

# Outcomes and Performance 2015



**Mount  
Sinai**

**Mount Sinai Health System  
Department of Otolaryngology–  
Head and Neck Surgery**

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## Mission

The mission of the Mount Sinai Health System is to provide compassionate patient care with seamless coordination and to advance medicine through unrivaled education, research, and outreach in the many diverse communities we serve.

## Vision

The Mount Sinai Health System's vision is to continue to grow and challenge convention through our pioneering spirit, scientific advancements, forward-thinking leadership, and collaborative approach to providing exceptional patient care.

[www.mountsinai.org](http://www.mountsinai.org)

*The Department of Otolaryngology – Head and Neck Surgery extends a sincere thank you to Linda and Art Charpentier for their generous contribution making this report possible.*

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This material and more information about the Department of Otolaryngology–Head and Neck Surgery can be found at [www.mountsinai.org/ent](http://www.mountsinai.org/ent)

The Mount Sinai Hospital consistently ranks among the best for Otolaryngology by U.S. News and World Report

# Message from the Dean

Once again, the Mount Sinai Health System's Department of Otolaryngology - Head and Neck Surgery demonstrates outstanding leadership and initiative in this year's annual *Outcomes and Performance* report. By employing novel programs aimed at reducing complications, the Department achieved a variety of patient care benefits and improvements in clinical outcomes.

This year's report highlights several innovative hospital quality programs, including the Stop Sepsis Program and the Inpatient Hospitalist Program, as well as critical clinical and research advances aimed at enhancing precision medicine and the patients' experience. Innovative clinical programs, such as the cranial nerve 5 to 7 transfer for facial nerve paralysis and virtual surgical planning for mandibular reconstructive surgery, as well as the discovery of a master switch (gene NR2F1) for tumor dormancy, are advances that have a significant impact on patient care today, and patient care tomorrow.

It is my pleasure to share with you the accomplishments of this outstanding Department, one that exemplifies Mount Sinai's mission to advance biomedical research, drive clinical improvements, and accelerate medical innovation.



**Dennis S. Charney, MD**  
Anne and Joel Ehrenkranz Dean  
Icahn School of Medicine at Mount Sinai  
President for Academic Affairs  
Mount Sinai Health System



Dr. Dennis S. Charney

# Message from the Chairman

This year's *Outcomes and Performance* Report highlights the performance of the Department of Otolaryngology - Head and Neck Surgery at the newly formed Mount Sinai Health System. The formation of the health system has resulted in an expansion of the full time and voluntary faculty, as well as clinical services. Once again, patient visits increased and the Department experienced an increase in the volume of complex surgical cases.

To improve patient care, we have introduced two new programs, the Stop Sepsis Program and the Inpatient Hospitalist Program. The former is designed to identify and manage patients at risk for infection before sepsis ensues. The latter program aims to place every inpatient under the care of an inpatient hospitalist with the intent of improving personalized care. Both programs have proven successful in improving patient care and reducing complications.

In an effort to expand our patient-centered efforts across the health system we have recruited Dr. Mark Courey as the Vice Chair of Quality. Dr. Courey will work with his team to standardize outcomes metrics with the goal of continued improvement. At the Mount Sinai Health System, we remain dedicated to safe and efficient care for all of our patients. I hope that you find this report helpful and informative.



**Eric M. Genden, MD, MHCA, FACS**  
Professor and Health System Chairman  
The Department of Otolaryngology --  
Head and Neck Surgery  
Mount Sinai Health System



Dr. Eric M. Genden

Sepsis cases **are on the rise** in the United States.

More than **1.1 million people** get sepsis in the hospital each year, according to the CDC.

Between **28 and 50 percent** of these people die from it.

Mount Sinai is leading sepsis prevention with its groundbreaking **“Stop Sepsis Program.”**

The Department of Otolaryngology – Head and Neck Surgery, which adopted the Stop Sepsis Program in 2014, had a **zero percent sepsis mortality rate in 2014 and 2015.**

## Stop Sepsis Program

Perioperative sepsis has been identified as a major contributor to inpatient morbidity and mortality. In 2014, The Department of Otolaryngology- Head and Neck Surgery enrolled in Mount Sinai's "Stop Sepsis Program." This intervention program is a patient-centric, data-driven solution that addresses early identification and management of patients with suspected sepsis. Early recognition includes real-time patient tracking and Best Practice Alerts to signal clinicians about patients at high risk for mortality. Patients are evaluated within one hour of the best practice alert to assess their clinical status. This early warning system was used to activate clinical pathways as appropriate. The program has proven successful in identifying patients at risk, and early intervention has improved patient safety.

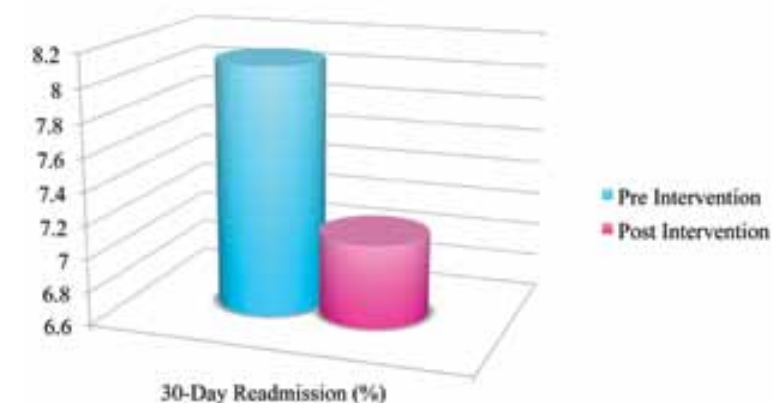
**This is evident in the Department's zero percent sepsis mortality rate in 2014 and 2015.**

## Inpatient Hospitalist Program

Another hospital quality program the Department adopted was the Mount Sinai Departments of Otolaryngology and Internal Medicine initiative, the Inpatient Hospitalist Program. This ambitious co-management program aims to improve inpatient satisfaction, decrease cost and length of stay, decrease morbidity (including post-operative complications) and decrease readmissions among high risk surgical patients. Actively participating in the medical care of the patient, the hospitalist manages all facets of chronic disease, communication with house staff and surgical providers, recommendations from the preoperative evaluation, communication with the patients and their families, communication with the patient's PCP and consultations with subspecialty services.

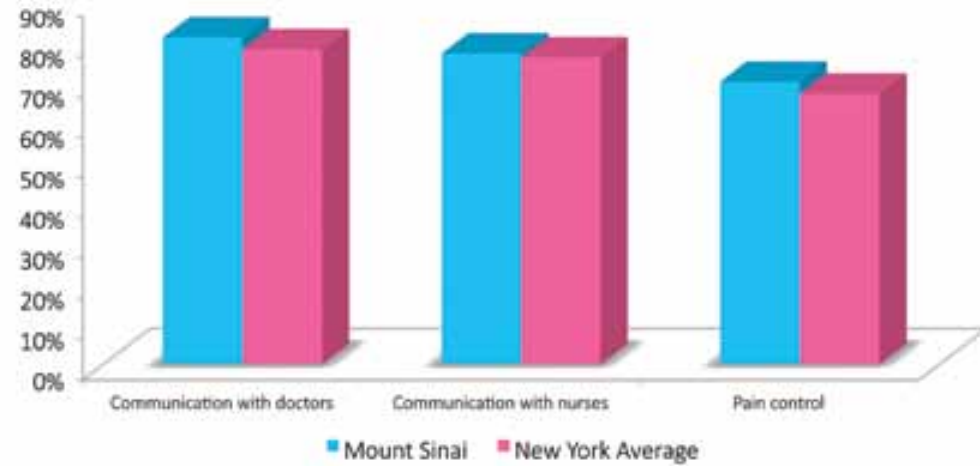
This Program was implemented in July 2015, and since its inception, it has had a positive impact on our inpatient outcome measures. Specifically, this partnership has resulted in a reduction in our expected inpatient hospital stay as well as our 30-day readmission rate.

## 30-Day Readmission Rate

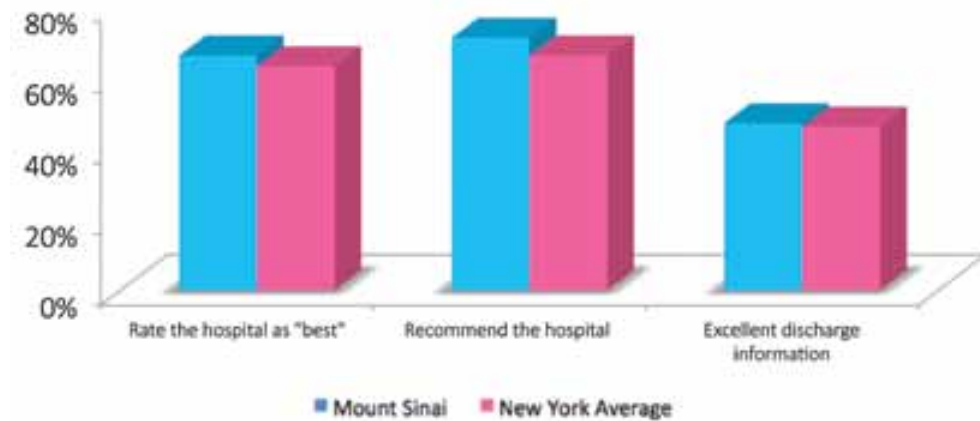


# The Patient Hospital Experience

The patient hospital experience is a measure of critical aspects of patients' hospital experiences, such as communication with nurses and doctors, the responsiveness of hospital staff, the cleanliness and quietness of the hospital environment, pain management, communication about medicines, discharge information, overall rating of hospital, and would they recommend the hospital. Working with nursing leadership, we have improved our patient's hospital experience by addressing our patients needs.



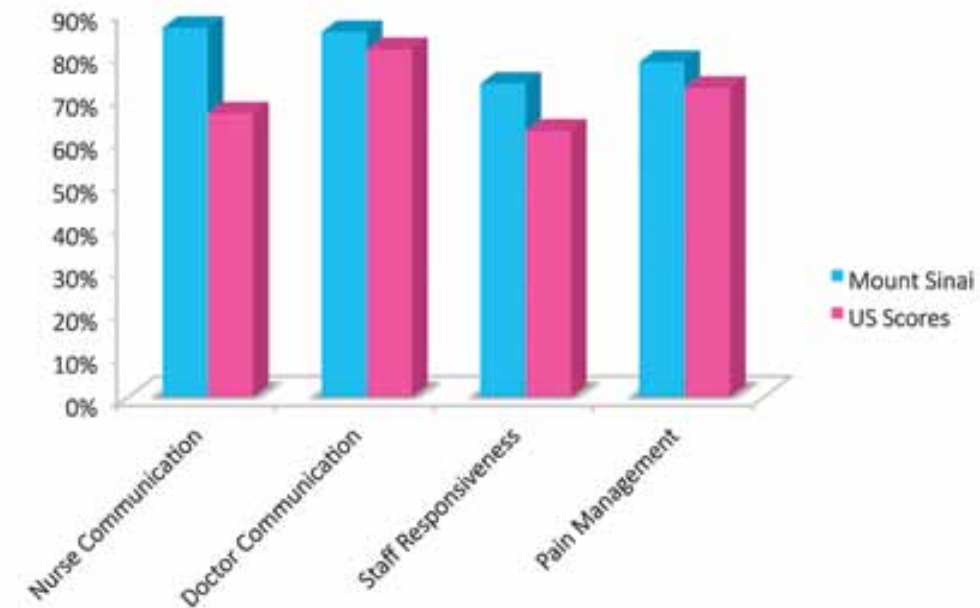
Source: The Centers for Medicare and Medicaid Services and Hospital Consumer Assessment of Healthcare Provider and Systems Survey. Medicare.gov Hospital Compare, <http://www.medicare.gov/HospitalCompare/profile>



Source: The Centers for Medicare and Medicaid Services and Hospital Consumer Assessment of Healthcare Provider and Systems Survey. Medicare.gov Hospital Compare, <http://www.hospitalcompare.hhs.gov>

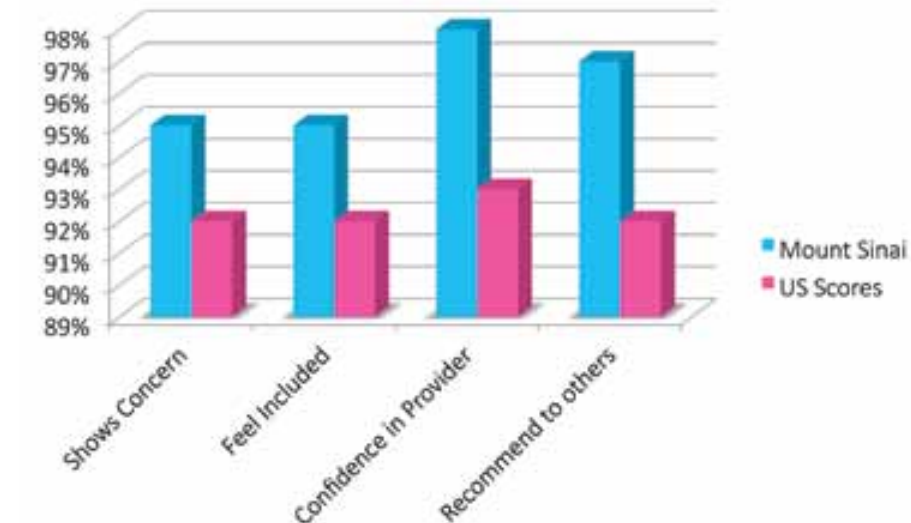
# The Patient Practice Experience

## Hospital Consumer Assessment of Healthcare Providers and Systems Inpatient Scores (HCAHPS)



Source: University Health System Consortium

## Outpatient Patient Satisfaction Scores



Source: University Health System Consortium

Mount Sinai Health System's Department of Otolaryngology-Head and Neck Surgery



"I am now alright and cancer free," says Brian Lowery (right) after robotic surgery with Dr. Miles for oral cancer



World Trade Center patient Michael with Dr. Illoreta, who performed his sinus surgery

# Departmental Volume and Growth



Dr. Edward Shin, Chair of Otolaryngology-Head and Neck Surgery at New York Eye and Ear Infirmary of Mount Sinai

## Patient Encounters

The volume of patient encounters has consistently increased at the Mount Sinai Health System's Department of Otolaryngology – Head and Neck Surgery. Department physicians evaluate over 100,000 patients a year. The volume provides extraordinary data set to focus on the patient experience and surgical and medical outcomes.



## Surgical Volume



# Departmental Volume and Growth



Drs. Likhterov, Chai and Buchbinder, who all see patients at the new Bay Ridge, Brooklyn office

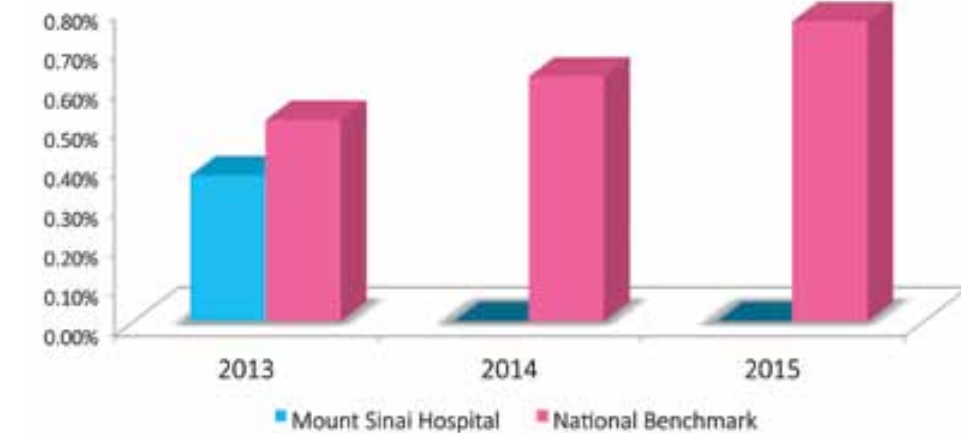
## Rate of Readmission and Reoperation



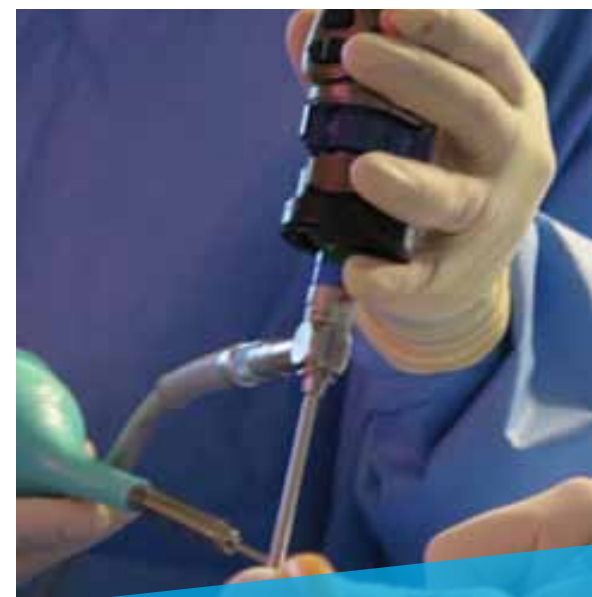
Source: University Health System Consortium

## Mortality Rate

Mortality rate is the measure of patients that expire during hospitalization. The rates are calculated as a ratio of the number of deaths among hospital patients with the specific medical condition or procedure by the total number of patients admitted for that same medical condition or procedure. The risk adjustment method is used to account for the impact of individual risk factors such as age, severity of illness and other medical problems that can put some patients at greater risk of death than others.



Source: University Health System Consortium



Dr. Illoreta performs endoscopic sinus surgery in the OR

# Head and Neck Institute and Division of Head and Neck Oncology

“The Head and Neck Institute at Mount Sinai is internationally known for its pioneering work in the management of head and neck cancer, reconstruction, training and research.”

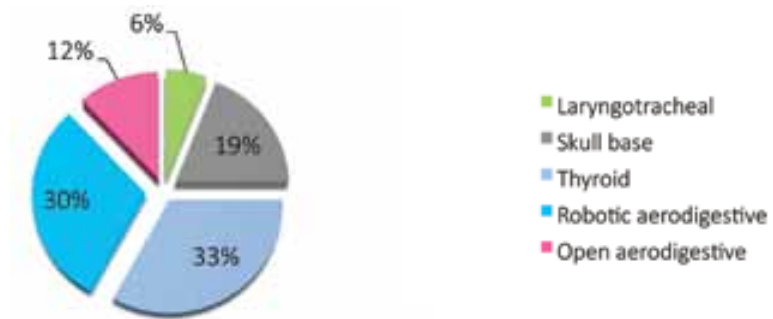
**Dr. Eric M. Genden**  
*Isidore Freisner*  
 Professor and Chairman  
 Department of Otolaryngology-Head and Neck Surgery  
 Mount Sinai Health System

## Patients from across the nation and around the globe

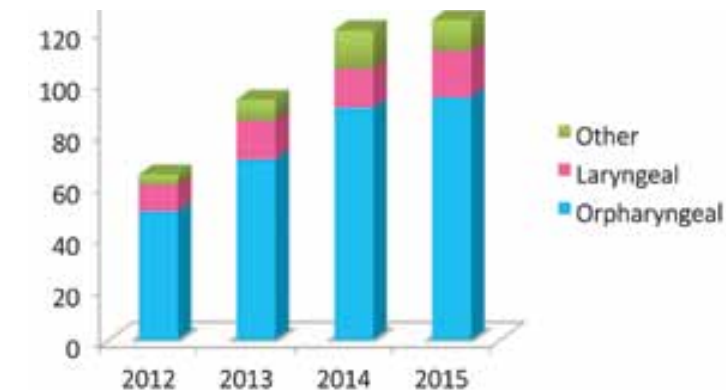
seek the unparalleled care Mount Sinai’s team offers for all stages of head and neck disorders and cancers

In 2015, the Mount Sinai Health System’s Division of Head and Neck Oncology was the highest volume surgical unit in the state of New York. The multidisciplinary program offers patients minimally invasive skull base surgery, robotic transoral surgery, and minimally invasive thyroid and parathyroid surgery, and a program for personalized therapy. The Head and Neck Institute offers a variety of innovative trials for patients with human papilloma virus (HPV)-related oropharyngeal cancers, patients with advanced thyroid cancer, and patients seeking personalized therapy.

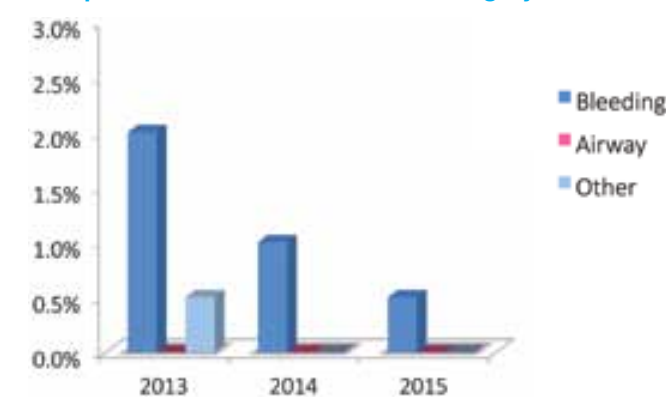
### Case Distribution



### Robotic Surgery Case Distribution



### Complications Related to Robotic Surgery



Dr. Teng (right) and Resident Nazir Khan perform a neck dissection



Dr. Stimson Schantz, Head and Neck Surgeon at New York Eye and Ear Infirmary of Mount Sinai

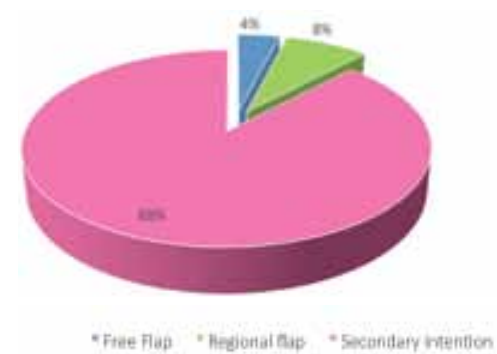


Drs. Rosenberg (center) and Miles (right), along with Fellow Jack Russo, perform a facial reanimation with a free tissue flap for a major head and neck reconstruction case

## Robotic-Assisted Reconstruction

TransOral robotic surgery (TORS) provides a minimally invasive approach to the oropharynx. In many cases, TORS provides an alternative to the midline mandibulotomy lip splitting incision approach. This decreased patient morbidity and length of hospital stay. Extensive defects of the oropharynx can be left to heal by secondary intention, managed with a regional flap, or reconstructed with a free flap.

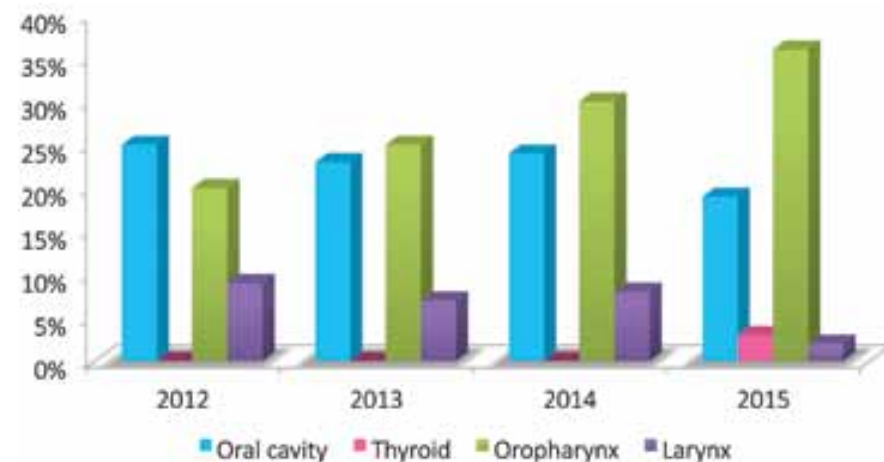
## Reconstructive Techniques



## Head and Neck Oncology Clinical Trials Program

Innovative clinical trials are critically important to patient care and provide patients an opportunity to gain access to the newest treatments, often at no cost. In 2015, several new trials were opened providing a variety of surgical, medical, and radiation trials available as options for our patients. As part of the Tisch Cancer Institute, the Division of Head and Neck Oncology has consistently remained a top performer within the solid tumor research program at Mount Sinai in terms of clinical trial accrual and has increased clinical trial accrual by 36.7% from 2013-2015. The Division of Head and Neck Oncology continues to maintain and expand a wide portfolio of state-of-the-art clinical trial options available to our patients afflicted with head and neck cancer.

## Head and Neck Oncology-Trial Enrollment



Drs. Genden and Urken at the Thyroid Collaborative Symposium at Mount Sinai

## Reducing Infection Risk for Major Head and Neck Surgery

The Division of Head and Neck Oncology reviewed the risk of surgical site infections in 266 patients who underwent free tissue transfer involving the oral cavity and pharynx from 2009 to 2014 at Mount Sinai in order to determine factors which could improve outcomes. The goal was to identify risk factors and reduce infection rates in our patients undergoing major surgery. While our Departmental infection rate is consistent with the infection rate of most major medical institutions in the United States, a surprising finding was noted in patients who had received clindamycin alone for prophylaxis, due to drug allergy or other indication. Clindamycin was associated with an approximate 4-fold increased risk for surgical infections (odds ratio, 3.784; 95% confidence interval: 1.367-10.470 [P = .010]) after controlling for confounding factors. These findings were published in Otolaryngology Head Neck Surgery, November 2015, "Increased Surgical Site Infection Rates following Clindamycin Use in Head and Neck Free Tissue Transfer."



This has prompted a departmental policy change at Mount Sinai with increased antibiotic coverage in this specific group of patients in order to reduce the infection risk. Additionally, infection rates will be tracked continuously to determine the effects of the altered regimen.



Dr. Raymond Chai and thyroid patient Jennifer

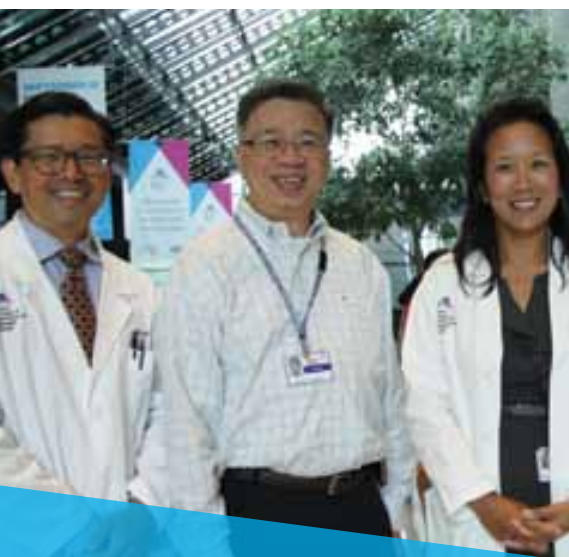


Dr. Mike Yao, Head and Neck Surgeon at The Mount Sinai Hospital





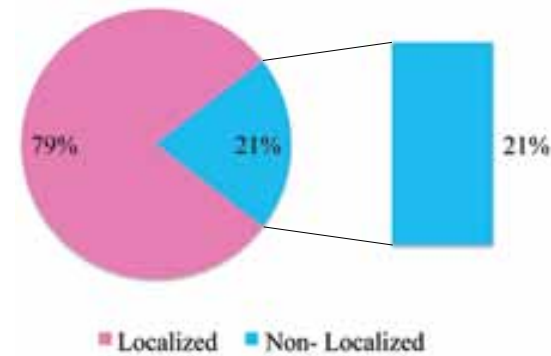
Physicians at the Head and Neck Institute perform surgery on a patient with a multinodular goiter



Drs. Yao, Chhieng and Teng screened nearly 170 participants at the Department's annual September Thyroid Cancer Awareness Screening

**Parathyroid disease** is the third most common endocrine disorder affecting 0.3% of the general population, 1%–3% of postmenopausal women and a total population incidence of 21.6 cases per 100,000 person-years. The disease usually occurs as the result of sporadic parathyroid adenomas, but can also be seen in association with multiple endocrine neoplasia and in rare genetic syndromes and metabolic diseases. Identification of the parathyroid adenoma is critical to achieving minimally invasive surgery and conferring a disease cure. Researchers at the Mount Sinai Head and Neck Institute have been investigating the use of 4-dimensional CT scan imaging to identify the diseased gland when conventional imaging fails to identify and localize the diseased gland.

### Cases of Parathyroid Disease



In 2015, 21% of cases referred for management were not localized using conventional ultrasound and sestamibi nuclear imaging.

### The Impact of 4 Dimensional CT Scan Localization



During this study, 83% of non-localized cases were localized using 4D CT scanning. This data suggests that 4D CT may supplant ultrasound and sestamibi imaging as a first line localization study. Additionally, it has been our experience that 4D CT scan significantly improves localization, which decreases the need for neck exploration and decreases the incidence of postoperative complication including bleeding, pain, dysphagia. We are currently evaluating the role of 4D CT in identifying aberrant parathyroid localization, such as mediastinal and retroesophageal locations. This study represents the bench to bedside application of an investigative imaging protocol that has significantly improved the safety and care of our patients.

**Metastases can originate from disseminated tumor cells (DTCs), which may be dormant for years before reactivation.** In a published report in Nature Communications, February 2015, researchers Julio A. Aguirre-Ghiso, PhD, and Maria Soledad Sosa, PhD of the Icahn School of Medicine at Mount Sinai demonstrated that two existing cancer drugs can turn on a gene that tells tumor cells to remain inactive.

They discovered that the gene NR2F1, when switched on, programs tumor cells to stay dormant. When the gene is switched off, tumor cells divide and multiply as part of abnormal growth, potentially allowing dormant cells to grow into tumors throughout the body (metastasis). Combining the anticancer drugs azacytidine and retinoic acid significantly increased the amount of active NR2F1 in tumor cells. These patterns were found in mouse models of several cancers, and confirmed in prostate cancer cells from human patients.

Results suggest that NR2F1 is a “master regulator” of tumor cell growth, influencing several genes that determine whether cells remain inactive, or quiescent in medical terms. According to the study, NR2F1 exerts control over long lasting programs in stem cells in the human embryo, where it directs cells to stop growing and become specialized cells (neurons) for life. This function suggests that NR2F1 may exert a long-lasting effect on tumor cells, keeping them dormant after they have broken off from an original tumor.

**“Our results explain why some tumor cells scattered through the body are committed to remaining harmless for years, while others cause active disease.”**

Julio A. Aguirre-Ghiso, PhD, Professor of Medicine, Hematology and Medical Oncology, and Otolaryngology, added, “In the discovery of this master switch, we found a way to analyze tumor cells before treatment to determine the risk of a cancer recurrence or metastasis.”

“Azacytidine and retinoic acid, the latter a form of vitamin A, prevented tumor cells from rapidly multiplying, restored normal cell function, and activated several tumor suppressor genes that are often turned off in tumors,” said study co-leader Maria Soledad Sosa, PhD, an Assistant Professor in Hematology and Oncology at the Icahn School of Medicine. “We now have strong evidence that combining these well-known drugs may have a profound, long-lasting therapeutic effect.”

The current study, supported by grants from the Samuel Waxman Cancer Research Foundation, National Cancer Institute, National Institute of Environmental Health Sciences, New York State Stem Cell Science program, JJR Foundation and Hirschl/Weill-Caulier Trust, Department of Defense and Janssen Research and Development LLC, builds on the research team’s earlier finding that lowering amounts of tumor suppressor genes TGFβ2 and p38 awakened dormant tumor cells, fueling metastatic tumor growth. Azacytidine and retinoic acid restored TGFβ2 expression and p38 activation to drive tumor cell dormancy.



Dr. Julio Aguirre-Ghiso, Director of the Head and Neck Cancer Research Program at the Icahn School of Medicine at Mount Sinai

# The Division of Facial Plastic and Reconstructive Surgery

“The Division of Facial Plastic and Reconstructive Surgery continues to draw patients from around the globe, seeking treatment for services ranging from aesthetic enhancements to complex facial nerve and ear reconstruction.”

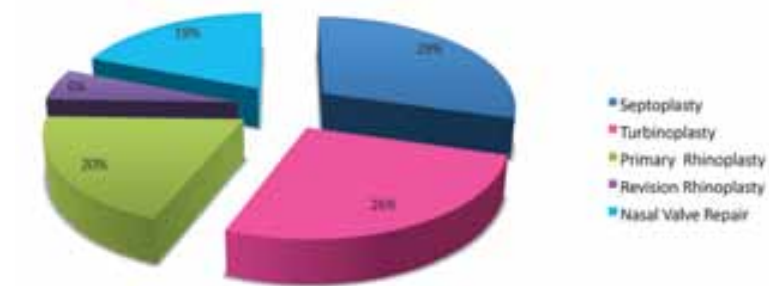
**Dr. Joshua Rosenberg**  
Facial Plastic and Reconstructive Surgeon

# The Division of Facial Plastic and Reconstructive Surgery offers the full range of cosmetic and reconstructive surgery

## Nasal Surgery

Rhinoplasty is one of the most common plastic surgeries performed in the United States. Mount Sinai’s Division of Facial Plastic & Reconstructive Surgery performs a high volume of nasal surgery for both aesthetic and functional purposes. The Division of Facial Plastic and Reconstructive Surgery encompasses cosmetic and reconstructive treatments of the face, head and neck. From facelift and rhinoplasty to major reconstruction of the face, the Division offers the full range of facial plastic surgical care. Each aspect complements the other: function enhances appearance, while an aesthetic eye reconstruction yields better functional, as well as cosmetic results. Our physicians provide these services in a caring, safe and comfortable environment. Several key outcomes initiatives are described in more detail below.

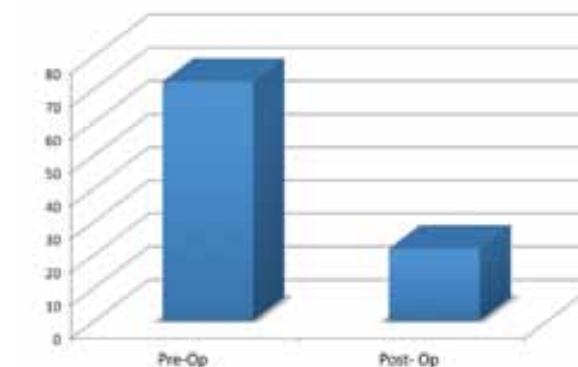
## Types of Nasal Surgery Performed in 2015



## Improved Outcomes after Nasal Surgery

The success of rhinoplasty performed for either aesthetic and/or functional purposes is measured by the objective assessment of pre and post surgical nasal breathing using the validated NOSE (Nasal Obstruction Symptom Evaluation) scale. NOSE scores can stratify the degree of patients’ nasal obstruction ranging from normal nasal breathing (NOSE < 25) to extreme nasal obstruction (NOSE > 75).<sup>1</sup> Our patients’ average NOSE score was 72.1 on presentation and 22.8 at 3 months after surgery. All patients showed improvement in NOSE scores, and the mean surgical improvement was 48.8.

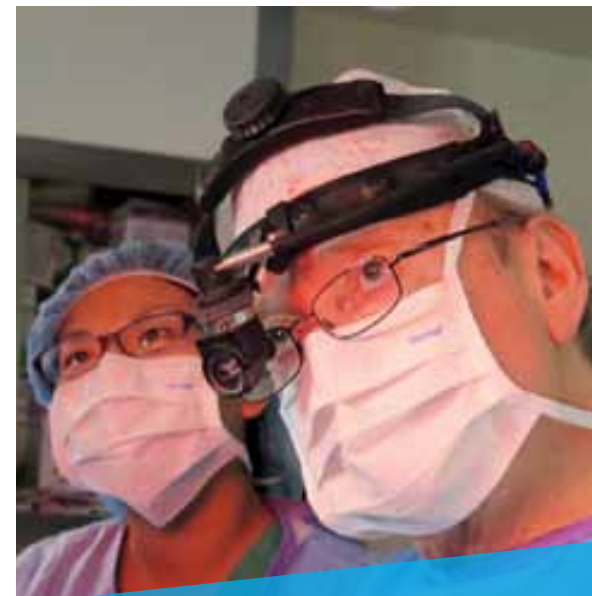
## Functional Outcomes after Septorhinoplasty



<sup>1</sup>Lipan MJ, Most SP. Development of a Severity Classification System for Subjective Nasal Obstruction *JAMA Facial Plast Surg.* 2013;15(5):358-361



Dr. Grigoriy Mashkevich, Facial Plastic and Reconstructive Surgeon at New York Eye and Ear Infirmary of Mount Sinai



Fellow Yan Ho observes Dr. William Lawson performing a septorhinoplasty

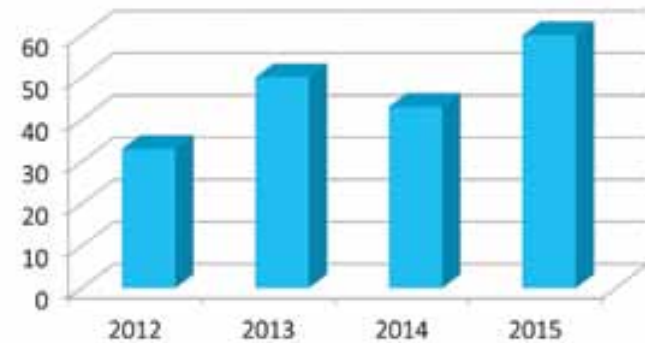
# The Division of Facial Plastic and Reconstructive Surgery



## Rehabilitation of Facial Nerve Paralysis

Facial nerve paralysis represents a severe form of facial disfigurement with potentially devastating social, psychological and functional problems for affected patients. Mount Sinai's Facial Nerve Paralysis Program involves a multidisciplinary approach, ensuring patients receive all aspects of care in one setting.

## Facial Reanimation Surgery Volume



## Before and after photos of a patient treated for residual effects of Bell's Palsy

Treatment included cranial nerve 5 to 7 transfer for smile reanimation along with BOTOX injections to improve facial balance.



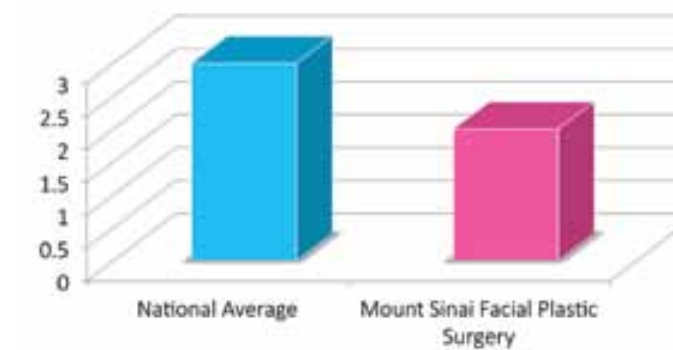
The Leon and Norma Hess Center for Science and Medicine houses clinical care for Head and Neck Institute patients and 180,000 square feet of laboratory space

# The Division of Facial Plastic and Reconstructive Surgery

## Decreased Surgeries for Microtia Repair Shortened

Microtia is a well known craniofacial abnormality occurring between 1:6,000 to 1:10,000 live births. Numerous techniques have been described for reconstruction of the absent auricle. Adopting a reconstruction protocol using specific surgical techniques and post-operative care Mount Sinai's Division of Facial Plastic and Reconstructive Surgery has allowed for decreased numbers of procedures per patient required for auricular reconstruction.<sup>2</sup>

## Surgeries Required for Microtia Repair

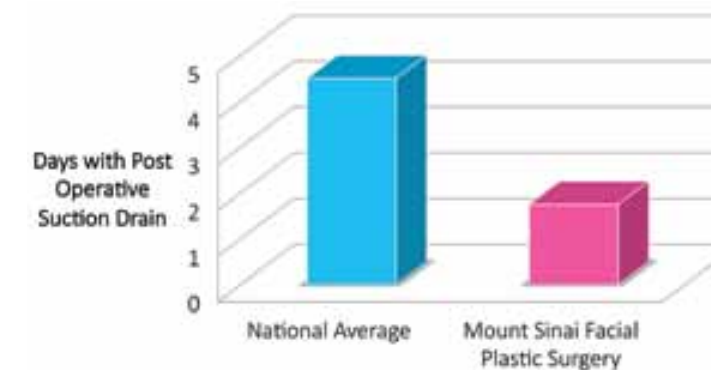


<sup>2</sup>Im DD et al. Current Management of Microtia: A National Survey. *Aesthetic Plast Surg* 2013;37 402-408

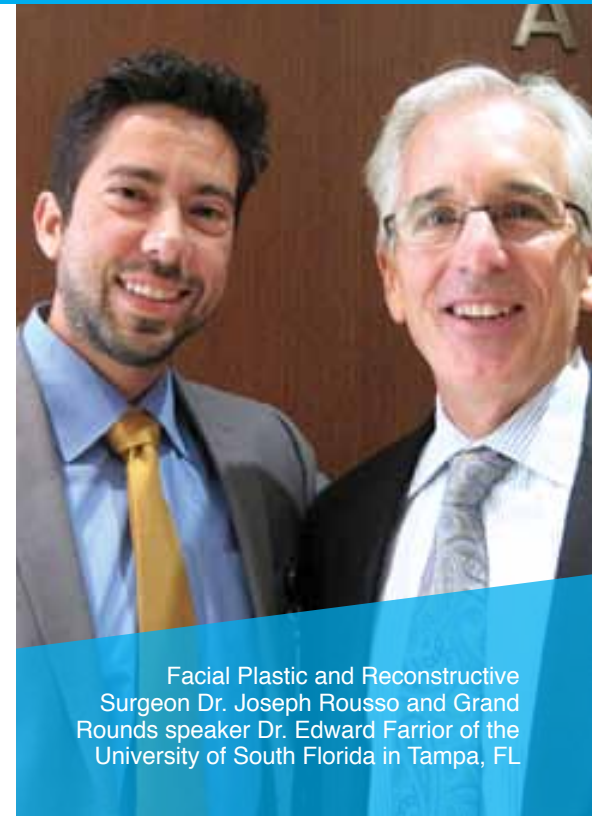
## Shortened Hospital Admission after Microtia Repair

The duration of suction drain placement after microtia repair correlates with the length of post-operative admission.<sup>3</sup> By decreasing the duration of suction drain placement the Division of Facial Plastic surgery shortened the length of post operative hospitalization well below National averages.

## Length of Hospital Stay after Microtia Repair



<sup>3</sup>Bregem CC et al. International Trends in the Treatment of Microtia. *J Craniofac Surg* 2011;22 1367-1369



Facial Plastic and Reconstructive Surgeon Dr. Joseph Rousso and Grand Rounds speaker Dr. Edward Farrow of the University of South Florida in Tampa, FL



Dr. Rosenberg performs a cranial nerve 5 to 7 transfer to correct a patient's Bell's palsy

# The Division of Facial Plastic and Reconstructive Surgery

# The Division of Facial Plastic and Reconstructive Surgery: Research

## Cleft Lip, Palate & Velopharyngeal Insufficiency Services

The New York Eye & Ear Infirmary of Mount Sinai's Cleft Lip/Palate & Craniofacial Program is a highly specialized, multidisciplinary team co-directed by Facial Plastic Surgeon Dr. Joseph Rouso and Pediatric Otolaryngologist Dr. Joseph Bernstein. Under their direction, more than 190 procedures, spanning the full gamut of surgical techniques, were performed both in New York and internationally during outreach missions in 2015. The team tailors each surgery to the patient's aesthetic and functional deficiencies and offers cutting-edge approaches to comprehensive care, allowing for the highest possible quality of care and shorter hospital stays.

Our evidenced-based models of care include:

- Cleft lip & nasal treatment primarily performed in one outpatient surgical procedure, as opposed to the standard 2-3 procedures
- Measuring all velopharyngeal insufficiency (VPI) and cleft palate speech outcomes using all available tools, including aerodynamic measures, nasometry, speech perceptual evaluation, and nasopharyngoscopy with consistent objective improvements
- Monthly conferences assessing all aesthetic and functional results for each individual patient
- Incorporating minimally invasive pharyngeal augmentation surgery to the VPI armamentarium

## Cleft Lip Before & After

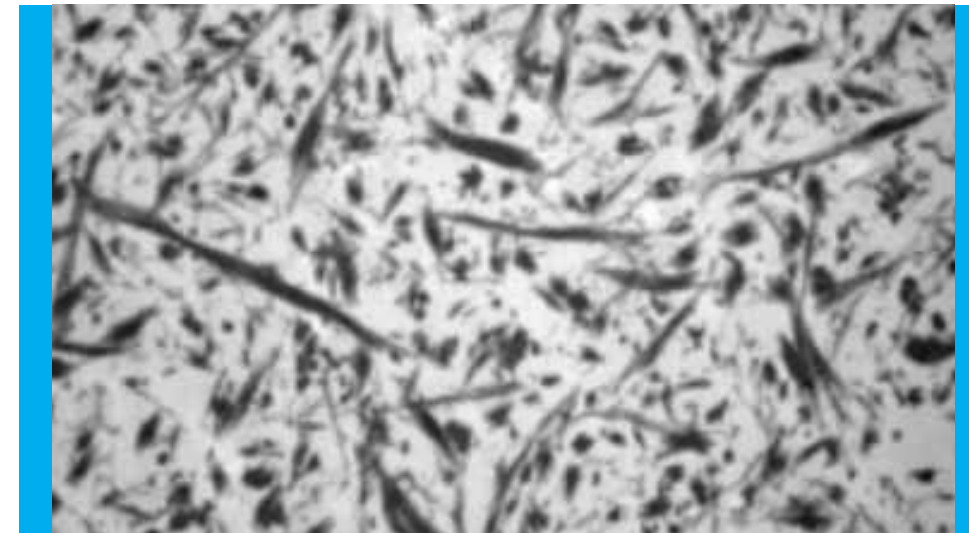
One year after a single-stage, outpatient repair, the cleft lip and nose are both corrected without any noticeable sign of the prior cleft.



These protocols have resulted in the following outcomes improvements:

- Cleft lip patients average a 24-hour or less length of stay (LOS) versus the national average of 1.4 days
- Cleft palate case LOS average is 30 hours versus the national average of 2 days
- Operating time for VPI surgery using our minimally invasive technique averages 45 minutes, compared to 3-hour cases prior to 2013 with more invasive techniques
- More invasive procedures average 70 minutes, compared to the national average of 140 minutes and LOS of 34 hours versus 3.2 days

The Division of Facial Plastic & Reconstructive Surgery, in collaboration with the laboratory of Dr. James C. Iatridis of the Department of Orthopedics, is investigating novel techniques in tissue engineering. The goal is the development of an engineered tissue construct simulating cartilage. Recent research using genipin as a cross-linker in fibrin hydrogels has been shown to improve the mechanical properties and reduces degradation of engineered tissue, but does not yet mimic the properties of native cartilage.



Transmission electron microscopy showing fibrin-genipin polymer cross-linking interrupted with added extracellular matrix.



More about the Division's clinical trials and translational research can be found on page 41

New York Eye and Ear Infirmary of Mount Sinai, conveniently located on 14th Street in Manhattan, is home to the Division's Cleft Lip/Palate and Craniofacial Program

# The Division of Laryngology

“At the Division of Laryngology, we aim to restore voice and swallowing function to normal by way of state-of-the-art medical, surgical and rehabilitation techniques.”

## Dr. Peak Woo

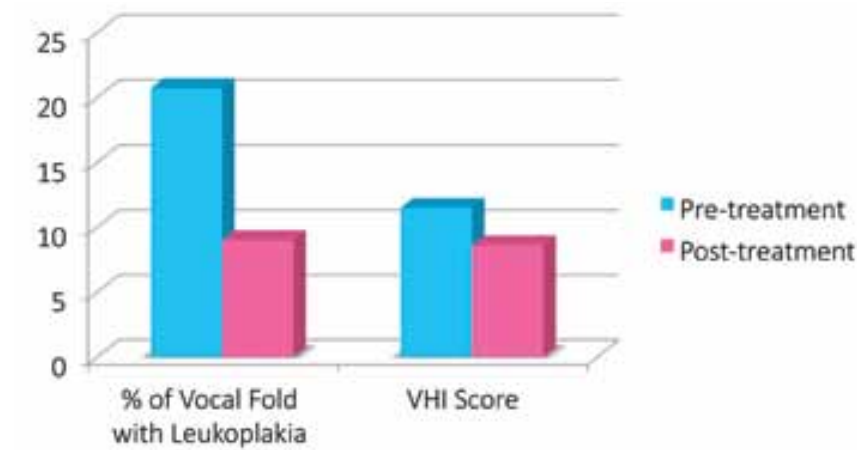
Director, Laryngology  
Residency Program  
The Mount Sinai Hospital



# The Division of Laryngology is one of the busiest in the nation

Mount Sinai's Division of Laryngology is one of the busiest in the nation when it comes to the evaluation of patients with swallowing disorders. With 510 modified bariums swallow evaluations in 2015, our specialists have the experience and expertise to evaluate and treat a wide range of swallowing disorders. Incoming Chief, Dr. Mark Courey, who joined Mount Sinai in January 2016, is broadening the scope of services offered to enhance patient care. Additionally, a research initiative, led by Cathy Lazarus, PhD, C CC-SLP, is harnessing the strength of this volume of visits to improve the treatment of patients with swallowing disorders and to optimize their care and outcomes with an IRB approved collaborative study. Two other areas of study include the Eugen Grabscheid Voice Center's clinical research to improve treatment for patients with acquired laryngeal hypersensitivity, particularly World Trade Center responders, and the office KTP laser treatment of vocal fold leukoplakia, discussed in further detail below.

## Office KTP Laser Treatment of Vocal Fold Leukoplakia – Disease Control and Voice Outcomes



This is a retrospective review of 45 patients with vocal fold leukoplakia treated by in-office KTP laser to evaluate specific disease outcomes and treatment morbidity. The study shows that in-office treatment of leukoplakia with KTP laser results in adequate long-term disease control with maintenance of vocal quality and minimal morbidity. Patients underwent an average of 2.2 (range: 1-6) in-office KTP treatments with average 12.9 months between treatments. Thirty patients (67%) were managed successfully (control of disease) with in-office KTP treatment alone, thirteen patients (29%) required return to the operating room, and two patients (4%) underwent radiation therapy. Twenty-eight patients (62%) had no evidence of disease at last evaluation.



Dr. Woo and Resident Enrique Perez perform a laryngeal endoscopy



Cindy Gantz, MS, CCC-SLP, and patient

# The Division of Oral and Maxillofacial Surgery

“At Mount Sinai, we are pioneering the use of haptics-based virtual surgical planning and 3-D printing technology in oral and maxillofacial surgery and measuring patient outcomes to enhance their overall experience and functionality.”

**Dr. Daniel Buchbinder**

*Chief, Division of Oral and Maxillofacial Surgery  
Mount Sinai Health System*

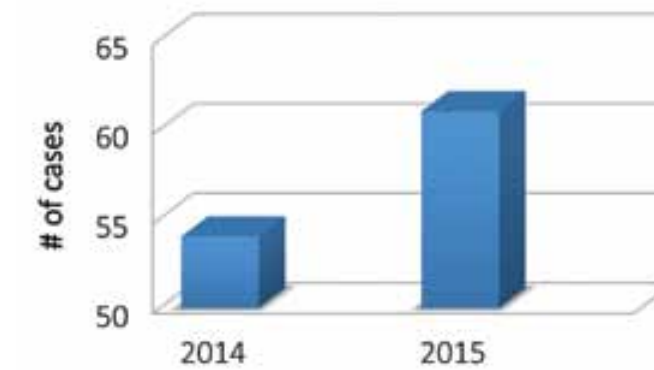


## Our team utilizes cutting edge techniques

to improve outcomes and decrease surgical time

The Division of Oral and Maxillofacial Surgery specializes in the comprehensive management of congenital jaw deformities and the resulting functional impairment (malocclusion). Our team utilizes cutting edge, computer based virtual planning techniques (VSP) and CAD-CAM based cutting guides and patient specific implants to improve outcomes and decrease surgical time.

### Orthognathic Surgery Case Volume



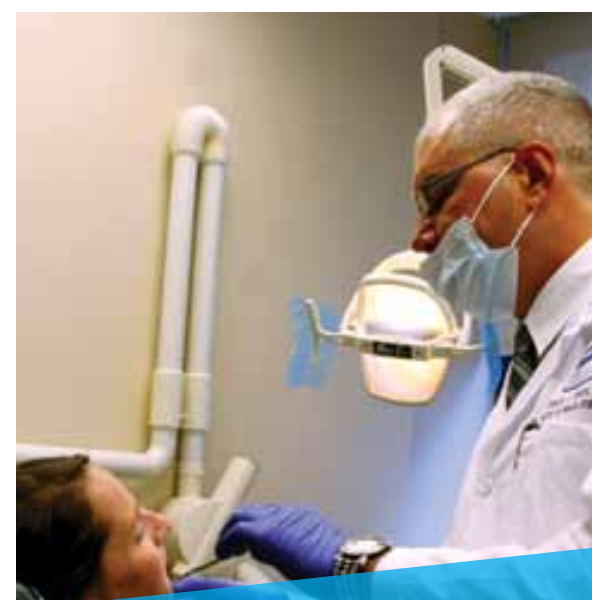
### Outcomes Assessment with the use of VSP in Orthognathic Surgery

VSP is a great tool for planning an orthognathic surgical procedure. A comprehensive initial work up is performed on the patient which includes facial photographs (3D), intraoral photographs, facial measurements, midline notations, occlusion class notation, plain films, study models, a bite registration, and a cone beam CT scan. Once all the data is gathered a cephalometric analysis is performed with the patients clinical findings in mind resulting in an individualized problem list and treatment plan for the patient.

The clinical results achieved using this technology have been outstanding. We decided to critically asses our results by comparing the actual amount of maxillary anterior movement achieved in the OR to the predicted VSP measurement derived preoperatively. All movements in orthognathic surgery are three dimensional movements which make complete accuracy of post-operative bone movements somewhat difficult to accomplish. We performed a retrospective analysis of 20 orthognathic cases performed in the last 18 months where a maxillary anterior advancement was planned. The goal was to see if there was a significant discrepancy between the VSP and actual result using a simple linear measurement.



Dr. Vincent Carrao, Chief of the Division of Oral and Maxillofacial Surgery at The Mount Sinai Hospital



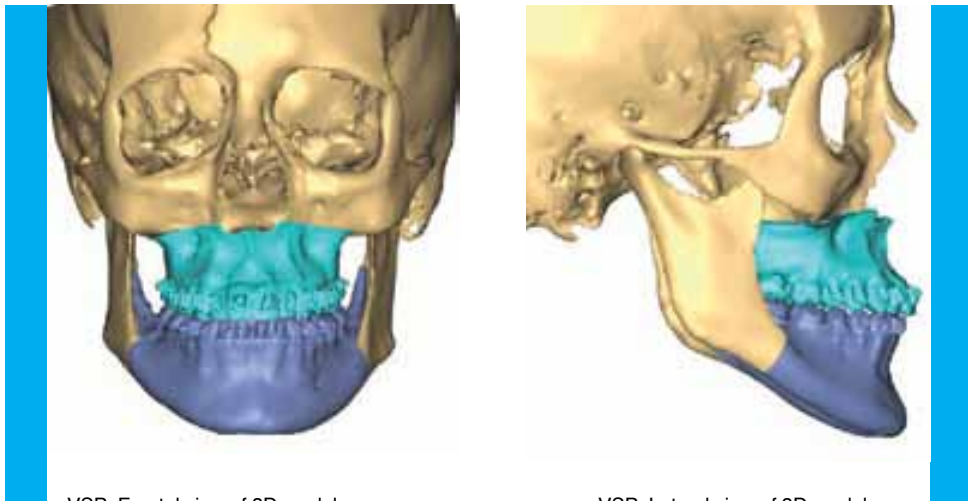
Dr. Devin Okay, Director of Prosthodontics, evaluates a TMJ patient

# The Division of Oral and Maxillofacial Surgery



Dr. Carrao performs a complex temporal mandible joint reconstruction using a custom joint prosthesis

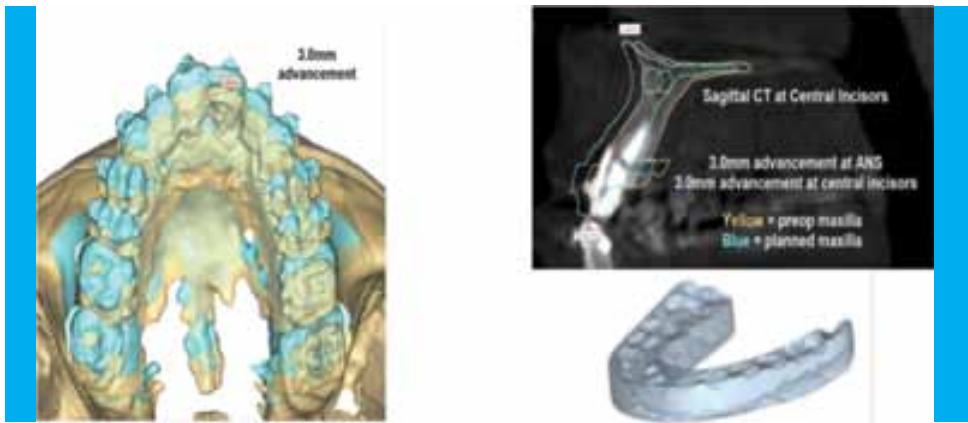
The use of virtual surgical planning (VSP) for oral and maxillofacial surgery is becoming a routine part of our treatment planning process. System wide, the oral and maxillofacial surgeons at Mount Sinai utilize VSP for planning of the vast majority of congenital deformity correction cases.



VSP: Frontal view of 3D model

VSP: Lateral view of 3D model

Once a plan has been formulated, the cone beam CT is then downloaded into a surgical software to create virtual 3D model of the patient's craniofacial structures. The 3D images can then be manipulated to simulate the planned surgical movements based on the pre-op analysis. After the movements are achieved on the 3D computer rendition, CAD-CAM surgical guides are fabricated using a 3D printer. The guides are used to help ensure the precise repositioning of the osteotomized segments to the desired position during the surgical procedure.

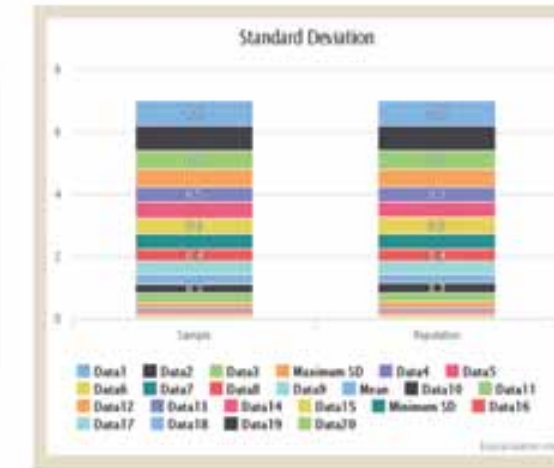


VSP: CAD-CAM generated surgical guide to aid in the accurate intra-operative repositioning of the maxilla

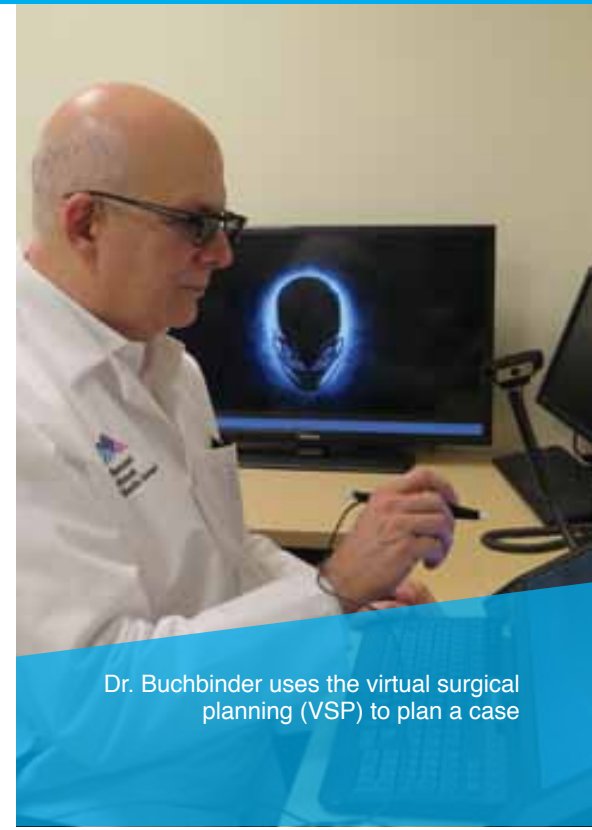
# The Division of Oral and Maxillofacial Surgery

Preoperative and post-operative lateral cephalometric X-rays were utilized to measure the amount of anterior advancement. A perpendicular line to the Sella-Nasion line bisecting the sella landmark was traced on the lateral cephalograms. A linear measurement from the perpendicular line to the A point of the maxilla was measured in the pre-op and post-operative X-rays with the line of measurement being parallel to the palatal plane. The measurements were made to the tenth of a millimeter. All of the cephalometric films are taken with the same machine which incorporates a standardized measuring device on every film. All of the surgical procedures were performed by the same surgeon. Once the maxillary AP distance was measured it was then compared to the VSP prediction.

Total Numbers	Mean (Average)	Standard Deviation
20	0.305	0.26651
Variance (Standard Deviation)	Population Standard Deviation	
0.07103	0.25976	
Variance (Population Standard Deviation)		
0.06747		



The results of this analysis revealed a level of accuracy which landed a standard deviation for all of the procedures at 0.27mm from the predicted value, confirming the accuracy of this method of surgical planning.



Dr. Buchbinder uses the virtual surgical planning (VSP) to plan a case



Drs. Carrao and Miles discuss removing an aggressive desmoid tumor

# The Division of Otolaryngology and Neurotology

“Cholesteatoma is not ‘one size fits all.’ At the Division of Otolaryngology and Neurotology, we personalize the operation to each patient’s needs, and almost always achieve this in a single stage.”

## Dr. Eric Smouha

Director of Neuro-Otology and the Center for Hearing and Balance at The Mount Sinai Hospital

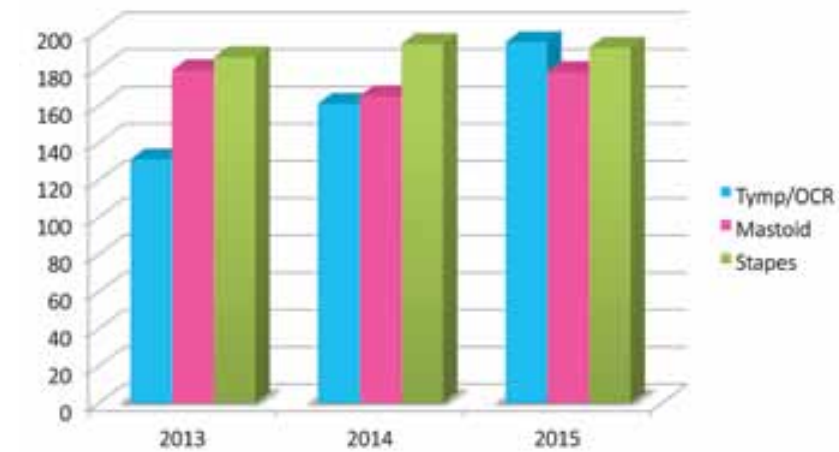


# The Division of Otolaryngology and Neurotology

specializes in diseases of the ears, hearing and balance, and skull base

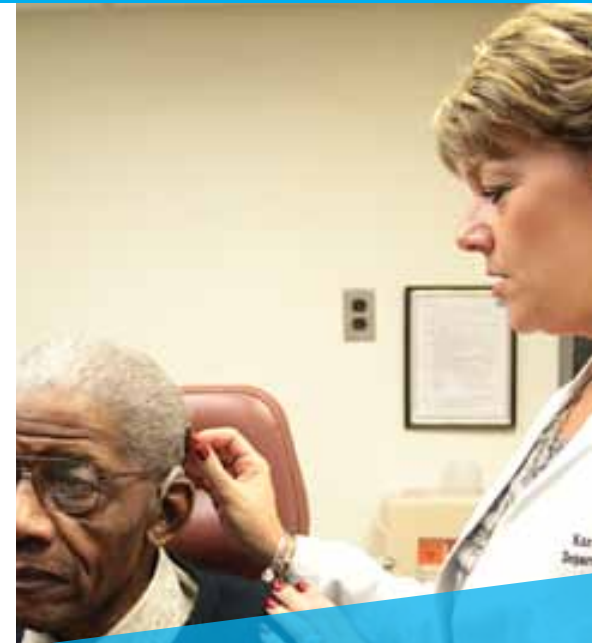
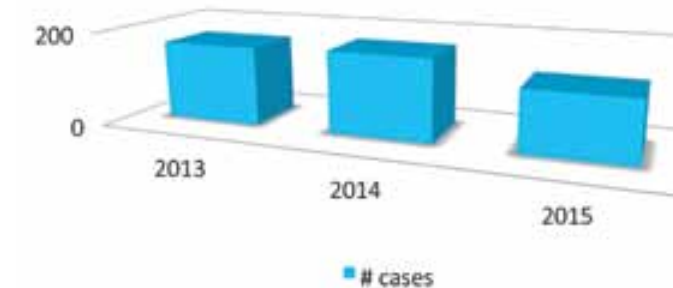
Among the most common otologic procedures are tympanoplasty and mastoidectomy for the treatment of chronic ear infections, and stapedectomy for the restoration of hearing. Our merger with the Ear Institute at New York Eye and Ear Infirmary of Mount Sinai has led to a pooling of resources and increase in the volume of surgical cases. Additionally, Peter Weber, MD, MBA, has recently joined as the Director of the Ear Institute, which provides audiological, speech/language/listening therapy, educational and social work services for children and adults who are deaf and hard of hearing.

## Surgical Case Volume for Tympanoplasty, Mastoidectomy, and Stapedectomy



The Ear Institute has gone through a transition period during the past year. As some surgeons moved on in early 2015, total numbers did trend slightly lower. However, Dr. Peter Weber looks forward to significant growth over the next several years. New indications for implantation, the best dedicated pediatric team in the country treating children with hearing loss, a dedicated research arm, and an excellent core of established surgeons and additional new hires will help elevate the New York Eye and Ear Infirmary of Mount Sinai’s hearing program to one of the best in the country.

## Surgical Case Volume for Cochlear Implant



“I am now successful communicating because Karen Siegel (right) and her staff made it possible,” said Ruben Brown after receiving a cochlear implant



The Department welcomes Chief of the Division of Otolaryngology and Neurotology, Dr. Peter Weber, who joined Mount Sinai in December 2015



# The Division of Otology and Neurotology

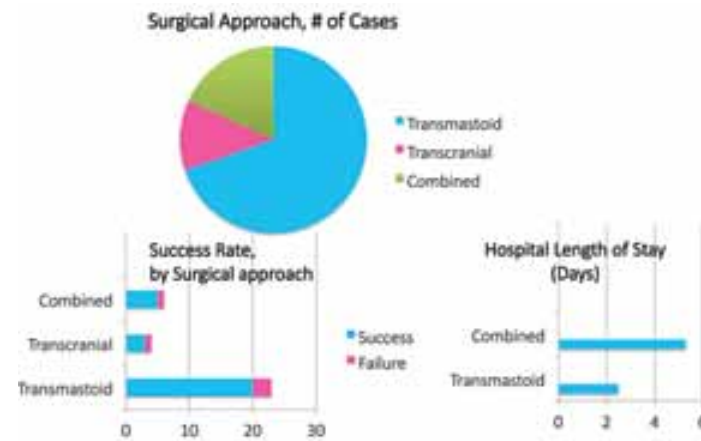
# Single-stage cholesteatoma surgery is a cost-effective method of treating cholesteatoma with excellent outcomes and better value to patients

## Complication Avoidance

Spontaneous cerebrospinal fluid (CSF) leak is an uncommon and potentially life-threatening condition that tends to occur in people with high BMI (body mass index). This often occurs in conjunction with herniation of brain tissue into the ear (encephalocele). Untreated, this condition can lead to meningitis. The traditional treatment is a neurosurgical approach, through the cranium, that requires an ICU stay and can have potential complications of stroke and seizure.

At Mount Sinai, we have favored a transmastoid repair, through the ear bone, that has avoided any neurological complications and has a much shorter length of stay in the hospital.

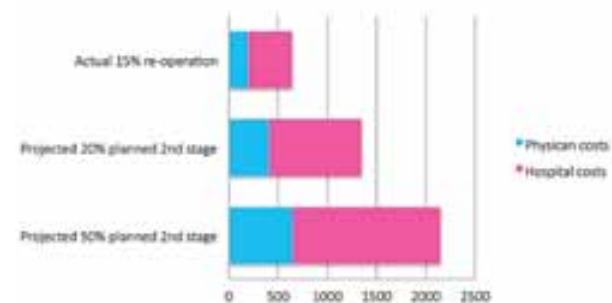
## Repair of CSF leak, 2006-15



## The Cost-Effective Treatment of Cholesteatoma

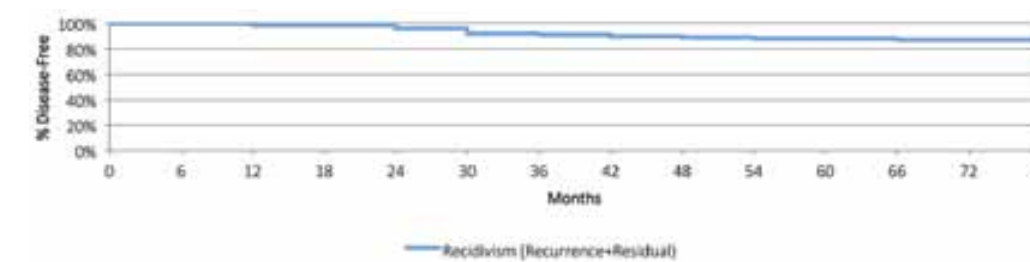
Cholesteatoma is an aggressive disease of the middle ear. Our preference at Mount Sinai is to perform a single stage operation for the treatment of this disease, whereas 2-stage surgery is often favored traditionally.

Last year we reported on a group of patients with cholesteatoma treated at Mount Sinai from 2007-2010 who had adequate follow-up. Costs of surgery and outpatient care were calculated based on standard Medicare rates. Our actual costs were compared to the hypothetical costs of planned second stage surgery, the traditional approach, in which an initial operation is done to remove the disease, and a second operation is done 9-18 months later to search for recurrence and rebuild the hearing.



This year, we studied the long term outcomes of our patients with cholesteatoma. We improved our data capture and had a longer duration of follow-up. We assessed 132 ears, with average length of follow-up of 58.7 months. There were 18 cases of recurrent disease (13.6%) detected at an average of 29.3 months post-surgery. The resulting average total cost per patient was \$2,120.53. Over the average length of follow-up of 55.6 months, the average annual cost per patient is \$457.67.

## Recidivism (Recurrence+Residual) Rate for Primary Cholesteatoma Cases

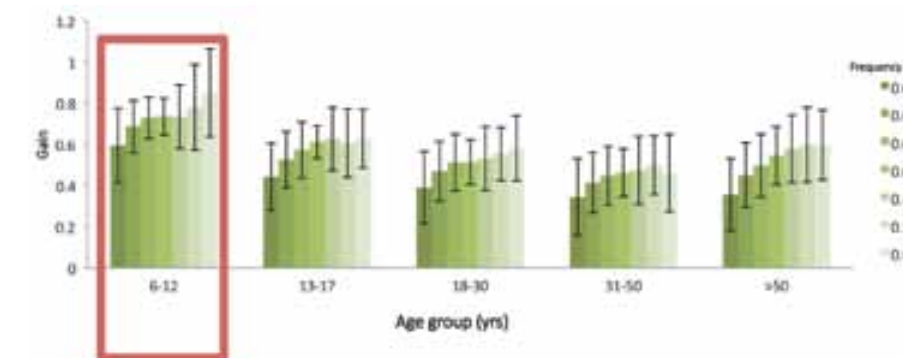


We conclude that single-stage cholesteatoma surgery is a cost-effective method of treating cholesteatoma with excellent outcomes and better value to patients.

## Basic Science Research

Vestibulo-ocular reflex (VOR) changes as a function of age. Prior data suggest that the current non-age-stratified adult normative data may not be appropriate when interpreting pediatric or geriatric rotary chair (RC) test result. The purpose of this study was to examine the range of VOR gain on RC testing in normal subjects of various ages.

This was a prospective cross-sectional study of 100 subjects, age > 6 yrs old, without any history of dizziness and hearing loss.



Our study demonstrates VOR gain differences with age, especially in the preadolescent and geriatric group. The over 50 age group had higher VOR gains compared to the 31 to 50 year-old age group ( $p = 0.0748$ ).

This is the largest age-stratified normative data compilation and the largest range of frequencies studied. The lowest frequency is the most sensitive for Rotary Chair testing to detect age-related VOR changes.



Dr. Christopher Linstrom, Otolologist at The Ear Institute of New York Eye and Ear Infirmary of Mount Sinai



Dr. Ana Kim, Otolologist and Director of Otolologic Research at The Ear Institute of New York Eye and Ear Infirmary of Mount Sinai

# The Division of Pediatric Otolaryngology

“Pediatric Otolaryngology is amidst a new phase of growth and development. We have revitalized our Airway Program and are actively expanding aerodigestive, sleep, cleft and microtia into unparalleled, multidisciplinary centers.”

**Dr. Joseph Bernstein**  
*Chief of the Division of Pediatric Otolaryngology  
 Mount Sinai Health System*



**Tonsillectomy** is the second most common surgery among children, behind only the placement of ear tubes for recurrent middle ear infections

The year 2015 was an exciting one for the Division of Pediatric Otolaryngology at the Mount Sinai Health System. At New York Eye and Ear Infirmary (NYEE) of Mount Sinai, we recently opened a new pediatric ambulatory surgery unit to service the more than 3,500 outpatient eye and ear surgeries performed at this single site annually. It enhances the patient experience and enables us to bring the highest level of care and patient satisfaction to our pediatric patients and their families. At this site, we perform the bulk of our surgeries on children, from ear tubes and tonsillectomy to congenital neck masses and cochlear implantation.

For children who have conditions that are not appropriate for outpatient management, our surgeons utilize the incredible inpatient pediatric services available in the Mount Sinai Health System at both Mount Sinai Beth Israel and the Kravis Children’s Hospital at Mount Sinai. It is through the resources of the Mount Sinai Health System as a whole that we have been able to adeptly treat and manage serious conditions from severe obstructive sleep apnea to major airway reconstructions.

### Tonsillectomy Volume and Complications

Tonsillectomy is one of the most common surgeries of childhood and although frequently performed, is not without risk. The two major risks of the surgery are of post-operative bleeding, which can be severe, as well as dehydration from inadequate pain control.

The pediatric otolaryngologists at NYEE, along with our nursing staff are now skilled in the optimal use of non-narcotic pain medications for young children and in educating families on fluid goals for their child after surgery. This keeps children safe and as comfortable as possible during a difficult recovery. This level of quality care is evidenced by our very low re-admission rate for dehydration after tonsillectomy. Additionally, through the use of technologies and techniques such as coblation and tonsillotomy, our post-operative tonsil bleed rate is also below the national average.

### Complication After Tonsillectomy N=891



Dr. Alyssa Hackett, Pediatric Otolaryngologist at New York Eye and Ear Infirmary of Mount Sinai



More than 3,500 children undergo operations at New York Eye and Ear Infirmary’s Pediatric Surgical Unit

# The Division of Rhinology and Skull Base Surgery

“With the help of a multidisciplinary team and a unified approach to patient care, the Division of Rhinology and Skull Base Surgery continues the Mount Sinai tradition of excellence, embracing the most complex inflammatory and neoplastic cases affecting the sinuses and skull base.”

## Dr. Satish Govindaraj

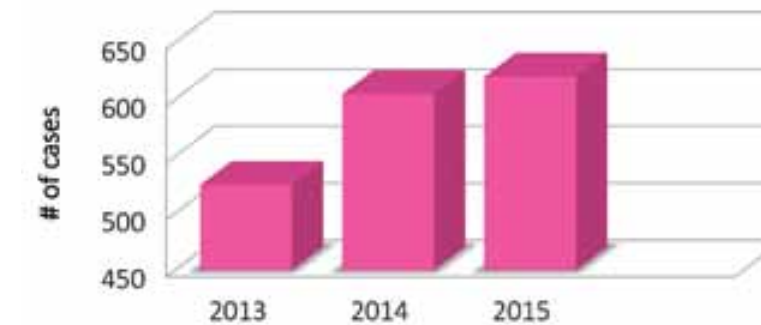
Chief of the Division of Rhinology and Skull Base Surgery  
Vice Chairman of Clinical Affairs  
Mount Sinai Health System

# The Division of Rhinology and Skull Base Surgery

specializes in both primary and revision endoscopic sinus surgery

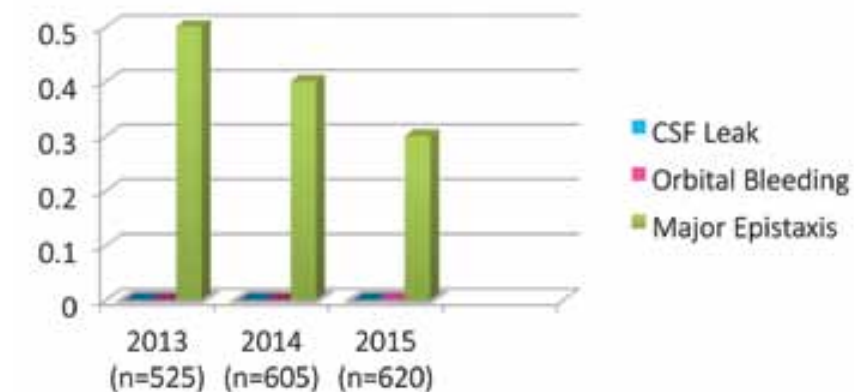
The Division of Rhinology and Skull Base Surgery specializes in the comprehensive management of neoplastic and inflammatory conditions that affect the nose and sinuses. One of the most commonly performed procedures is functional endoscopic sinus surgery. Our team specializes in primary and revision endoscopic sinus surgery.

## Endoscopic Sinus Surgery Case Volume



## Primary and Revision Endoscopic Sinus Surgery – Complications

The Division of Rhinology and Skull Base Surgery at the Mount Sinai Health System is composed of fellowship trained rhinologists who specialize in both primary and revision endoscopic sinus surgery. Each year our surgical volume has experienced steady growth and our complication rate remains low with an absence of major complications and lower post operative major epistaxis rate (defined as requiring post-operative packing placement or surgical control of bleeding).



Dr. Madeleine Schaberg of New York Eye and Ear Infirmary of Mount Sinai specializes in endoscopic sinus surgery, rhinology and skull base surgery

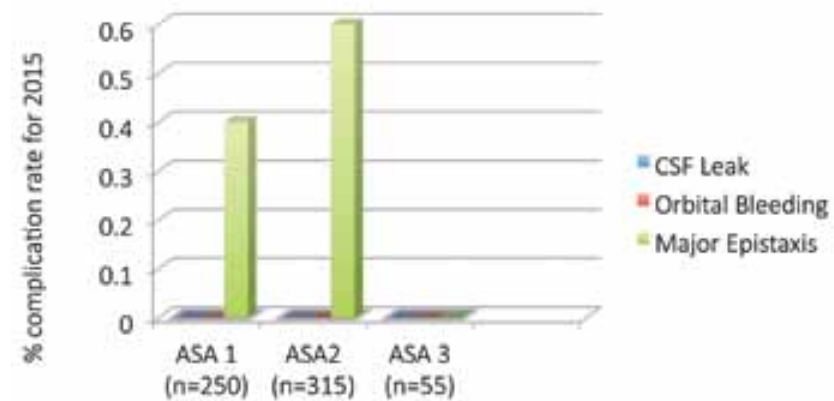


Rhinologist and Skull Base Surgeon Dr. Anthony Del Signore observes the use of Surgical Theater and Brainlab's IPlanNet during a complex skull base case

# Division of Rhinology and Skull Base Surgery

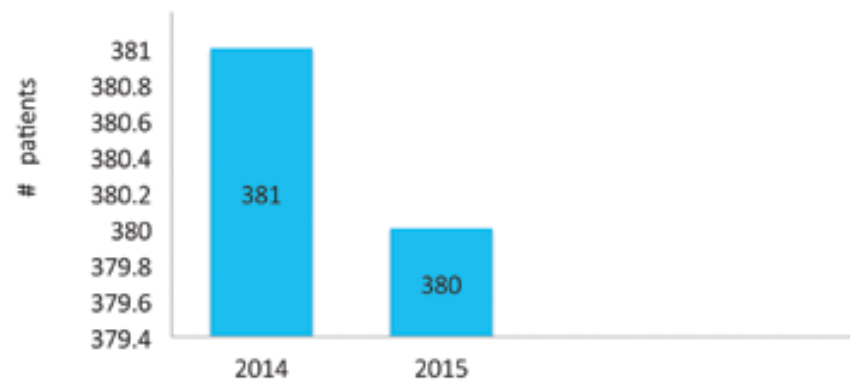
As an academic center our institution specializes in performing surgery on patients with serious medical conditions. In 2015, our rhinologists maintained a low complication rate despite ASA status. The Division had no iatrogenic CSF leaks or orbital bleeding and a less than 1% major epistaxis rate as defined as a need for packing placement or operating room control of bleeding. Our ASA 3 group did not have any major complications.

**Endoscopic Sinus Surgery Complication Rate for 2015 by American Society of Anesthesiologists (ASA) Physical Status Classification System**



## Allergy Screening Program

The Division of Rhinology and Skull Base Surgery provides allergy screening for our patients. This program is headed by our Physician's Assistant, Sabra Baum. Patients are able to obtain same day allergy screening and counseling. Those patients that are identified with allergies are referred to our allergy/immunology department for immunotherapy evaluation if indicated.

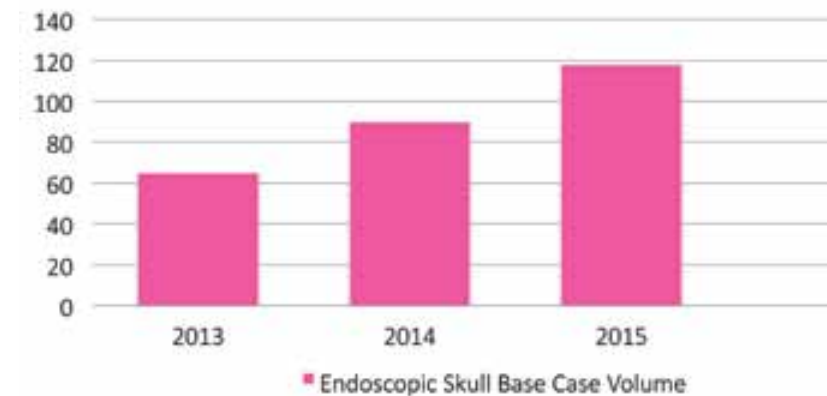


Skull base surgeons at Mount Sinai routinely plan cases using Surgical Theater

# Division of Rhinology and Skull Base Surgery

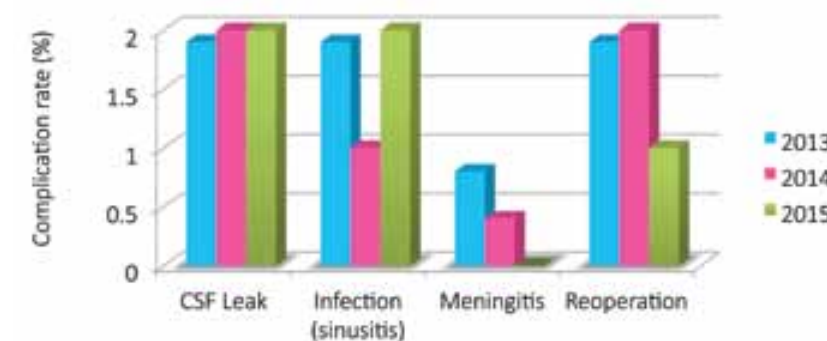
The Division of Rhinology and Skull Base Surgery works closely with the Department of Neurosurgery in the management of skull base pathology. Over the last three years, the division has experienced steady growth in endoscopic skull base case volume. The endoscopic approach results in less morbidity and a shorter hospital stay for our patients. The Division, along with Neurosurgery, reported our experience with one day discharge in our pituitary patients. This paper was published in *The Journal of Skull Base Surgery* in August 2015.

**Endoscopic Skull Base Case Volume**



Our Division has seen a steady growth in the number of endoscopic skull base cases with a complication rate that remains below 2%. Our length of stay for endoscopic cases remains low and we have noted the number one reason for extended length of stay in these cases has been CSF leaks.

**Endoscopic Skull Base Complication Rate**



Dr. Govindaraj evaluates a patient with odontogenic sinusitis



Dr. Alfred Iloreta and Neurosurgery Chairman Dr. Joshua Bederson seamlessly perform a combined transsphenoidal and transpterygoid endoscopic approach to a Meckel's cave tumor

# The Division of Sleep Surgery

“Recognizing the difficulties our patients have breathing and sleeping, the team at the Division of Sleep Surgery is at the forefront of the full range of surgical solutions for obstructive sleep apnea, including the use of the Inspire Therapy device for those unable to comply with CPAP.”

## Dr. Fred Lin

Chief of the Division of Sleep Surgery, Mount Sinai Health System, Director of Sleep Surgery, The Mount Sinai Hospital

**Obstructive sleep apnea (OSA)** affects more than 18 million Americans, can cause cardiovascular and metabolic disorders, as well as dementia and cancer

The Division of Sleep Surgery specializes in the comprehensive management of obstructive sleep apnea and sleep disordered breathing. Our team specializes in upper airway surgery including nasal surgery, palate surgery, maxillofacial surgery, and surgery of the tongue to improve airway obstruction. We are also one of the few centers in the New York Tri-State area performing the Inspire® Hypoglossal Nerve Stimulator, where we plan to track outcomes and associated benefits and risks of the surgery. We hope to compare this modality of therapy with options traditionally used to treat sleep apnea.

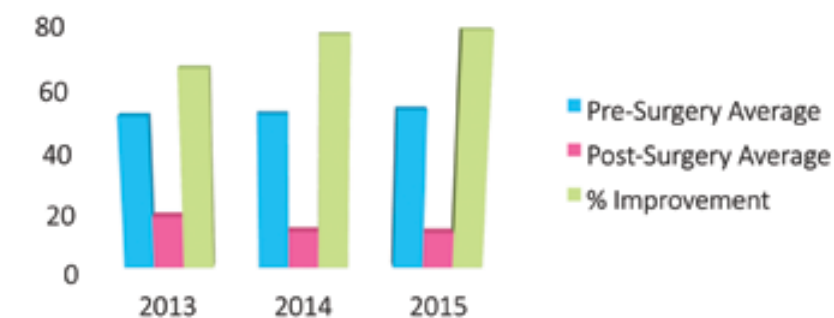
### Sleep Surgery Case Volume



The Division of Sleep Surgery has three full time otolaryngologists that are either board certified in sleep medicine or fellowship trained in sleep surgery. We work closely with the departments of pulmonology, endocrinology, and bariatric surgery to offer a multi-disciplinary approach to the treatment of sleep apnea and snoring. We also provide a team based approach within our department with the division of oral maxillofacial surgery to provide dental appliances and maxilloamandibular advancement surgery.

Our goal is to improve not only the health, but also the quality of life of sleep apnea patients. We measure all patients pre- and post-treatment with the SNORE-25 quality of life measure, which is a validated quality of life survey. Our results have shown significant gain in improvement of sleep quality and daytime symptoms of night time sleep disturbances post-surgery.

### SNORE-25 Quality of Life Improvement



Additionally, in 2015, our sleep surgeons had a less than 1 percent complication rate regardless of OSA severity with no readmissions and no mortalities.

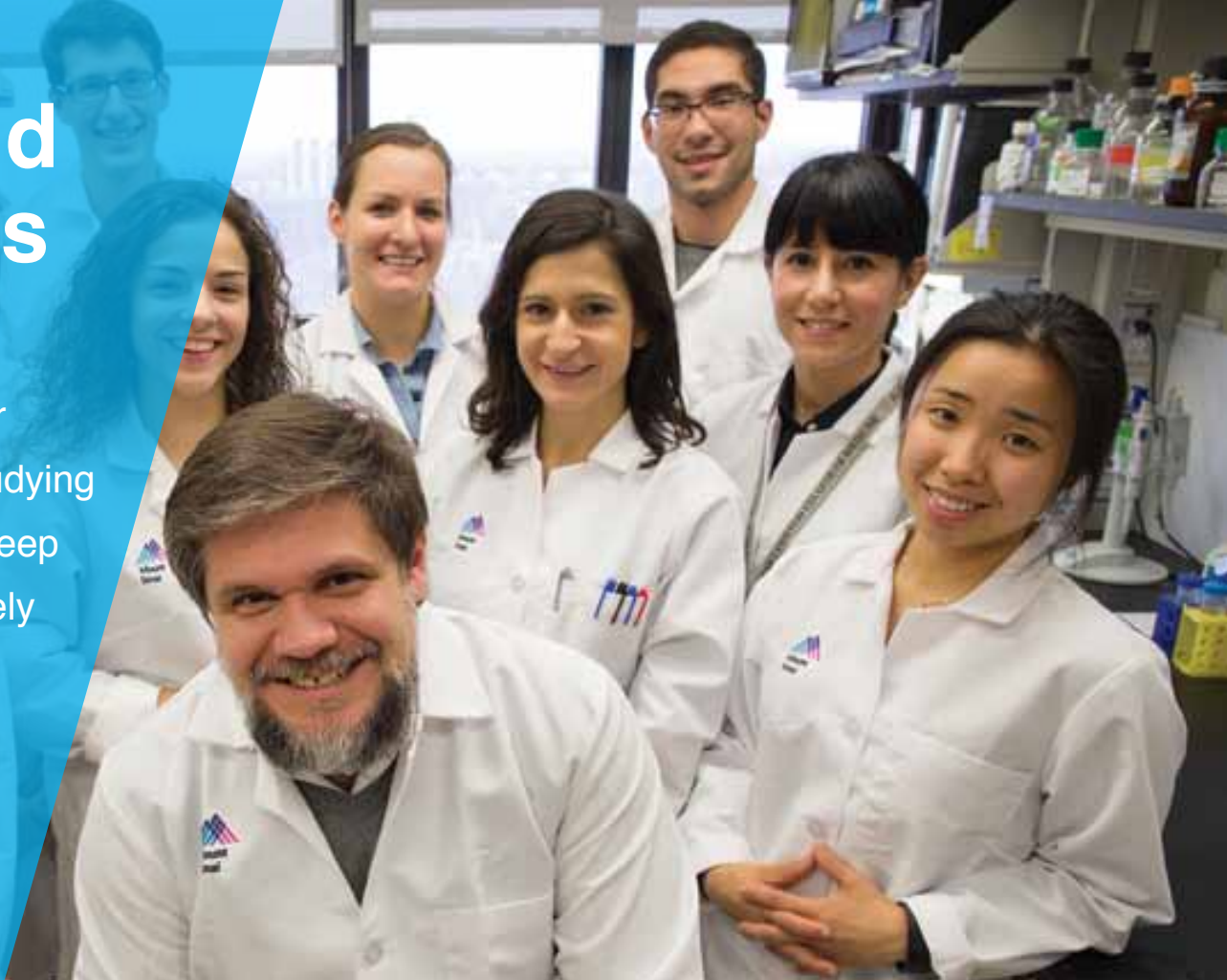
Mount Sinai Health System's Department of Otolaryngology—Head and Neck Surgery



Dr. Boris Chernobilsky, Director of Airway and Sleep Surgery at Mount Sinai Beth Israel, has forged the use of the Inspire Therapy implant device for patients who are not able to comply with CPAP

# Research and Clinical Trials

“At the Head and Neck Cancer Research Program, we are studying where and how cancer cells sleep in the body, so we can ultimately eliminate the possibility of metastasis. Our findings are referenced heavily and have impacted research studies around the world.”



## Dr. Julio Aguirre-Ghiso

Director of the Head and Neck Cancer Research Program  
Icahn School of Medicine at Mount Sinai

### Head and Neck Oncology

#### Afatinib with Postoperative Radiation Therapy for Intermediate and High Risk Squamous Cancer of the Head and Neck (SCCHN)

Principle Investigator: Richard Bakst, MD

This is a non-randomized, two arm, two cohort Phase I dose-escalation study with the goal of determining the maximum tolerated dose (MTD) and of afatinib with radiation therapy, and afatinib with chemotherapy (docetaxel) and radiation therapy.

#### Randomized Phase II Study of Adjuvant Concurrent Radiation and Chemotherapy versus Radiation Alone in Resected High-Risk Malignant Salivary Gland Tumors

Principle Investigator: Richard Bakst, MD

The purpose of this study is to determine the feasibility of conducting a cooperative group prospective in patients with resected malignant salivary gland tumors, comparing postoperative radiotherapy alone to concurrent chemotherapy and radiation using weekly cisplatin.

#### Transoral Robotic Surgery (TORS) vs. Non-Surgical Treatment for Oropharyngeal Cancer: A Retrospective and Prospective Multi-institutional

### Comparative Study

Principle Investigator: Eric Genden, MD

This study evaluates the outcomes of two treatment methods: TORS and non-surgical treatment for oropharyngeal squamous cell carcinoma.

#### Integrated PET/MR Imaging after Primary Therapy of Head & Neck Malignancies

Principle Investigator: Lale Kostakoglu, MD

This study assesses diagnostic performance of post-therapy FDG PET-MRI vs. FDG-PET and MRI alone vs PET/CT for restaging of locally advanced head and neck cancer patients.

#### (ADVAXIS) Window of Opportunity Trial of Neoadjuvant ADXS 11-001

Principal Investigator: Brett Miles, DDS, MD, FACS

This is an investigator-initiated prospective clinical study of patients with stage II-IV squamous cell carcinoma of the oropharynx (OPSCC) who are to undergo ablative transoral robotic surgery (TORS).

#### Sinai Robotic Surgery (SIRS) Trial in HPV-Positive Oropharyngeal SCCA

Principle Investigator: Brett Miles, DDS, MD, FACS

This non-randomized Phase II de-escalation clinical trial aims to establish recurrence rates, site of recurrence, survival

# Research and Clinical Trials

and quality of life outcomes for early T-stage HPV-positive oropharyngeal SCCA treated with upfront surgery.

#### Phase III Clinical Trial of Pembrolizumab (MK-3475) in First Line Treatment of Recurrent/Metastatic Head and Neck Squamous Cell Carcinoma

Principal investigator: Krzysztof Misiukiewicz

To compare the Progression Free Survival (PFS) per RECIST 1.1 assessed by central radiologists' review in subjects with first line R/M HNSCC treated with pembrolizumab monotherapy or a combination of pembrolizumab with chemotherapy versus standard treatment cetuximab with chemotherapy.

#### Molecular Testing for Personalized Cancer Therapy

Principal investigator: Krzysztof Misiukiewicz

This is a genomic analysis study with the purposes of identifying personalized target for therapy, providing an adequate analysis of biopsied tissue and identifying personalized targetable treatments.

#### The Quarterback II

Principal Investigator: Marshall Posner, MD

This is a Phase II study of de-intensified definitive chemoradiotherapy given with induction chemotherapy in HPV-positive oropharynx, unknown primary or nasopharynx cancer.

#### The Effect of Psychological Distress of Hospital Length of Stay in Squamous Cell Carcinoma

Principle Investigator: Marita Teng, MD

The objective of this study is to determine the prevalence of psychological distress in a subset of head and neck cancer patients using the Distress Thermometer and problem list.

### Facial Plastic and Reconstructive Surgery

#### Facial Nerve Coaptation

Principal Investigator: Grigoriy Mashkevich, MD

This study aims to improve smile restoration in facial paralysis.

#### Septal Perforation Repair with Temporoparietal Free Flap

Principal Investigator: Grigoriy Mashkevich, MD

This study assesses the utility of temporoparietal fascia free flap in closure of large septal perforations.

#### Review of Permanent Versus Absorbable Suture Tongue-in-Groove Technique in Endonasal Rhinoplasty

Principal Investigator: Alexander Ovchinsky, MD

Evaluating the degree and longevity of changes in tip rotation and projection is the primary objective of this study.

### Facial Nerve Disorders Database

Principal Investigator: Joshua Rosenberg, MD

Co-PI: Eric Genden, MD

The purpose of this study is to accrue data regarding treatment plans and outcomes in the treatment of facial nerve disorders. The research team is recruiting 20 participants and study activities include collection of data about the participants' surgery outcomes.

#### Role of Honey for Local Wound Care of Donor Sites after Split Thickness Skin Grafting

Principal Investigator: Joshua Rosenberg, MD

Co-PI: Benjamin Malkin, MD

This randomized study aims to examine the role of honey as a surgical dressing for FTT and STSG donor sites, hypothesizing that when compared to standard forms of local wound care, patients treated with honey impregnated gauze will heal faster with lower reported pain scores. The duration of enrollment is for 6-9 months until completion of the primary analyses.

#### Microtia Reconstruction

Principal Investigator: Joseph Rousso, MD

This study compares long-term outcomes of modified 2 stage autologous cartilage techniques to standard Nagata technique.

#### American Academy of Facial Plastic & Reconstructive Surgery (AAFPRS) Face-To-Face International Database

Principal Investigator: Joseph Rousso, MD

Co-PI: M. Abraham

The goal of this study is to establish a comprehensive international database for all craniofacial surgeons in the AAFPRS to be able to access data similar to SEER database.

#### Microtia Reconstruction Models

Principal Investigator: Joseph Rousso, MD

This is a head-to-head prospective comparison of standard autologous cartilage reconstruction versus diced cartilage in a biodegradable alloplastic template in mouse model.

### Laryngology

#### Exploring the Relationship between Age-related Pharyngeal Muscle Atrophy and Difficulty Swallowing

Co-Investigator: Cathy Lazarus, PhD

The purpose of this study is to examine pharyngeal lumen volume and its association with swallowing impairment in healthy community-dwelling seniors. The use of Acoustic Reflection Technology (ART), a sonar technology, is used to measure pharyngeal volume and videofluoroscopy (the Modified Barium Swallow procedure) and examine swallow function. The impact of the Effortful maneuver on pharyngeal swallow biomechanics and function are also being examined in this population.

### Oral and Maxillofacial Surgery

#### Haptic Assisted Surgical Planning Study

Principal Investigators: Daniel Buchbinder, DMD, MD; Ilya Likhterov, MD.

This study aims to validate the accuracy of computer assisted planning for fibula reconstruction of the mandible using a haptic device and software developed by researchers at the University of Uppsala, Department of image analysis.

**Sponsor:** The Thanc Foundation

#### Patient Related Outcomes in CMF Trauma Treatment using a Mobile Health App (MHA)

Principal Investigator: Daniel Buchbinder, DMD, MD

This study aims to validate the use of a MHA as an innovative platform to collect data for the validation phase of the symptom battery development in conjunction with researchers at Northwestern University. The MHA was also designed so that we can conduct research on certain components of this technology in a smaller pilot study. Specifically the feasibility of consenting and enrolling subjects remotely, use of automated e-reminders in clinical follow up and data collection to improve follow-up and data collection and determining whether responses provided remotely using MHA differ from responses given in the clinical office setting.

**Sponsor:** AOCMF Research Commission and ISMMS

#### Double Mandibular Fracture Study

Co-Principal Investigator: Michael D Turner, DDS, MD

This multicenter study aims to compare two internal fixation treatment modalities in patients with double mandibular fractures to offer a better understanding of the type of fixation hardware necessary for the treatment of mandibular angle fractures.

**Sponsor:** AOCMF Research Commission

### Otology and Neurotology

#### Music Awareness in Adult Cochlear Implanted Subjects

Principal Investigators: Christopher J. Linstrom, MD, and Carol A. Silverman, PhD

This is an ongoing study investigating the abilities of post-lingually deafened adults to perceive and enjoy music. A validated questionnaire has been distributed and responses are being tabulated regarding the ability of implanted adults to perceive and enjoy music after implantation. This will be followed by a modified test of music awareness ability that we have developed for use in children.

#### Cost Effectiveness in Cholesteatoma Treatment

Principal Investigator: Eric Smouha, MD, with Rajan Dang

This is a retrospective chart review, comparing outcomes and costs of single-stage surgery for cholesteatoma to traditional second-stage approach.

**Sponsor:** Icahn School of Medicine at Mount Sinai

## Mal de Debarquement Syndrome: a Novel Therapy

Principal Investigator: Eric Smouha, MD, with Mingjia Dai and Bernard Cohen

This is a clinical trial of a new treatment modality for a challenging illness, showing very high rate of success in refractory patients.

**Sponsor:** Icahn School of Medicine at Mount Sinai

## Malignant External Otitis: Changing Clinical Behavior

Principal Investigator: Eric Smouha, MD, with Daniel Carlton and Enrique Perez

This retrospective chart review demonstrates the emerging trend of treatment failure using conventional antibiotic regimens.

**Sponsor:** Icahn School of Medicine at Mount Sinai

## Optical Imaging with a High Resolution Microendoscope to Identify Cholesteatoma of the Middle Ear

Principal Investigator: Eric Smouha, MD

Cholesteatoma continues to have a high rate of recurrence after adequate treatment. This is a clinical trial of intraoperative optical modality that ensures complete removal of disease at surgery.

**Sponsor:** Icahn School of Medicine at Mount Sinai

## Treatment of Spontaneous CSF Leak/Encephalocele: Preference for Transmastoid Approach

Principal Investigator: Eric Smouha, MD, with Enrique Perez and Daniel Carlton

This is a retrospective chart review of cases of spontaneous CSF otorrhea managed by a transmastoid approach, demonstrating that this approach has high rate of success and very low morbidity in high-risk patient population.

**Sponsor:** Icahn School of Medicine at Mount Sinai

## Pediatrics

### Characterizing the Nasal Airway in Syndromic Craniosynostosis

Principal Investigator: Joseph Bernstein

This study aims to characterize the nasal airway deficiencies in a craniosynostosis mouse model in order to clarify our current understanding of nasal airway compromise in children with syndromic craniosynostosis.

## Rhinology and Skull Base Surgery

### Large Scale Cerebral Oximetry in Functional Endoscopic Sinus Surgery

Principal Investigator: Satish Govindaraj

The study examines the effects of a hypotensive anesthetic technique in patients who undergo functional endoscopic sinus surgery. The cognitive effects, as well as intraoperative cerebral oxygenation, are monitored and examined in each patient.

### Retrospective Analysis of Varying Approaches for

## Petrous Apex Lesions

Principal Investigator: Satish Govindaraj

This is a multi-institutional study examining the various approaches used for petrous apex lesions. The complication rates, surgical time, length of stay and other factors are being compared.

## Efficacy of a Drug-Eluting Sinus Implant (Propel Stent) in Patients Undergoing FESS

Principal Investigator: Alfred Illoreta

The study examines the effects of placement of a drug-eluting implant, the Propel stent, during functional endoscopic sinus surgery. Postoperative endoscopic exams and quality of life scores are being examined.

## Incidence of Sphenoid Mucocoeles after Endoscopic Transphenoidal Approach w/Sphenoid Obliteration

Principal Investigator: Alfred Illoreta

The study reviews postoperative scans in patients who underwent transsphenoidal pituitary surgery with fat obliteration of the sphenoid sinus to determine if there is a risk of mucocele development. This was a common method of skull base repair, prior to the present techniques used today with an endoscopic approach.

## Operative Technique and Complication Rates in CSF Leak Repairs

Principal Investigator: Alfred Illoreta

This retrospective review will examine secondary leaks after CSF leak repair at our institution. Patient factors, surgical approach, reconstruction techniques will be examined.

## RESOLVE II: A Clinical Evaluation of the Safety and Efficacy of the Steroid-Releasing S8 Sinus Implant in Chronic Sinusitis Patients with Recurrent Sinus Obstruction

Principal Investigator: Alfred Illoreta

This multi-institutional clinical trial with Intersect ENT assesses the safety and efficacy of the steroid-releasing S8 office steroid-releasing implant when used on post-sinus surgery patients who present with recurrent sinus obstruction due to polyposis.

## Role of MT Resection in Delivery of Topical Irrigations

Principal Investigator: Alfred Illoreta

The study uses the cadaver model to examine the distribution of sinonasal irrigations in specimens with and without middle turbinate resections. The study will determine if there is a higher delivery of topical therapy in specimens who have undergone middle turbinate resections.

## Use of Pharyngeal Packs in FESS

Principal Investigator: Alfred Illoreta

This study is determining the effects of pharyngeal throat pack placement on patients who undergo endoscopic sinus surgery. Postoperative reporting of nausea, vomiting, pain

scores and medication delivery in recovery room are being examined.

## The Role of Doxycycline in Management of Severe Chronic Rhinosinusitis with Nasal Polyps

Principal Investigator: Arjun Parasher, MD

This double-blind trial compares patients with a treatment regimen of Doxycycline and standard therapy versus a control arm of placebo and Methylprednisolone among patients with refractory sinonasal polyposis. Endoscopic polyp grading and quality of life scores are being used to determine difference between both treatment groups.

## Sleep Surgery

### The Effect of Phenotype on Sleep Surgery Outcomes

Principal Investigator: Boris Chernobilsky, MD

Sleep disorders, including obstructive sleep apnea (OSA) have been increasingly recognized as significant health problems in the last two decades. Sleep surgery is currently offered as a treatment in patients with OSA who fail to adhere to CPAP therapy and in some cases, surgery is offered as primary therapy for patients with suitable anatomy. This multi-institutional investigation aims to determine sleep surgical procedures that will maximize success given certain patient characteristics.

### Long-term Sleep Quality Outcomes in Treated Head and Neck Cancer Patients

Principal Investigator: Boris Chernobilsky, MD

The purpose of this retrospective chart review is to determine whether there is an increased risk of sleep disorders in patients who have been treated for head and neck cancer. Specifically, the study will be a retrospective analysis of patients who have been treated for head and neck cancer and completed the EORTC-30 quality of life survey following their treatment. We are looking at Mount Sinai Beth Israel patients and cross-referencing our data to determine if it is consistent with prior studies. Future studies will try to identify what particular aspects of sleep are affected and which particular sleep disorders are prevalent in this population.

### Transoral Robotic Versus Coblation Tongue Base Surgery

Principal Investigator: Fred Lin, MD

The objective of the study is to compare the outcomes of utilizing transoral robotic surgery (TORS) versus tissue coblation in performing tongue base reductions utilizing pre-and post-operative Epworth Sleepiness Scale and Apnea Hypopnea Index Scores. Twenty patients with sleep apnea will be approached and consented; survey and CT scan will be performed. Subject will choose either tongue base reduction surgery with tissue coblation or the surgery with TORS. Four months later, a final survey will be administered.

## Principal Investigator:

Julio Aguirre-Ghiso, 2014-present

Project Title: Microenvironments and Signaling Pathways Regulating Early Dissemination, Dormancy and Metastasis

Sponsor: CDMRP

## Principal Investigator:

Julio Aguirre-Ghiso, 2014-present

Project Title: Organ Specific Macrophages and the Regulation of Disseminated Tumor Cell Fate

Sponsor: NCI/NIH

## Principal Investigator:

Julio Aguirre-Ghiso, 2012-present

Project Title: Development of Novel Anti-dormancy Therapies

Sponsor: Eli Lilly

## Principal Investigator:

Julio Aguirre-Ghiso, 2011-present

Project Title: Tumor Microenvironments Determining Migration, Dissemination and Dormancy

Sponsor: NIH/NCI

## Principal Investigator:

Julio Aguirre-Ghiso, 2009-present

Project Title: Regulation of Disseminated Tumor Cell Fate by RARb and NR2F1 Signaling

Sponsor: Samuel Waxman Cancer Research Foundation

## Principal Investigator:

Julio Aguirre-Ghiso, 2004-present

Project Title: Functional Determinants of Metastatic Dormancy

Sponsor: NCI/NIH

## Principal Investigator:

Ana Kim, MD, 2015-present

Project Title: A Prospective, Randomized, Double-Blind, Placebo-Controlled, Multicenter, Phase IIb Study of OTO-104 Given as a Single Intratympanic Injection in Subjects with Unilateral Meniere's Disease

Sponsor: Otonomy, Inc.

## Principal Investigator:

Ana Kim, MD, 2015-present

Project Title: Contribution of Genetic Factors to Sudden and Noise-Induced Hearing Loss

Sponsor: Empire Clinical Research Investigator Program

## Principal Investigator:

Ana Kim, MD, 2015-present

Project Title: Borderline Cochlear Implant Candidacy

Sponsor: Children's Hearing Institute

## Principal Investigator:

Ana Kim, MD, 2014-present

Project Title: AM-101 in the Post-Acute Treatment of Peripheral Tinnitus 1 (AMPACT1) – an Open-label Extension to the TACTT2 Study

Sponsor: Auris Medical Protocol Number AM-101-CL-12-01

## Principal Investigator:

Ana Kim, MD, 2013-present

Project Title: A Phase 3, Randomized, Placebo-Controlled, Multi-Center Study to Evaluate the Efficacy and Safety of AM-101 in the Treatment of Acute Peripheral Tinnitus 2 (TACTT2) Following Traumatic Cochlear Injury or Otitis Media

Sponsor: Auris Medical Protocol Number AM-101-CL-12-01

## Site Principal Investigator:

Ana Kim, MD, 2008-present

Project Title: Implementation and Testing of Research Infrastructure for Practice-Based Research in Hearing and Communication Disorders

Sponsor: NIH/CHEERS

## Principal Investigator:

Brett Miles, MD, DDS, 2015 – present

Project Title: Phase II trial of ADXS11-001 Vaccine for HPV-related Oropharyngeal Cancer

Sponsor: Advaxis, Inc.

## Principal Investigator:

Benjamin Malkin, MD, 2015-present

Project Title: The Role of Doxycycline in Severe Chronic Rhinosinusitis with Nasal Polyps

Sponsor: CORE Program Grant Partners (includes the AAO and AAOA)

## Principal Investigator:

Michael Pitman, MD, 2015-present

Project Title: Effect of Anti-GDNF Antibodies on Reinnervation, Synkinesis and Vocal Fold Function after RLN Injury

Sponsor: American Laryngological Association – ALVARE Research Grant

## Honors/Awards 2015

Nikita Gupta, Michelle Cruz, Phillip Nasser, Joshua Rosenberg, James Iatridis: First Place, Oral Presentation Tenth Annual Metropolitan New York Resident Research Day Symposium, New York Eye and Ear Infirmary 2015 for “Fibrin-Genipin Hydrogel for Cartilage Tissue Engineering in Nasal Reconstruction”

Nikita Gupta, Michelle Cruz, Phillip Nasser, Joshua Rosenberg, James Iatridis: First Place Poster Presentation Allergy, Rhinology, & Facial Plastics 118th Annual Meeting of the Triological Society at COSM 2015 for “Fibrin-Genipin Hydrogel for Cartilage Tissue Engineering in Nasal Reconstruction.”

Grigoriy Mashkevich, MD: Microsurgical Training Teaching Award, New York Eye & Ear Infirmary of Mount Sinai

Brett Miles, MD, DDS: Triologic Society Clinical Research Honorable Mention for Triologic Thesis: “Feasibility of Intraoperative Margin Control Utilizing High Resolution Microendoscopy Optical Imaging for in Head and Neck Squamous Cell Carcinoma” 2015; results presented at the Triologic Meeting in Miami, FL, January 2016



More than 1,800 students are enrolled in the MD, PhD and masters programs and postdoctoral fellowships at the Icahn School of Medicine at Mount Sinai



The Icahn School of Medicine at Mount Sinai receives \$267 million in annual funding from the National Institutes of Health

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## Laryngology

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# Publications

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# Faculty and Clinical Specialists



## Department of Otolaryngology – Head and Neck Surgery Faculty

### Allergy

Sujan Patel, MD

### Facial Plastics

Matthew Hirsch, MD  
William Lawson, MD, DDS  
Grigoriy Mashkevich, MD  
Alexander Ovchinsky, MD  
Joshua Rosenberg, MD  
Joseph Rouso, MD

### General ENT

Bart Castellano, MD  
David Phillip Culang, MD  
Claude Douge, MD  
Benjamin Malkin, MD  
Anthony Reino, MD  
Benjamin Tweel, MD

### Head and Neck

Raymond Chai, MD  
Eric Genden, MD  
Ilya Likhterov, MD  
Brett Miles, MD, DDS  
Stimson Schantz, MD  
Edward Shin, MD  
Marita Teng, MD  
Mark Urken, MD  
Mike Yao, MD  
Helen Yoo-Bowne, MD

### Laryngology

Mark Courey, MD  
Peak Woo, MD

### Oral and Maxillofacial Surgery/ Dentistry

Brian Bovino, DDS  
Daniel Buchbinder, DMD, MD  
Vincent Carrao, DDS, MD  
Devin Okay, DDS  
Alan Schwimmer, DDS  
Michael Turner, DDS, MD  
David Valauri, DDS  
Joshua Verona, DDS

### Otology

Ronald Hoffman, MD  
Christopher Linstrom, MD  
Eric Smouha, MD  
Peter Weber, MD

### Pediatrics

Joseph Bernstein, MD  
Alyssa Hackett, MD  
Michael Rothschild, MD

### Research

Julio Aguirre-Ghiso, PhD  
Cathy Lazarus, PhD  
Marshall Posner, MD  
Kristina Simonyan, MD, PhD

### Rhinology

Anthony Del Signore, MD  
Satish Govindaraj, MD  
Alfred Iloreta, MD  
Madeleine Schaberg, MD

### Sleep Surgery

Boris Chernobilsky, MD  
Fred Lin, MD  
Gennady Ukrainsky, MD



Health System Chairman Dr. Eric Genden presented, "HPV-Oral Cancer: What Practicing Clinicians Needs to Know" at the 2015 AAO-HNSF annual meeting



The Department welcomes Dr. Mark Courey, Vice Chair of Quality and Chief of the Division of Laryngology, who joined Mount Sinai in January 2016

# Clinical Specialists



Lyudmila Milman, RPA-C, checks up on patient, Harvey, after surgery



Leanne Goldberg, MS, CCC-SLP, with a dysphasia patient

## Audiologists

Stella Agrapidis, AuD, CCC-A  
 Meghan Brady, AuD, CCC-A  
 Sandra Delapenha, MA, CCC-A  
 Michele DiStefano, MS, CCC-A  
 Karla Fernandez, AuD, CCC-A  
 Jessica Gallatioto, AuD, CCC-A  
 Nancy Gilston, AuD, CCC-A – add  
 Lisa Goldin, MPhil, CCC-A  
 Melissa Harawitz, AuD, CCC-A  
 Jennifer Jones, AuD, CCC-A  
 Randy Judson, AuD, CCC-A, F-AAA  
 Elena Kagan, AuD, CCC-A  
 Lauren Kaplan, AuD, CCC-A  
 Sharon Kupfer, AuD, CCC-A  
 Tat'yana Kennedy, AuD, CCC-A  
 Megan Kuhlmeier, MS, CCC-A  
 Jaymee Levine, AuD, CCC-A  
 Melissa Magnolia, AuD, CCC-A  
 Patricia Mazzullo, AuD, CCC-A  
 Tracey Moskatel, AuD, CCC-A  
 Sabrina Mussawar, AuD, CCC-A  
 Bess Nagler, AuD, CCC-A  
 Kerri O'Connor, AuD, CCC-A  
 Shelly Ozdamar, AuD, CCC-A  
 Maryana Peravozchikava, AuD, CCC-A  
 Derek Petti, AuD, CCC-A  
 Katherine Scigliano, AuD, CCC-A  
 Karen Siegel, AuD, CCC-A  
 Nicole Sislian, PhD, CCC-A  
 Stephanie Tartaglia, AuD, CCC-A  
 Randi Tepper, AuD, CCC-A  
 Sabrina Vitulano, AuD, CCC-A  
 Nora Yeung-Molina, AuD, CCC-A

## Speech Language Pathologists

Erin Bestrich, MA, CCC-SLP  
 Denise Cruz, MS, CCC-SLP  
 Lisa Erlichster, CCC-SLP  
 Cindy Ganz, MS, CCC-SLP  
 Leanne Goldberg, MS, CCC-SLP  
 Karen Keung, MS, CCC-SLP  
 Tamar Kotz, MS, CCC-SLP  
 Cathy Lazarus, PhD, CCC-SLP  
 Vera Leyko, MS, CCC-SLP  
 Jessica Lisogorsky, MS, CCC-SLP  
 Daniel McCabe, DMA, CCC-SLP  
 Elizabeth Roarke, MS, CCC-SLP  
 Sarah Sietsema, MS, CCC-SLP  
 Karen Slotnick, CCC-SLP  
 Devon Zuller, MS, CCC-SLP

## Vestibular Therapists

Bryan Hujsak, DPT  
 Jennifer Kelly, DPT  
 Laura Lei-Rivera, DPT  
 Joanne Zerillo, DPT

## Physician Assistants

Sabra Baum, RPA-C  
 Kit Ling Chew, RPA-C  
 Katrina De Los Reyes, RPA-C  
 Lyudmila Milman, RPA-C  
 Angelina Marshall-Figueroa, RPA-C  
 Tanya Sharrieff, RPA-C  
 Anna Trub, RPA-C  
 Mei Kuen Xei, RPA-C

# Mount Sinai Health System at a Glance

- ONE MEDICAL SCHOOL**
- 1 Icahn School of Medicine at Mount Sinai  
One Gustave L. Levy Place  
New York, NY 10029
- SEVEN HOSPITAL CAMPUSES**
- 1 Mount Sinai Beth Israel  
First Avenue at 16th Street  
New York, NY 10003
  - 2 Mount Sinai Beth Israel Brooklyn  
3201 Kings Highway  
Brooklyn, NY 11234
  - 3 The Mount Sinai Hospital  
One Gustave L. Levy Place  
New York, NY 10029
  - 4 Mount Sinai Queens  
25-10 30th Avenue  
Long Island City, NY 11102
  - 5 New York Eye and Ear Infirmary of Mount Sinai  
310 East 14th Street  
New York, NY 10003
  - 6 Mount Sinai St. Luke's  
1111 Amsterdam Avenue  
New York, NY 10025
  - 7 Mount Sinai West  
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# Practice Locations

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212-241-9410  
Physician Referrals: 800-TO-SINAI

### **Center for Science and Medicine—Cancer Center**

10 East 102nd Street, 3rd floor  
New York, NY 10029  
212-241-9410

### **Mount Sinai Doctors East 85th Street**

234 E 85th Street, 4th Floor  
New York, NY 10028  
212-241-9410

### **Mount Sinai Otolaryngology—Staten Island**

2052 Richmond Road, Suite 1C  
Staten Island, NY 10306  
718-420-1279

### **Mount Sinai North Shore Medical Group**

325 Park Avenue  
Huntington, NY 11743  
212-241-9410

### **Elmhurst Hospital Center Otolaryngology**

79-01 Broadway – H2-69  
Elmhurst, NY 11373  
718-334-3392

### **James J. Peters Veterans Medical Center—Otolaryngology**

130 West Kingsbridge Road  
Bronx, NY 10468  
718-584-9000 x5992

### **The Queens Hospital Center Otolaryngology**

82-68 164th Street  
Jamaica, NY 11432  
718-334-3392

### **St. Barnabas Hospital**

4422 3rd Avenue  
New York, NY 10457  
718-960-9000

## **MOUNT SINAI BETH ISRAEL**

### **Mount Sinai Beth Israel Phillips Ambulatory Care Center (PACC)**

10 Union Square East  
New York, NY 10003  
212-844-8450

### **Mount Sinai Beth Israel—Westchester Head, Neck and Thyroid Institute**

244 Westchester Avenue  
Suite 405  
White Plains, NY  
212-844-8775

### **New York Eye and Ear Infirmary of Mount Sinai**

310 E. 14th Street  
New York, NY 10003  
212-979-4000  
Physician Referrals: 212-979-4472

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9020 5th Avenue  
Brooklyn, NY 11209  
718-951-9007

## **NEW YORK EYE AND EAR INFIRMARY OF MOUNT SINAI**

### **New York Eye and Ear Infirmary of Mount Sinai**

310 E. 14th Street  
New York, NY 10003  
212-979-4000  
Physician Referrals: 212-979-4472

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234 E 85th Street, 4th Floor  
New York, NY 10028  
212-241-9410

### **Columbus Circle**

200 W 57th Street, Suite 1410  
New York, NY 10019  
212-957-6933

### **Ear Institute**

380 2nd Avenue, 9th Floor  
New York, NY 10010  
212-614-8379

### **Financial District**

65 Broadway, #901  
New York, NY 10006  
212-514-6933

### **Tribeca**

77 Worth Street  
New York, NY 10013  
212-966-3901

### **Upper East Side**

1430 2nd Avenue  
New York, NY 10021  
212-535-2298

### **Bay Ridge**

9020 5th Avenue, 3rd Floor  
Bay Ridge, NY 11209  
718-333-5120

### **Sheepshead Bay**

2560 Ocean Avenue, 2nd Floor  
Brooklyn, NY 11229  
718-646-1234

### **Williamsburg**

101 Broadway #201  
Brooklyn, NY 11249  
718-384-6933

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45-64 Francis Lewis Blvd., 2nd Fl.  
Bayside, NY 11364  
718-225-6100

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108-12 72nd Avenue  
Forest Hills, NY 11375  
718-544-9300

### **White Plains**

244 Westchester Avenue, #215  
White Plains, NY 10604  
914-997-9100

### **Short Hills**

1046 S. Orange Avenue  
Short Hills, NJ 07078  
973-379-0101

## **WEBSITE SHORTCUTS**

### **The Department of Otolaryngology—Head and Neck Surgery**

[www.mountsinai.org/ent](http://www.mountsinai.org/ent)  
[www.nyee.edu/ent](http://www.nyee.edu/ent)  
[www.bethisraelny.org](http://www.bethisraelny.org)

### **Head and Neck Institute**

[www.mountsinai.org/headandneck](http://www.mountsinai.org/headandneck)  
[www.headneckandthyroid.com](http://www.headneckandthyroid.com)

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[www.mountsinai.org/hearing](http://www.mountsinai.org/hearing)

### **Center for Minimally Invasive Robotic Surgery**

[www.headandneckrobotics.com](http://www.headandneckrobotics.com)

### **Center for Thyroid and Parathyroid Diseases**

[www.mountsinai.org/thyroid](http://www.mountsinai.org/thyroid)

### **Eugen Grabscheid MD Voice Center**

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### **Facial Plastics and Reconstructive Surgery**

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### **Rhinology and Sinus Surgery**

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