: Case report and literature review. Methods: A chart review of the case in question was performed and a literature review examining the management of pediatric traumatic esophageal perforation was conducted. Results: A previously healthy 6 month old girl presented with 48 hours of fevers, drooling, decreased oral intake, and left neck swelling. Imaging obtained to assess for potential abscess revealed free air in the neck and superior mediastinum. Esophageal perforation was suspected, but a Gastrografin swallow study was normal. She underwent direct laryngoscopy, bronchoscopy, and esophagoscopy and was found to have a large retropharyngeal collection and a linear laceration extending from the left pyriform sinus to the superior cervical esophagus. There was spontaneous drainage from the esophageal injury, which, once expressed, left a 6-8 mm defect into the mediastinum. The patient was managed conservatively without operative intervention and a Gastrografin study nineteen days after initial evaluation showed resolution of the leak. Conclusions: Esophageal perforation is an emergent and potentially lethal injury. Complications may include mediastinitis and requirement for long term parenteral feeding or use of a nasogastric or gastrostomy tube. Surgical intervention is not typically indicated for repair of penetrating esophageal injuries in otherwise healthy children.

120. Case Report: Transoral Resection of Buccal Vascular Malformation with Facial Nerve Monitoring
Bailey Harvey, BS, Lubbock, TX; Rahul Varman, MD, Lubbock, TX; Winslo Idicula, MD, Lubbock, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the importance of a detailed history and physical exam in the diagnosis and treatment of vascular malformations in the head and neck regions.

Objectives: Our aim is to present this case in order to update the literature on oral vascular malformations and describe a paradoxically indolent course of a seemingly archetypal vascular malformation. Study Design: Case report with concurrent literature review. Methods: Literature review of types of vascular malformations, their clinical differences, and their frequency in the general population in addition to a chart review of a pediatric patient with buccal vascular malformation that required surgical intervention. Results: A transoral resection of the buccal lesion was performed with facial nerve monitoring, after which the patient was sent home. After surgery and discharge from the hospital the patient has been doing well and presented for a followup appointment where her only complaint was of right sided upper lip weakness when smiling. At this time the lesion has been resolved without any evidence of recurrence. Conclusions: Vascular malformations are common enough in the general population that they should be routinely looked for in pediatric patients presenting with facial trauma, especially if the patient is of pubescent age.
121. **Analysis of the Academic Pediatric Otolaryngology Workforce**  
Justin Andrew Koceja, BS, San Antonio, TX; Zach Burgess, BS, San Antonio, TX; Harold Pine, MD, Galveston, TX; Timothy McEvoy, MD, San Antonio, TX; Marisa Earley, MD, San Antonio, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the demographic makeup of academic pediatric otolaryngologists, the highly variable geographic distribution of providers, and factors affecting changes in the future workforce.

**Objectives:** Analyze the current academic pediatric otolaryngology workforce in the United States (US) in terms of demographics and regional distribution, examine trends in pediatric otolaryngology fellowship training, and assess workforce needs. **Study Design:** Workforce modeling. **Methods:** All US otolaryngology residency programs' websites were accessed to identify current academic pediatric otolaryngologists (APOS). Gender, age, years in practice, fellowship status, and workplace zip code were obtained via public websites. San Francisco Match data were examined for pediatric otolaryngology fellowships. Each APO was assigned to a hospital referral region (HRR) determined by the Dartmouth Atlas of Healthcare to assess regional distribution. A model accounting for career length, attrition rate, and yearly addition of new APOS was developed to forecast workforce growth. **Results:** There were 514 current APOS identified. Of those, 63% were male and 37% were female. The mean number of years in practice was 15. Over 330 applicants matched into pediatric otolaryngology fellowships between 2010 and 2018, with 67% entering academia. Of the 306 HRRs across the country, only 29% had at least one APO, with significant variation in density regionally (range: 0-29 APOs per HRR). The number of APOs per 100,000 persons under age 18 was projected to increase from 0.69 in 2020 to 0.96 in 2040. **Conclusions:** There may be a current need for more APOS. The potential implementation of a new pediatric otolaryngology subcertification requirement may exacerbate this need and hamper projected workforce growth. The significant number of HRRs without an APO can be an important consideration for all pediatric otolaryngologists.

122. **Electronic Medical Record Based Tools: Not a Universal Panacea in the Diagnosis of Coin Shaped Foreign Body Ingestions**  
Jennifer M. Lavin, MD MS, Chicago, IL; Jacqueline B. Corboy, MD MS, Chicago, IL; Yiannis Katsogridakis, MD MPH, Chicago, IL; Oanh Pham, RN, Chicago, IL; Dusty Brinson, RN, Chicago, IL; Steve Krug, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand improvement interventions that are associated with improved timeliness in the diagnosis of coin based foreign body ingestion.

**Objectives:** Electronic medical record (EMR) based tools have been demonstrated to improve timeliness of x-ray order placement in patients presenting with coin shaped foreign body ingestion. Similar efforts directed towards downstream processes are necessary to facilitate rapid diagnosis of esophageal button battery. We hypothesized that improvement tools such as electronic medical record based alerts and process standardization could be utilized to expedite x-ray completion. **Study Design:** Prospective quality improvement initiative. **Methods:** Using Plan, Do, Study, Act methodology, iterative interventions were implemented. In July 2017 a previously designed best practice advisory was linked to an automated notification page to the x-ray technician. Next, a standardized process was created where patients were gownned in triage and placed in a designated space awaiting x-ray. Workflow planning began in December 2018 and was formalized in February 2019. Time from arrival to x-ray completion was tracked for all patients presenting with coin shaped foreign body ingestion. Control charts were used to determine presence of special cause variation. **Results:** An average of 10.1 patients (range 4-21) monthly presented to the ED with coin shaped foreign body ingestion. Automated pages to the x-ray tech were not associated with improved time to x-ray completion. Upon initiation of the new patient workflow, median time to x-ray completion decreased from 37.4 to 23.3 minutes. **Conclusions:** Time to x-ray completion in children presenting to the ED with ingestion of coin shaped foreign bodies is not improved solely through electronic notification of the imaging technologist. Efforts to standardize processes for patient intake and placement are associated with more timely completion of imaging studies.

123. **Development of a Nonsurgical Scoring Tool to Differentiate Allergic Fungal Sinusitis and Chronic Rhinosinusitis in Pediatric Patients**  
Friederike S. Luetzenberg, MBA, Orlando, FL; Timothy M. Maul, PhD, Orlando, FL; Julie L. Wei, MD, Orlando, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to clinically differentiate between pediatric allergic fungal sinusitis (AFS) and chronic rhinosinusitis (CRS).

**Objectives:** To identify differences and predictive factors in the demographics, history, symptoms, imaging, and histopathology findings for both. **Study Design:** Retrospective chart summary. **Methods:** Review of all AFS and CRS patients from January 2014 to December 2019 treated at a tertiary children's hospital. Data included demographics, CT findings, surgical and pathology findings, and medical interventions. Data was analyzed through chi squared, Fisher's Exact,
and Mann Whitney U testing and logistic regression. **Results:** Ninety-six patients (36 AFS, 60 CRS) were identified, with AFS patients being significantly older at age of diagnosis (p<0.001) and not associated with Caucasian race (p<0.05). AFS patients were less likely to report headaches (OR=2.78, 95% CI 1.14-6.76), more likely to have allergic rhinitis (OR=3.9, 95% CI 1.6-9.5) and nasal polyps (OR=11.0, 95% CI 3.0-39.8). CT imaging shows AFS with unilateral disease (OR=9.9, 95% CI 3.8-25.8) and bony erosion (OR=9.5, 95% CI 2.5-36.7). All AFS patients displayed fungal hyphae on GMS or positive fungal culture, with 80% growing Curvularia. Logistic regression revealed unilateral CT findings, bony erosion, nasal polyp, allergic rhinitis, and age being independent predictors of AFS, with a model ROC curve with area=0.93 (95% CI 0.877-0.989), 89% sensitivity and 92% specificity. An AFS scoring system was developed from the regression coefficients. An AFS score of at least 28 was 77% likely to have AFS (94% sensitivity, 83% specificity). **Conclusions:** AFS in pediatric patients is distinguishable from CRS based on symptomology and CT results. An AFS score of ≥ 28 predicts pathologic findings with Curvularia as the predominant fungus identified.

124. **Review of the Effects of Gardasil Vaccination on Treatment Outcomes in Pediatric Patients with Recurrent Respiratory Papilloma**

Ryan Van Marshall, MD, Birmingham, AL; Robert Wineski, MD, Birmingham, AL; Emma Panico, MD, Birmingham, AL; Andrew DeAtkine, BA, Birmingham, AL; Christopher Waltz, BA, Birmingham, AL; Brian Wiatrak, MD, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss how Gardasil has decreased the rate of RRP in the pediatric population.

**Objectives:** To correlate the affect the Gardasil vaccine has on the rates of recurrent respiratory papillomatosis (RRP) in pediatric patients. **Study Design:** Retrospective chart review at a tertiary care children's hospital. **Methods:** A retrospective chart review was performed using the current procedural terminology codes pertaining relevant surgical cases to identify patients who underwent surgical intervention between January 1999 to December 2019 for symptoms related to RRP. The study population was divided into two groups: prior to the introduction of Gardasil in 2006 and after its introduction. Data from two time periods were compared, specifically looking at incidence and recurrence of RRP. **Results:** One hundred fifteen new cases of RRP were identified between 1999-2018. Six different surgeons performed a total of 1003 cases during that timeframe. The rate of new RRP cases between the study groups were compared showing an estimated relative risk of developing RRP to be 0.34 (p<0.05) and a reduction in new diagnosis of RRP in the post-Gardasil population. The average months between recurrences requiring repeat surgery was found to be 17.0 prior to 2006 compared to 7.0 after 2006 (p<0.05). **Conclusions:** While recurrent respiratory papillomatosis still presents a challenge, the introduction of the Gardasil vaccine has correlated with a significant decline in the incidence and recurrence of this disease at our institution.

125. **ENT Manifestations of Pediatric Granulomatosis with Polyangiitis: Results of a Case Series**

Nicole L. Molin, MD, Philadelphia, PA; Walid Khalid Salah, BS, Salt Lake City, UT; Karen James, MD, Salt Lake City, UT; Albert Park, MD, Salt Lake City, UT

**Educational Objective:** At the conclusion of this presentation, the participants should be aware of certain ENT manifestations that when present in pediatric patients can increase suspicion for a diagnosis of granulomatosis with polyangiitis (GPA).

**Objectives:** Common ENT manifestations of pediatric GPA can be nonspecific making diagnosis difficult. Our objective is to determine the prevalence of ENT manifestations in pediatric GPA and determine which manifestations could potentially help providers know when to have an increased suspicion for the disease. **Study Design:** Retrospective cohort study. **Methods:** Data obtained through chart review of pediatric patients diagnosed with GPA at a tertiary care pediatric hospital from 2011-2020. **Results:** Twenty-three children were diagnosed with GPA, 61% female 49% male, median age at presentation 13.6 years (range 8.7-17.6). Average time to diagnosis 4.3 months (range 2-22). Thirty percent were evaluated by an ENT prior to diagnosis. Eighty-three percent presented with ENT involvement including sinusitis (65%), nasal crusting (50%), epistaxis (48%), otitis media (35%), facial pain (30%), oropharyngeal ulceration (30%), nasal ulceration (25%), septal perforation (25%), and saddle nose deformity (20%). None of these findings alone represents more than 65% of the cohort. However, if four symptom/exam based findings are combined as an alert to possible GPA diagnosis, 80% of this cohort would’ve warranted further testing. These findings included oropharyngeal/nasal ulceration, facial pain and septal perforation, observed alone or in combination. **Conclusions:** We identified 23 pediatric patients with GPA, with a slight female predominance, 85% presented with ENT manifestations between the ages of 8-18 y/o. Time to diagnosis was up to 22 months, possibly related to the nonspecificity of the common ENT manifestations (i.e., sinusitis, epistaxis). However, combining the above four symptom/exam based findings can aid in earlier diagnosis by alerting providers when GPA may be suspected and warrant further testing. These preliminary results provide a basis for a larger prospect study to further analyze this approach.

126. **Prevalence of Middle Ear Effusion at Time of Tympanostomy Tube Placement before, during, and after Covid-19 Pandemic Mandatory Stay at Home Order**
Educational Objective: At the conclusion of this presentation, the participants should be able to identify the impact of Covid-19 pandemic and quarantine precautions on the prevalence of intraoperative middle ear effusion for pediatric patients.

Objectives: While management of OME includes observation since 50% of children may have resolution of OME after 3 months, many undergo bilateral myringotomy and tube (BMT) placement due to persistent effusion. With the Covid-19 pandemic and mandatory stay at home order (MSHO), children were quarantined at home and many stayed home after MSHO. We reviewed the prevalence of middle ear effusion (MEE) at the time of BMT before and during the pandemic and during MSHO. Study Design: Retrospective summary of cases at a single tertiary children's hospital. Methods: All children <18 years who underwent BMT between December 1, 2019 - July 1, 2020 (during Covid), and between December 1, 2018 - July 1, 2019 (pre-Covid) were included. Statistical analysis included chi-square and Mann-Whitney U tests. Results: A total of 1,568 cases were reviewed; 927 (59%) performed pre-pandemic and 641 (40.9%) during onset of pandemic (N = 1,568). There were no significant differences in gender, age, and BMI between groups, but significantly fewer Caucasians (58% vs. 43%, p < 0.05) and more Hispanics (20% vs. 31%, p < 0.05) during Covid. When comparing only March-July patients, there was significantly less prevalence of intraoperative effusion during Covid compared to pre-Covid (65% vs. 83%, p < 0.001). We found no seasonal difference in December-March in the year prior (84% vs. 84%, p=0.83). Conclusions: Pandemic and Covid-19 MSHO were associated with significantly lower intraoperative OME prevalence. Further research may elucidate the impact of face covering, social distancing, and virtual schooling on the incidence of pediatric RAOM, COME, and ENT symptoms.

127. Pilot Study Evaluating Swallow Outcomes, Resource Allocation and Care for Patients following Laryngeal Cleft Repair
Matthew Pelson Partain, MD, Boston, MA; Christopher Hartnick, MD MS, Boston, MA; Cheryl Hersch, MS CCC-SLP, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to consider their own institutions when evaluating results. If these children require less sedation and therefore a lower level of care hospital admission while the success rate of the surgery in terms of functional outcome remains unchanged, then this changes the value proposition both in terms of quality control and process improvement (specifically in terms of the reducing prolonged sedation and anesthetics) as well as in terms of overall cost of care. We have previously written about value based healthcare (VBHC) as it relates to integrated care unit (IPU) approach to pediatric dysphagia and laryngeal cleft repair and how this offers a framework to help healthcare institutions deliver better outcomes to patients at lower societal costs.

Objectives: This study aims to provide the pilot data to power a larger prospective longitudinal study to evaluate how to best utilize resources and care for patients following laryngeal cleft repair and thus optimize value based healthcare. Study Design: Retrospective cohort pilot study of patients with symptomatic pharyngeal phase dysphagia not responsive to conservative measures who underwent type 1 laryngeal cleft suture repair during diagnostic laryngoscopy, bronchoscopy and esophagoscopy at a single tertiary care academic subspecialty hospital from February 2017 to February 2020. Methods: Included patients underwent VFSS within 30 days of repair and had documented speech language pathologist followup and VFSS within 3 months postop. Exclusion criteria included prior cleft repair, gastrostomy tube dependence, type 2 through 4 laryngeal clefts, concurrent supraglottoplasty, or lack of documented followup. Patients that did not have both a preoperative and postoperative VFSS reviewed by speech pathology were excluded. A total of 70 patients were able to be included in the final analysis. Results: Floor: 92.3% of patients showed improvement in at least 1/2 consistency and 87.7% of all floor patients made it to a thin liquid diet within the next 6 months following cleft repair. PICU: 86.1% of patients showed improvement in at least 1/2 consistency and 45.2% made it to a thin liquid diet within the next 6 months following cleft repair. Conclusions: Patients can be managed safely monitored on a pediatric floor without PICU stay and have adequate improvement in postoperative swallow outcomes. Children may be able to be safely observed on thickened feeds with electronic support (tablets and movies/shows) and minimal sedation. The cost differential is $7,691 at our institution. This study aims to provide the pilot data to power a larger prospective longitudinal study looking at how to optimize the value based care in the postoperative period for laryngeal cleft patients.

128. Autonomous Classification of Pediatric Vascular Anomalies Using a Convolutional Neural Network
Palak Patel, MD, New Orleans, LA; Katelyn Ragland, MD, Little Rock, AR; Michael Dunham, MD, New Orleans, LA; Gresham Richter, MD, Little Rock, AR

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the basic concepts of autonomous image classification as it relates to vascular anomalies in children.

Objectives: Design and evaluate a convolutional neural network to classify images of pediatric vascular anomalies. Study Design: Retrospective, cross-sectional study of medical images. Methods: We obtained a series of head and neck
vascular anomaly images in pediatric patients from the database maintained in a large multidisciplinary vascular anomalies clinic. The clinic team, including a senior pediatric otolaryngologist, provided diagnostic labels for all images. Four diagnostic classes were recognized in the dataset--infantile hemangioma, capillary malformation, venous malformation and arteriovenous malformation. Our group designed and implemented a convolutional neural network to recognize the four classes of vascular anomalies. The system was based on the Oxford VGG19 neural network using transfer learning. **Results:** The multiclass system distinguished the four categories with an overall accuracy of 72%. Recall ranged from 28% for arteriovenous malformations to 90% for infantile hemangiomas and venous malformations. Half of the arteriovenous malformations were classified as venous malformations. Precision ranged from 50% for arteriovenous malformations to 70% for capillary malformations. **Conclusions:** Autonomous classification of congenital vascular anomalies using a convolutional neural network may be useful for screening skin lesions in children. Improved network design and larger datasets will be required. Automated recognition of the important arteriovenous malformation class may be difficult.

**Objectives:** Determine the incidence of hypersomnia and narcolepsy after resection of craniopharyngiomas (CP). In light of the current surgical trend to STR, we compare the impact of STR+RT versus GTR. **Study Design:** A cross-sectional study. **Methods:** A medical record review of all subjects was performed after the institutional review board's approval. Patients older than 18 years old, with previous neurosurgical treatment or incomplete polysomnography (PSG) were excluded. Demographic, clinical, and disease specific variables were obtained. Attention was given to control other variables that could impact the hypothalamic function or sleep quality (e.g., endocrine status, medical therapy, obesity). Preoperative images were used to classify the hypothalamic involvement. Statistical tests were used to determine the relationship between patients, surgical, and preop image features to the presence of sleep disorders. **Results:** 135 children were analyzed. The mean age was 10.3 (range 5-18). Hypersomnia and narcolepsy were identified in 39 and 25% of the cases, respectively. Obesity was associated with hypersomnia in 75% of the PSG's, and 66% of the narcoleptic individuals. GTR correlated with hypersomnia in 45% and narcolepsy in 33%. STR+RT presented with hypersomnia in 28% and narcolepsy in 18%. **Conclusions:** Children submitted to resection on suprachiasmatic tumors can present with different degrees of hypothalamic dysfunction. Hypersomnia and narcolepsy are frequent post-treatment findings. The option for STR+RT correlates with fewer sleep disorders. It remains uncertain to what degree the weight loss can impact treating circadian rhythm sleep disorders (CRSD) after CP resections. Prospective studies are needed to confirm these results and delineate the preferable intervention in children with CP.

**129. Sleep Disorders Associated with Craniopharyngioma Resection in the Pediatric Population**

Gustavo G. Rangel, MD, Memphis, TN; Anthony Sheyn, MD, Memphis, TN; Joshua Wood, MD, Memphis, TN; Tate M. Naylor, MD, Memphis, TN; Madhu P. Mamidala, PhD, Memphis, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to determine the most common circadian rhythm sleep disorders (CRSD) after craniopharyngioma treatment and the impact of the different therapeutical modalities in preserving hypothalamic function.

**Objectives:** To review the indications for transhyoid suture guided pharyngotomy (TSGP) for excision of thyroglossal duct cysts (TGDC) in pediatric patients. To describe the use of this technique as a primary surgery for addressing symptomatic lingual TGDC in infants. **Study Design:** Retrospective case series with chart review. **Methods:** A departmental database was queried to identify patients who underwent TSGP for the excision of TGDC over a 10 year period. Charts were reviewed to identify indications for surgery and any perioperative complications. **Results:** A total of 7 patients underwent TSGP from 1/1/2010 to 10/1/2020. Five were male and 2 were female. There were 3 patients operated on for recurrent lesions (ages 25-205 months, mean: 142 months) and 4 patients who underwent primary surgery for symptomatic lingual TGDC (ages 2.6-28.3 months, mean: 11.9 months). Among the primary surgery patients, the most common concurrent diagnosis was laryngomalacia, with supraglottoplasty as the most common concurrent procedure. There were two complications: one minor seroma and one major complication in the youngest patient (2.6 months) who developed respiratory failure in the days following the procedure, ultimately leading to delayed placement of a tracheostomy. With the exception of this infant who had an extended length of stay (32 days), the average length of stay was 2.3 days (1 - 3 days). **Conclusions:** Transhyoid suture guided pharyngotomy for the excision of TGDC in pediatric patients is an effective procedure for managing recurrent lesions. This procedure is a feasible option to consider for primary management of symptomatic lingual TGDC in select patients.
131. The Hearing Aid Effect in 2020: A Cross-Sectional Survey Based Study
Abdullah Mohammed Sindi, MD, Jeddah, Saudi Arabia; Faisal Tarif Zawawi, MD MSc FRCSC, Jeddah, Saudi Arabia; Kamal Alaa Hanbazazah, MD, Jeddah, Saudi Arabia; Abdullah Eiyad Abu Alfaraj, MD, Jeddah, Saudi Arabia

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the change in perception of individuals using hearing assistive devices.

Objectives: The hearing aid effect is a negative perception towards hearing assistive device (HD) users. It remains one of the main reasons behind parents’ and children's refusal to use them. The object of this study is to determine the current perception towards HD users and factors associated with it. Study Design: A cross-sectional survey based study. Methods: A 30 item photo based survey was created to measure the participants' perception of individuals wearing HD in comparison to healthy individuals (H) and to disabled individuals (D). The survey was validated with intrarater reliability of 86%. Afterwards a cross-sectional study was conducted by approaching the population who were visiting one of the largest shopping centers in a metropolitan city to participate in the survey. Demographics including age, gender and educational background were collected. Results: 517 participants fully answered the survey. Nearly two-thirds of the participants (59.7%) did not consider HD as an individual who needed assistance had a disability in comparison to healthy individuals. Interestingly, the participants from generation X and Z had a statistically significant better perception of health of individuals with HD (63.1%, 59% respectively) compared to participants from the baby boomers generation (54.3%). The majority of participants who considered HD is a handicap compared to healthy individual (79.9%) did not have a family member with a HD. Conclusions: The stigma of wearing hearing assistive device is significantly improving with time and the younger generations are not identifying it as disability. This is an important point to highlight while counseling parents and young adults who are candidates for HD.

132. Costs of Pediatric Neck Mass Procedures and Associated Hospital Readmissions
Alisse Gabrielle Singer, BA, Los Angeles, CA; Alisha West, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate cost differentials in pediatric neck mass procedures and their associated readmissions and to describe risk factors associated with increased costs.

Objectives: Although pediatric neck masses are a common clinical finding, their associated procedural costs have not been well evaluated. Our primary objective was to assess cost trends in neck mass procedures and associated hospital readmissions to inform healthcare quality improvement. Study Design: Retrospective cohort study. Methods: The Nationwide Readmissions Database (NRD) between 2010 and 2014 was used to select surgeries of the thyroid gland, parathyroid glands, salivary gland, cervical lymph nodes, thyroglossal duct, branchial cleft, thymus, and head and neck vessels. Using multivariate regression, we analyzed the association of hospital charges with hospital, patient, and admission level characteristics. Results: A weighted total of 11,824 patients underwent neck mass surgery. The median cost for procedure and readmission was $35,500 and $24,700. The highest charge was for the thymus ($121,900), head and neck vessels ($51,600), and cervical lymph nodes ($48,800). The highest cost by readmission cause was sepsis ($120,800), and aftercare ($43,400). Variables associated with increased initial procedure cost were age < 1 year, length of stay >= 7 days, more chronic conditions and concurrent procedures, thymus surgery, subsequent readmission, discharge with care, and procedure at a teaching, large, or private hospital (R2=48.2%, F(39, 826)=23.4). Variables associated with increased readmission costs were more chronic conditions or procedures, medium and large hospital size, and pneumonia (R2=36.1%, F(40, 775)=21.1). Conclusions: Pediatric neck mass surgery and readmissions incur significant costs. Higher costs were associated with long hospital stay, infancy, more chronic conditions and procedures, thymus procedure, subsequent readmission, higher level of discharge care, pneumonia, and teaching, medium to large, or private hospital.

133. Systematic Review of the Prevalence and Outcomes of Vestibular Symptoms in Patients with Enlarged Vestibular Aqueducts
Maximilian C. Stahl, BA, Bronx, NY; Todd Otteson, MD MPH, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the prevalence of vestibular symptoms in patients with enlarged vestibular aqueducts and understand important vestibular function tests, risk factors, and interventions.

Objectives: Enlarged vestibular aqueduct (EVA) is a congenital condition that can lead to various outcomes in pediatric patients including hearing loss and vestibular dysfunction. Our goal was to critically appraise the literature on the proportion of patients with EVA who report vestibular dysfunction, determine relevant risk factors for the development of these symptoms, and describe vestibular tests and interventions used to improve outcomes. Study Design: Systematic review. Methods: A systematic review was performed in accordance with the PRISMA guidelines. We queried the Embase, Ovid
Medline, and Cochrane Library databases for relevant literature. Studies were included if they had n > 10, reported vestibular symptoms or vestibular function testing in patients with EVA, and were published in English. Non-human studies, systematic reviews, and review papers were excluded. Results: Of 808 identified studies, 20 met inclusion criteria. Subjective vestibular symptoms included dizziness, episodic vertigo, and imbalance. Seventeen studies reported subjective vestibular symptoms, ranging from 2-71% of patients between studies. Seventeen studies performed some form of vestibular function test, including physical exam maneuvers (Dix-Hallpike), caloric testing, electronystagmography, and vestibular evoked myogenic potentials. Of those who had vestibular function testing, 7-92% had an abnormal result. Two studies identified head trauma as a risk factor. One study successfully treated patients with BPPV using the Epley maneuver, but other vestibular symptoms were not targeted with treatment. Conclusions: The degree to which vestibular symptoms impact patients with EVA varies significantly. Performing vestibular function testing may help identify asymptomatic patients with vestibular dysfunction. Future studies should target improving treatment of vestibular symptoms in EVA patients.

134. Integrative Medicine in Otolaryngology: A Contemporary Review
Zachary G. Tanenbaum, MS, Washington, DC; Daniel D. Swanson, BS, Washington, DC (Presenter); Stephanie Y. Johng, MS, Washington, DC; Earl H. Harley, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the utility of integrative medicine in the field of otolaryngology.

Objectives: To review the literature on integrative care of the patient in the field of otolaryngology. Study Design: Review of the literature. Methods: A contemporary review of the literature for articles pertaining to integrative medicine in patients with a focus on problems related to otolaryngology. PubMed, ClinicalKey Database, Google Scholar, Cochrane Systematic Review Database, and OVID Medline Database were used to collect articles pertaining to integrative medicine in otolaryngology. Results: Integrative medicine and other non-traditional and complementary treatment modalities have been significantly utilized in various otolaryngologic conditions including balance disorders, upper respiratory infections, head and neck cancer, and allergic rhinitis—among many other conditions. Although integrative medicine is not established as first line therapy, it has been demonstrated to aid considerably in many patient's sequelae of treatment and improve quality of life. Conclusions: Given the complexity of otolaryngologic disease and the increase in integrative medicine and other non-traditional treatment practices, physicians should be aware of the use, myths, and evidence of integrative medicine. Physicians and especially otolaryngologists should understand how the definition of integrative medicine has changed and become more inclusive in order to better direct care to specific modalities of integrative medicine. By better understanding integrative approaches to medicine, physicians can better care for patients as a whole: placing the patient at the center and addressing the full range of physical, emotional, mental, social, spiritual, and environmental influences that affect a person's health.

135. The Role of Corticosteroids in Pediatric Head and Neck Infections: A Contemporary Review
Zachary G. Tanenbaum, MS, Washington, DC; Stephanie Y. Johng, MS, Washington, DC (Presenter); Daniel D. Swanson, BS, Washington, DC; Sadhana S. Sathi, MS, Washington, DC; Earl H. Harley, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the role corticosteroids can play in pediatric head and neck infections.

Objectives: The purpose of this paper is to review the role of corticosteroids in a range of pediatric head and neck infections/conditions. Study Design: Review of the literature. Methods: A contemporary review of the literature using OVID Medline database. Results: The use of corticosteroids in the management of pediatric head and neck infections and other conditions continues to cause debate among medical providers. Whilst corticosteroids have a number of advantageous effects, they also have the potential to worsen infection, confuse the clinical picture, and attenuate the immune response. We examined the role of corticosteroids in the following pediatric head and neck conditions: peritonsillar abscess, orbital and preseptal cellulitis, acute bacterial rhinosinusitis, chronic rhinosinusitis with nasal polyposis, allergic rhinitis, non-allergic rhinitis, and epiglottitis. Corticosteroids have been shown to have potential benefits in all of the above pediatric conditions. Furthermore, there is evidence that suggests corticosteroid use may decrease symptoms and recovery time in some of these infections while having infrequent reported side effects. Conclusions: The evidence suggests that the use of corticosteroids in pediatric head and neck infections is efficacious and safe. However, further research is warranted due to limited pediatric studies, and physicians should prescribe corticosteroids judiciously in the aforementioned conditions to avoid corticosteroid induced side effects.