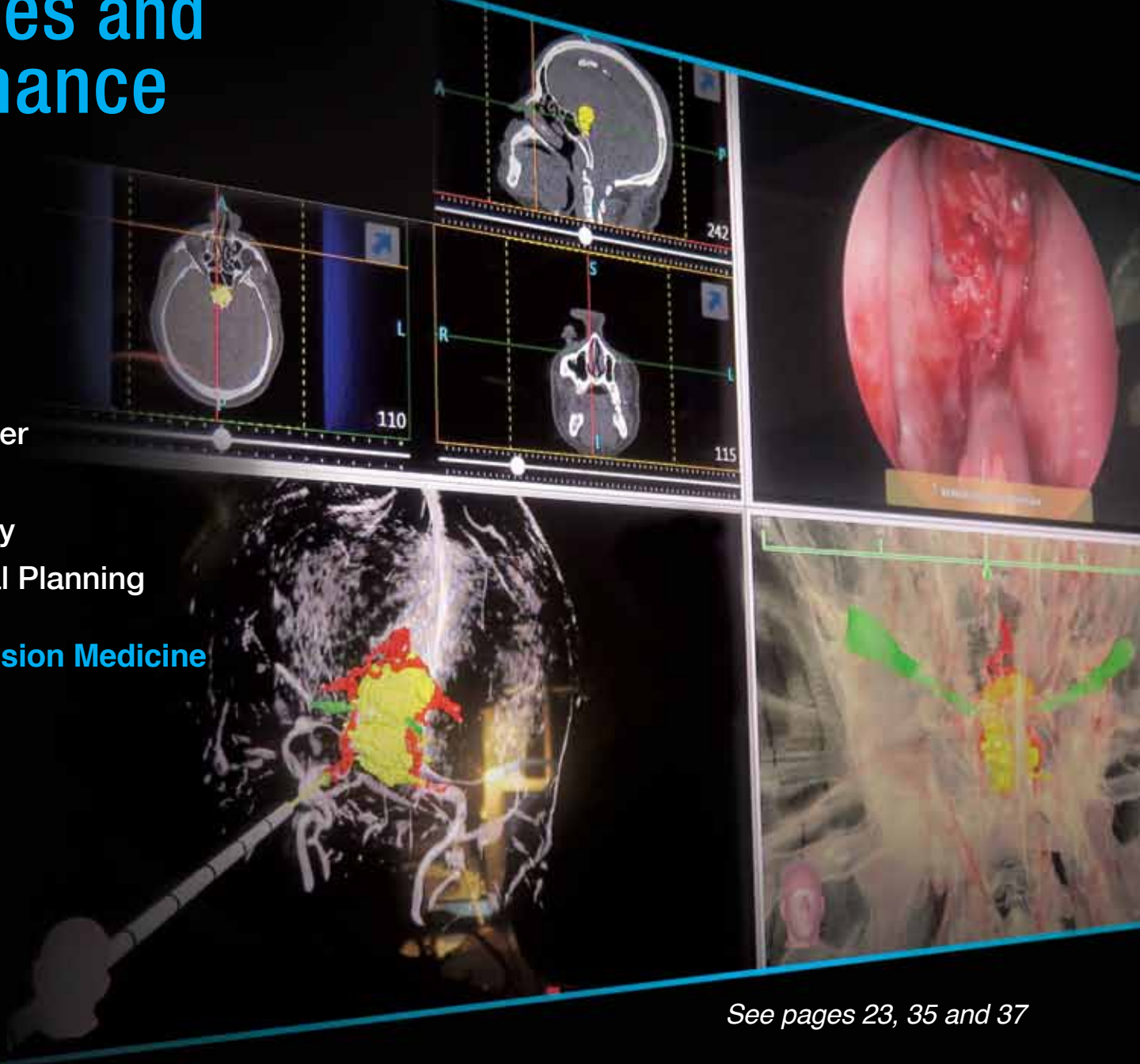


Outcomes and Performance 2016

- 3D Printing
- Brainlab iPlan
- Surgical Theater
- 7T MRI
- Inspire Therapy
- Virtual Surgical Planning

Redefining Precision Medicine at Mount Sinai



See pages 23, 35 and 37



**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

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

Message from the Dean



Dr. Dennis S. Charney

Patient outcomes are a priority and the Department of Otolaryngology – Head and Neck Surgery has continued to demonstrate leadership by annually assessing their treatment outcomes and addressing areas in need of improvement. This year's annual report highlights the impact of two programs aimed at reducing infection through early medical intervention. The Inpatient Hospitalist Program and the Stop Sepsis Program were designed to identify patients early in the course of medical distress and initiate early intervention. Both programs have demonstrated a reduction in perioperative morbidity and decreased hospital length of stay. This means safer hospitalizations for our patients.

Under the direction of Nina Bhardwaj, MD, PhD, the Department has also initiated an innovative tumor vaccine program that provides patients, who have not responded to conventional therapies, new hope. This innovative approach to fully personalized, multi-peptide therapeutic vaccine is designed to safely target tumor-derived neoantigens with minimal off-target immune activity. The investigational product vaccine is based on the Personalized Genomic Vaccine platform, which utilizes high-throughput sequencing technologies to identify tumor-specific somatic variations, and statistical models to characterize neoantigens. Having initiated clinical trials, the Department is leading the way to personalized tumor vaccine therapy.

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*

Message from the Chair



Dr. Eric M. Genden

It is a pleasure to share with you this year's Outcomes and Performance Report. Highlighted in this report are the Department of Otolaryngology - Head and Neck Surgery's innovative programs, research, and new technologies that help improve patient function and outcomes by reducing complication rates and hospital length of stay.

In 2016, we continued a variety of patient care programs that we instituted in a rapid cycle approach to determine which programs have the greatest impact on patient outcomes. The Stop Sepsis Program was designed to identify and intervene early in the course of sepsis. This program has proven exceptionally successful and, as a result, it has become the standard of care. The Inpatient Hospitalist Program was another rapid cycle program, introduced as a trial initiative that developed into a standard of care because of its outstanding impact on clinical care. This program, which provides immediate medical attention to inpatients in need, has facilitated expeditious patient care and excellent outcomes.

It was an extraordinary year for the development and clinical introduction of new technology for the Department. Investigators and clinicians collaborated in the Skull Base Surgery Center to adopt a 3-dimensional navigational system that allows surgeons to preoperatively evaluate the disease and determine the best surgical approach. It also provides surgeons the ability to create a preoperative 3-dimensional print representation of a patient's anatomy. This protocol has reduced complications by allowing the multidisciplinary team a unique view into the disease. Our Division of Sleep Surgery made excellent strides with the Inspire Therapy hypoglossal nerve stimulator implant, and the Division of Oral and Maxillofacial Surgery is routinely employing Virtual Surgical Planning for complex cases in an effort to improve outcomes.

The Department of Otolaryngology - Head and Neck Surgery also had an outstanding year translating research ideas into practice. Our faculty are unwavering in their dedication to safe and efficient care for all of our patients and close communication with our referring physicians. I hope that you find this report helpful and informative.

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

QUICK FACTS

ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

RANKED No. 1
AMONG PRIVATE MEDICAL SCHOOLS
IN TOTAL RESEARCH DOLLARS PER
PRINCIPAL INVESTIGATOR

\$290 MILLION
IN TOTAL NIH FUNDING

MOUNT SINAI HEALTH SYSTEM

7,100+
PHYSICIANS

THE MOUNT SINAI HOSPITAL
RANKED No. 15
NATIONALLY BY U.S. NEWS &
WORLD REPORT

4 MILLION
ANNUAL PATIENT VISITS

2016 OUTCOME HIGHLIGHTS

43 PERCENT
REDUCTION IN C. DIFFICILE INFECTIONS

22 PERCENT
REDUCTION IN PATIENT SAFETY
INDICATOR INPATIENT HARM EVENTS
(Medicare patients)

2016 DEPARTMENTAL HIGHLIGHTS

LARGEST
HEAD AND NECK ROBOTIC SURGERY
PROGRAM IN THE NATION

RANKED No. 1
IN NEW YORK FOR OTOLARYNGOLOGY
BY U.S. NEWS & WORLD REPORT

Stop Sepsis Program

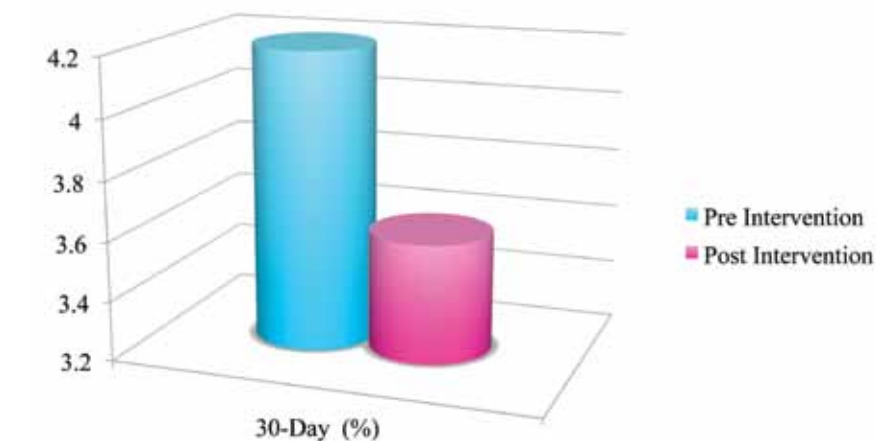
More than 1.1 million people contract sepsis in the hospital each year, according to the Centers for Disease Control and Prevention, and readmission due to sepsis is two to three times more likely than many other conditions, including heart failure and chronic obstructive pulmonary disease. Additionally, perioperative sepsis continues to be identified as a major contributor to inpatient morbidity and mortality. In 2014, Mount Sinai launched its "Stop Sepsis Program" across the hospital, which included the Department of Otolaryngology – Head and Neck Surgery. The 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. The early warning alert enables residents, nurses and attending physicians to employ standardized protocols to intervene early in patients at risk for sepsis. The quality improvement program has proven successful in identifying patients at risk, and early intervention has improved patient safety and outcomes. This is evident in the Department's zero percent sepsis mortality rate in 2014, 2015 and 2016.

Inpatient Hospitalist Program

As a way of improving quality measures for our inpatient service, the Departments of Otolaryngology and Internal Medicine have partnered to create the Inpatient Hospitalist Program to manage the medical issues associated with our inpatients. Head and neck cancer patients may suffer from multiple medical comorbidities, and as a way of optimizing their recovery, the hospitalist team has coordinated the medical management of these patients during their inpatient stay. The team communicates with our service daily regarding initiation of medications, ordering of labs, and communication with the patients' primary care physicians to clarify, as well as communicate any medical issues during their admission.

This quality improvement program, which was established in July 2015, has resulted in a modest improvement in overall length of stay and a reduction in our 30-day readmission rate for medical issues from 4.2% pre-intervention to 3.6% post-intervention. Our Department is pleased with the positive impact this program has had on our head and neck cancer inpatients.

30-Day Readmission Rate Due to Medical Comorbidities

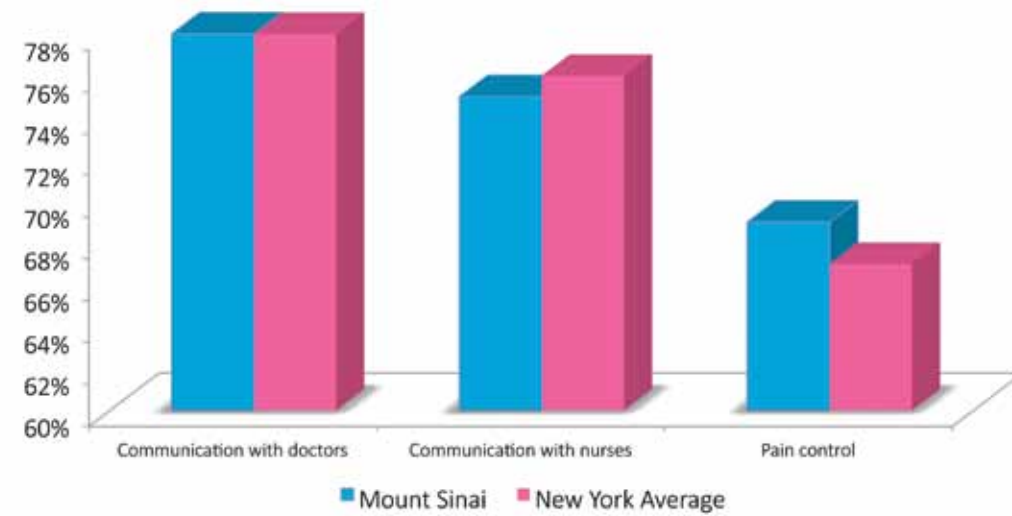


The Patient Hospital Experience

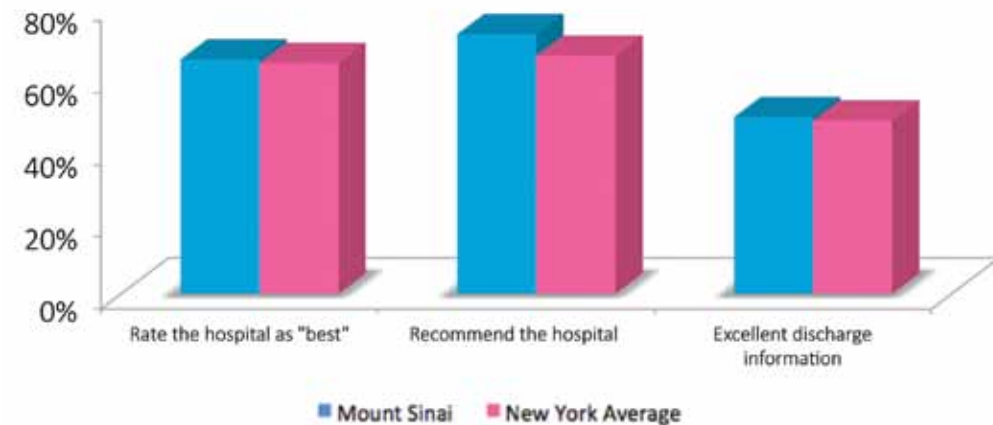


Dr. Mike Yao at the annual September Thyroid Cancer Awareness Screening at The Mount Sinai Hospital, where 135 participants were screened

The patient hospital experience is a measure of the critical aspects of a patient's hospital stay, 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.



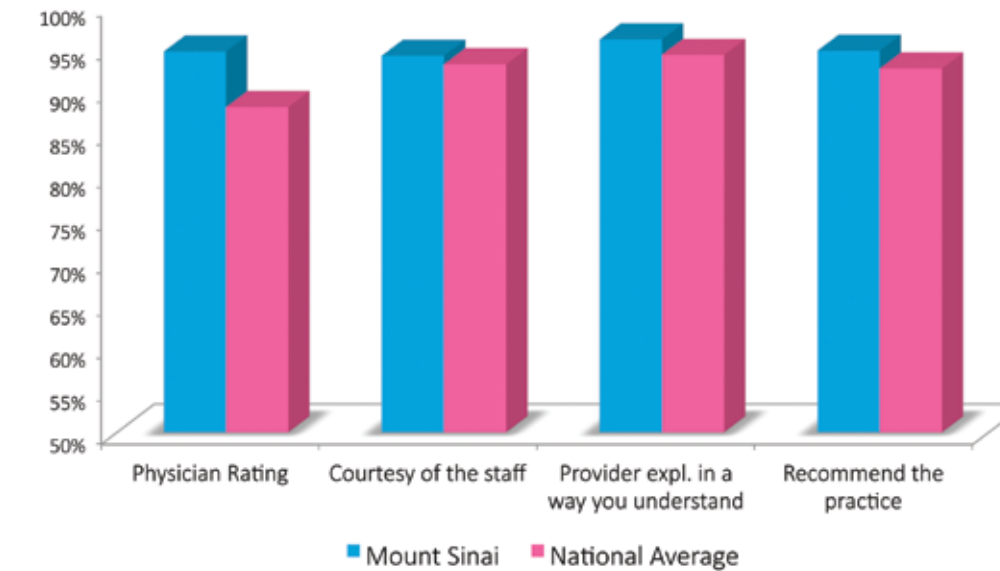
Source: The Centers for Medicare and Medicaid Services and Hospital Consumer Assessment of Healthcare Provider and Systems Survey. Medicare.gov Hospital Compare, <http://www.medicare.gov/HospitalCompare/profile>



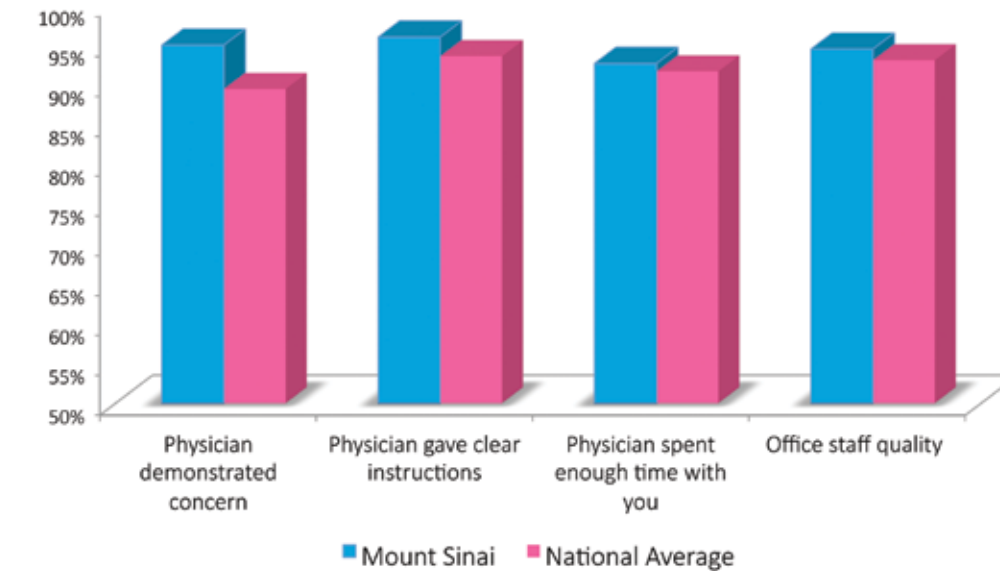
Source: The Centers for Medicare and Medicaid Services and Hospital Consumer Assessment of Healthcare Provider and Systems Survey. Medicare.gov Hospital Compare, <http://www.hospitalcompare.hhs.gov>

The Patient Practice Experience

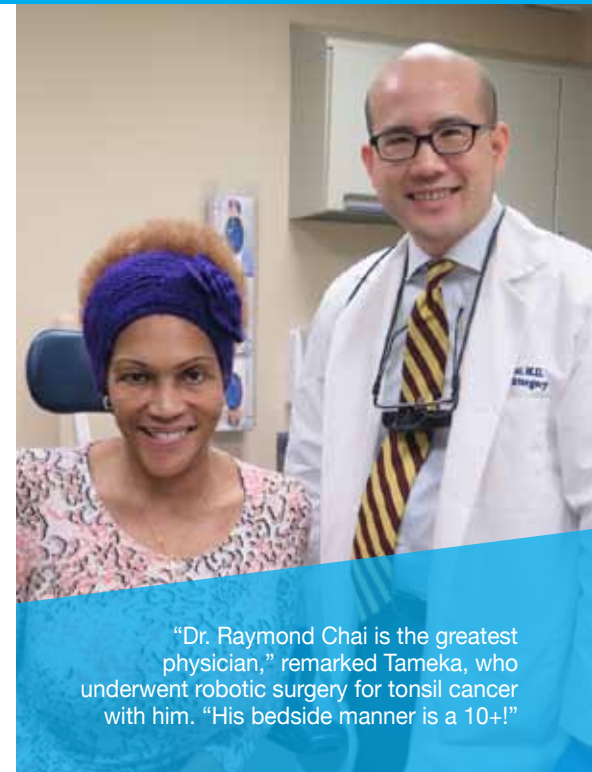
The patient experience reflects impressions and events that occur across the continuum of care. We believe that the patient experience extends beyond patient satisfaction surveys; it reflects the level of individualized care and managing the patient's expectations. As patient experience continues to emerge as an important focus in healthcare, we are finding ways to tailor our care to each patient's needs.



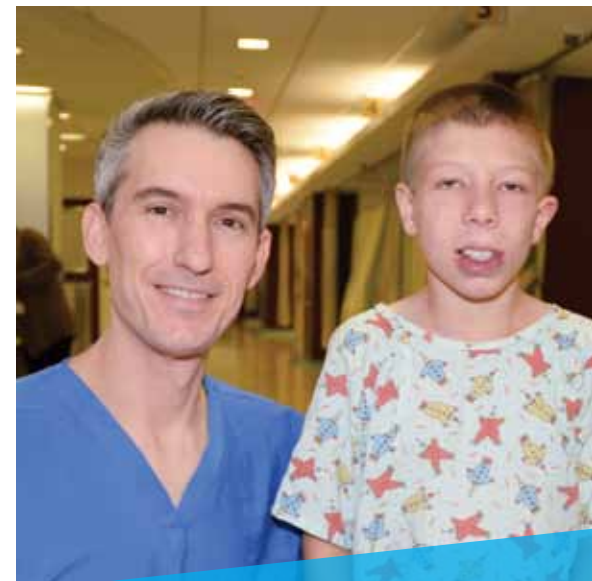
Source: Press Ganey Patient Experience Survey



Source: Press Ganey Patient Experience Survey



"Dr. Raymond Chai is the greatest physician," remarked Tameka, who underwent robotic surgery for tonsil cancer with him. "His bedside manner is a 10+!"



Dr. Levitin and Christopher, 10, who was born with an extensive port wine stain, underwent laser surgery and is thrilled with his progress

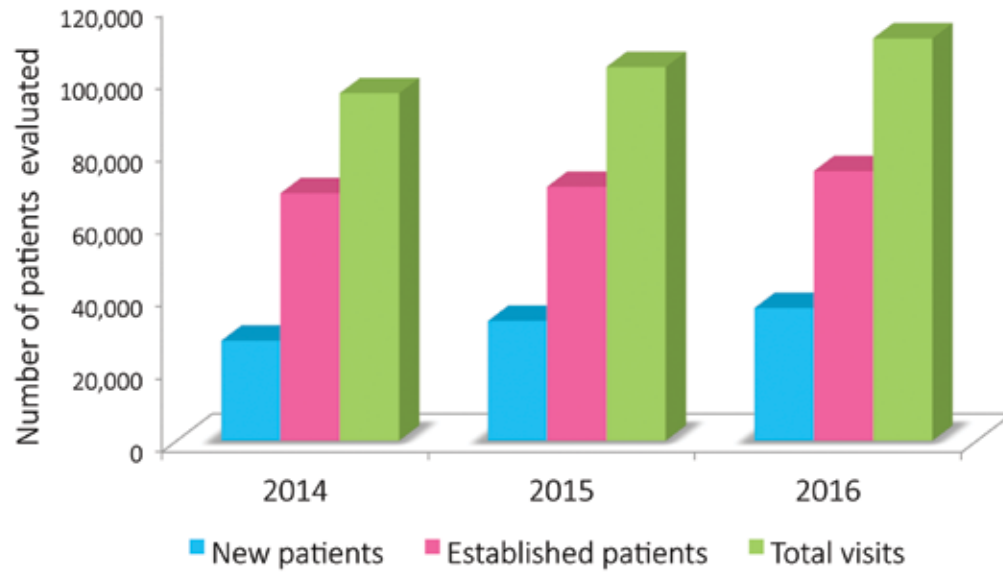
Departmental Volume and Growth



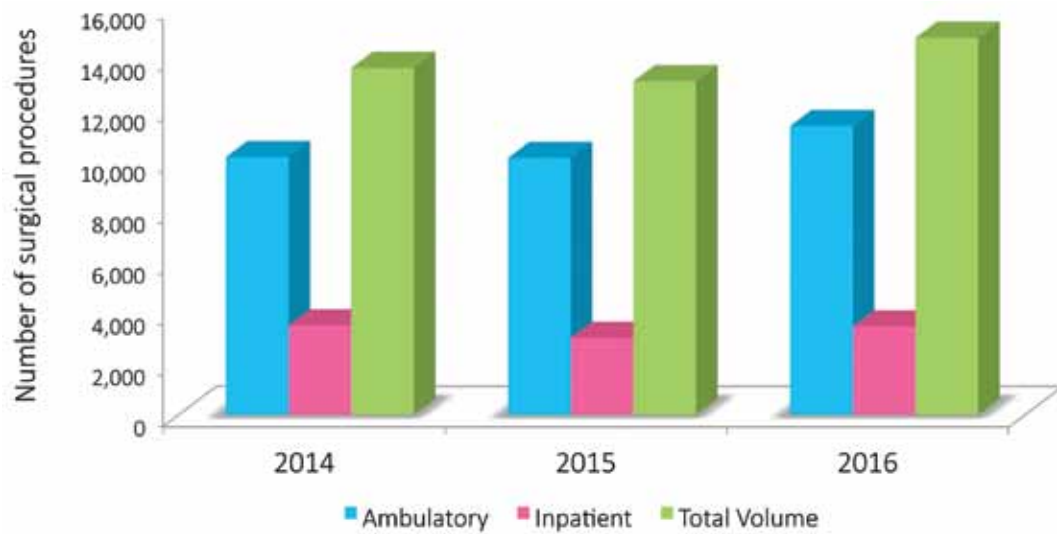
Chief of the Division of Rhinology and Skull Base Surgery Dr. Satish Govindaraj performs an endoscopic sinus surgery

Patient Encounters

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



Surgical Volume

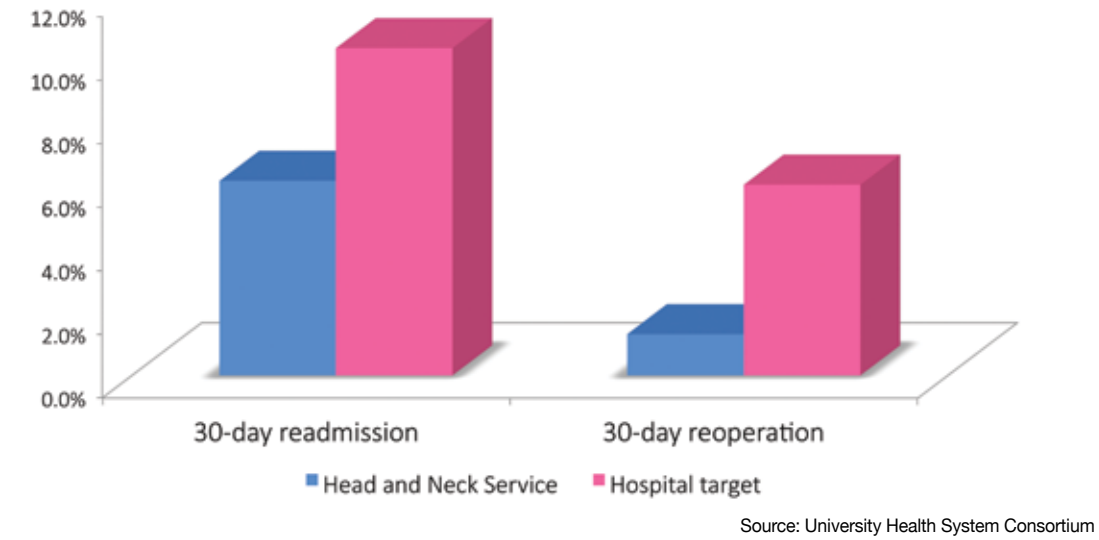


Departmental Volume and Growth



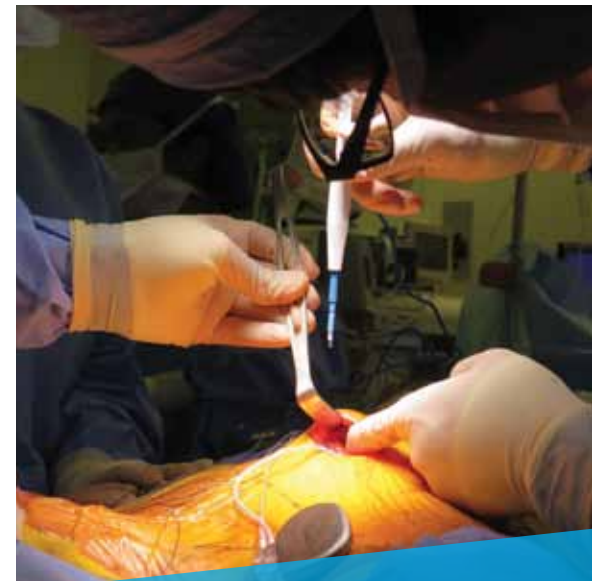
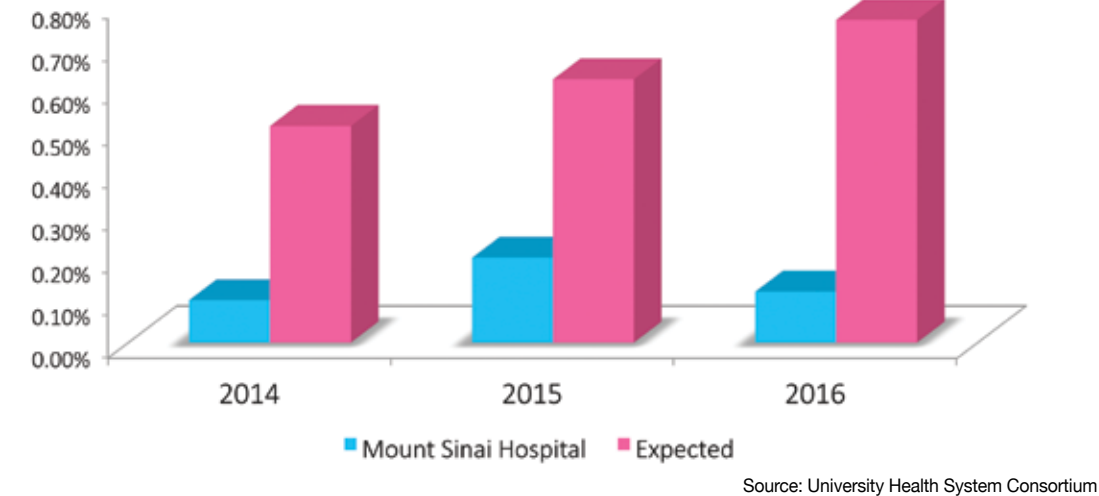
Dr. Brett Miles screens participant Karen at the Oral, Head and Neck Cancer Awareness Screening event, which drew a record 220 participants in 2016

Rate of Readmission and Reoperation



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.



Dr. Fred Lin implants a patient with the Inspire Therapy hypoglossal nerve stimulator, which has generated excellent outcomes

Head and Neck Institute and Division of Head and Neck Oncology

“We witnessed impressive growth of our translational research, particularly with the development of the personalized cancer vaccine program in 2016. Additionally, the introduction of the Mount Sinai Robotics Institute has underscored our emphasis on technology with the goal of benefitting patient care.”

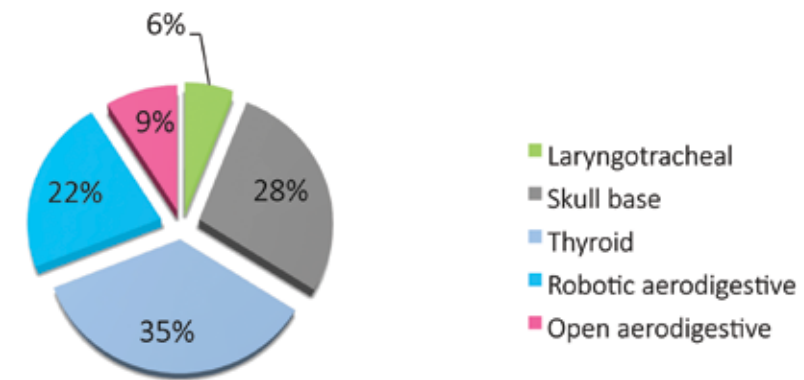
Dr. Eric M. Genden
Isidore Friesner
 Professor and Chair
 Department of
 Otolaryngology-Head
 and Neck Surgery
 Mount Sinai Health
 System



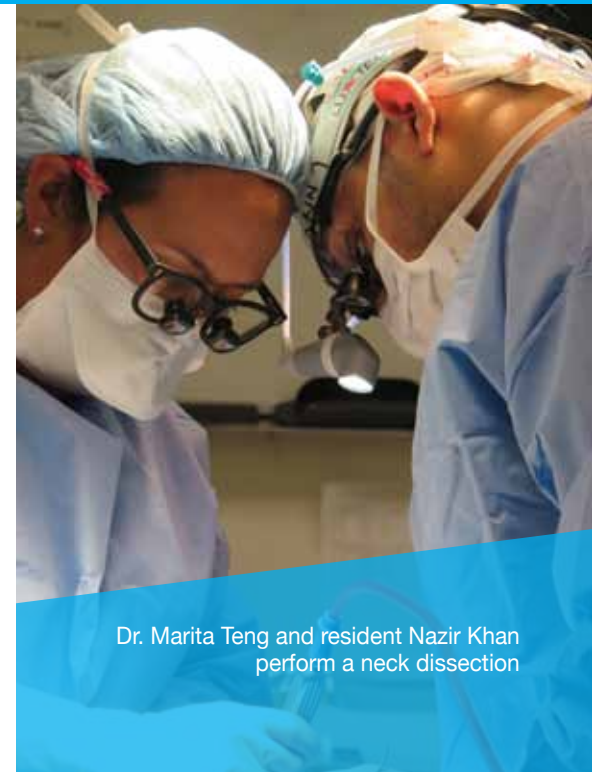
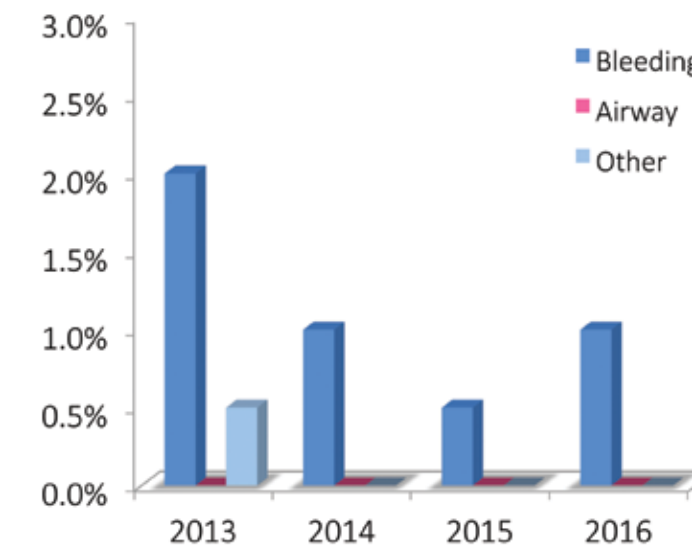
The Head and Neck Institute continues to offer a broad spectrum of innovative trials for patients

The Mount Sinai Health System's Head and Neck Institute/Division of Head and Neck Oncology was once again the highest volume surgical unit in the state of New York in 2016. The multidisciplinary program offers patients transoral robotic surgery (TORS), minimally invasive skull base surgery, minimally invasive thyroid and parathyroid surgery, and a program for personalized therapy. Housing the largest TORS program in the country, the Department of Otolaryngology formulated the Mount Sinai Robotics Institute with other Departments in 2016 to cross-promote and utilize clinical, educational, and training resources. Additionally, the Head and Neck Institute continued to offer a broad spectrum of innovative trials for patients with human papilloma virus (HPV)-related oropharyngeal cancers and advanced thyroid cancer, and the research team furthered efforts to study complications and implement techniques and protocols to reduce them.

Case Distribution



Complications Related to Robotic Surgery

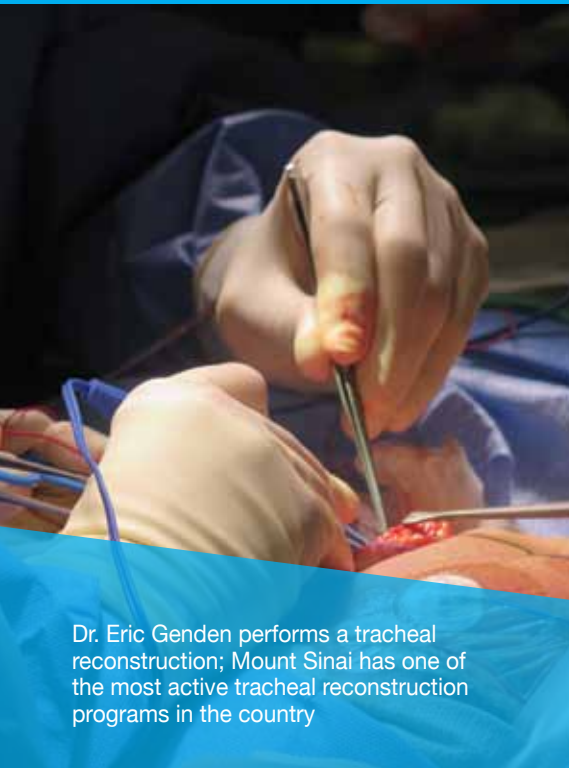


Dr. Marita Teng and resident Nazir Khan perform a neck dissection



Dr. Brett Miles focuses on removing a malignant oral lesion via minimally invasive robotic surgery

Head and Neck Institute: Clinical Trials and Research

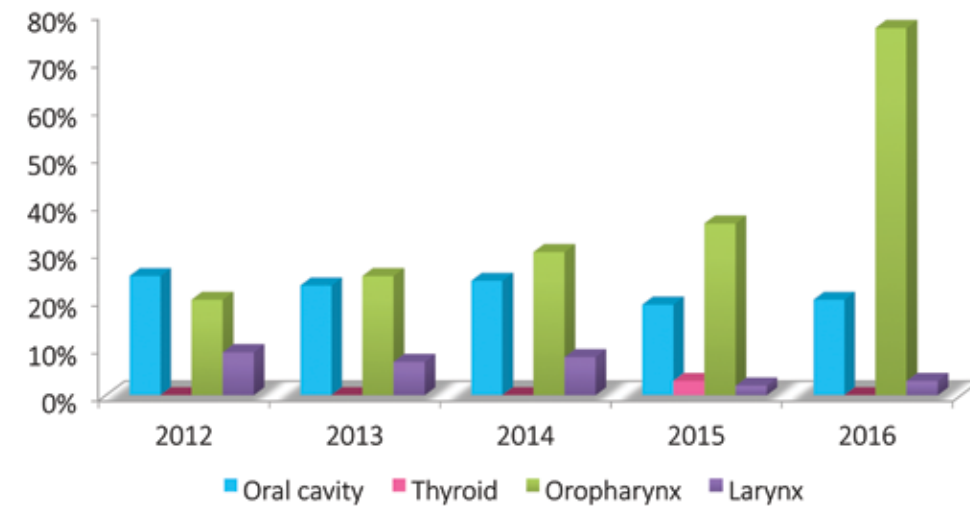


Dr. Eric Genden performs a tracheal reconstruction; Mount Sinai has one of the most active tracheal reconstruction programs in the country

Head and Neck Oncology Clinical Trials Program

The Division of Head and Neck Oncology at the Mount Sinai Health System continues to provide therapeutic clinical trials, which are critically important to patient care and part of the care package offered at NCI-accredited cancer centers, such as the Tisch Cancer Institute. The Division of Head and Neck Oncology offers a robust portfolio of clinical trials and prospective studies to our patients afflicted with head and neck cancer. These innovative trials include technologies such as novel targeted agents, minimally invasive surgical trials, innovative vaccine therapies, and personalized medicine options in conjunction with the Department of Medical Oncology, the Department of Radiation Oncology, and the Personalized Medicine/Immune Therapy Program as part of a comprehensive approach within the Mount Sinai Health System.

Head and Neck Oncology- Clinical Trial Enrollment



The Prevalence of Extranodal Extension in Metastatic Lymph Nodes Stratified by Size in Papillary Thyroid Cancer

A common presumption in thyroid cancer management is that small-lymph-node metastases do not indicate aggressive disease, and that extranodal extension (ENE) occurs only in metastatic lymph nodes that have reached a critical size. A team of pathologists and researchers, led by Dr. Mark Urken, Chief of the Division of Head and Neck Oncology at Mount Sinai Beth Israel, conducted a first-of-its-kind retrospective study that compared the prevalence of ENE in metastatic nodes with the diameter of the node in order to clarify the relationship between metastatic lymph node diameter and the risk of ENE.

A review of the pathology in 1,126 metastatic lymph nodes from 171 thyroid cancer patients who had been operated on at Mount Sinai Beth Israel from 2004 to 2015 was conducted. One hundred seventy three (15.4%) of the 1,126 lymph nodes demonstrated ENE. Lymph nodes manifesting ENE ranged from 1.5 to 44.0 mm in size. Increased lymph node size had a statistically significant association with ENE status. However, the results showed that a significant percentage of even small metastatic lymph nodes exhibited ENE. This study has prompted a reevaluation of protocols at the Department, and plans are underway for future studies to further elucidate the prognostic significance of small non-metastatic lymph nodes with respect to the development of ENE in patients with thyroid cancer.

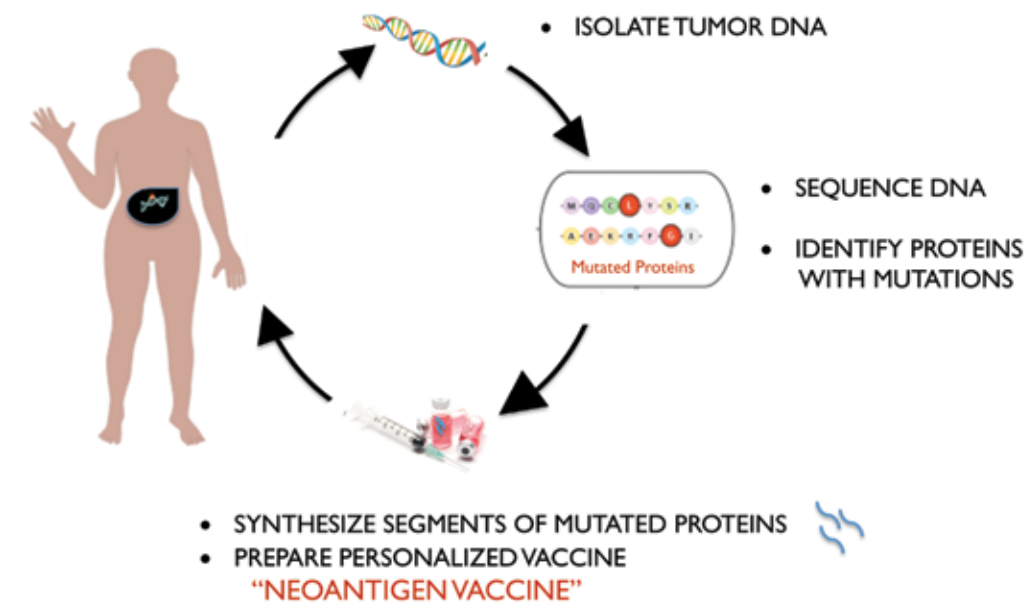
"Dr. Urken is the best," remarks patient Steve, who underwent a thyroidectomy

Head and Neck Institute: Personalized Genomic Vaccine Research

Personalized Genomic Vaccines

When tumor cells appear in the bloodstream of a cancer patient, the immune system is mobilized to attack and kill them through the action of white cells called killer T cells. Despite the initial immune response, tumors become highly adept at escaping the immune system. Fortunately, new immune-based therapeutics, in particular, checkpoint inhibitors, demonstrate clinical efficacy in several solid malignancies, including head and neck cancer by expansion of killer T cells that recognize neoantigens in tumor cells and target these cells. These agents are available as part of the Tisch Cancer Institute's Solid Tumor Program at the Icahn School of Medicine at Mount Sinai.

Unfortunately, not all patients respond to checkpoint inhibitors, and therefore novel strategies are being explored at Mount Sinai to combat this problem. As part of the Personalized Medicine Program at the Tisch Cancer Institute, we are currently implementing a Phase I proof-of-concept study, which is a fully personalized multi-peptide therapeutic vaccine, which is designed to target tumor-derived neoantigens for individual patients. The investigational vaccine is based on the Personalized Genomic Vaccine (PGV) platform, which utilizes tumor sequencing technologies to identify tumor-specific neoantigens for specific patients. The goal of this therapy is to induce a robust anti-tumor immune response and minimize the risk of non-specific immune activity. If effective, this would represent a significant contribution to the fields of tumor immunology and medical oncology. The first patient enrolled in this trial had head and neck cancer and should this trial prove successful, it will demonstrate the utility of the PGV therapeutic vaccine design platform, and pave the way for further cancer type-specific trials to demonstrate therapeutic efficacy. This is one of the many cutting edge technologies available throughout the Mount Sinai Health System and Tisch Cancer Institute.



Dr. Nina Bhardwaj, Principal Investigator, who focuses on combining dendritic cell biology with innovative translational and clinical approaches, such as the multi-peptide therapeutic vaccine for head and neck cancers



Dr. Edward Shin performs an open thyroidectomy at New York Eye and Ear Infirmary of Mount Sinai

Head and Neck Institute: Research



Resident Ming Gray volunteered to distribute Head and Neck Cancer Alliance educational material at a Mets Game; Mount Sinai is the New York Chapter for the organization

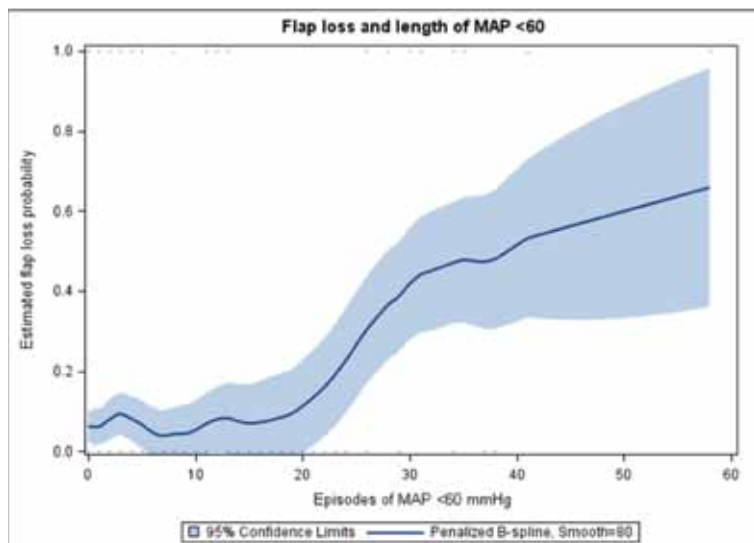


Dr. Brett Miles performing a fibular free flap reconstruction of the mandible

Reducing Complications in Free Flap Surgery with Improved Intraoperative Blood Pressure Monitoring

In 2016 Dr. Brett Miles, Division of Head and Neck Oncology, partnered with Dr. Samuel DeMaria, Department of Anesthesiology, to examine the effects of intraoperative blood pressure variability during complex head and neck surgery. Variations in blood pressure during surgery can affect the way tissues are perfused and maintaining appropriate blood pressure sustains perfusion of organs and reconstructed tissues without risking excessive bleeding during surgery. In an analysis of more than 250 patients who underwent major head and neck surgery at The Mount Sinai Hospital, data indicated that significant time during surgery spent with the mean blood pressure below 60mm/Hg was associated with major complications and graft loss related to the reconstruction.

This is the first study of its kind, and the data has prompted the development of a collaboration between the Department of Otolaryngology and the Department of Anesthesiology, which is examining novel strategies to maintain blood pressure in the optimal range in this population to improve surgical outcomes.



Unpublished data, pending submission. Courtesy Hung Mo Lin, MPH Department of Biostatistics Mount Sinai

Isolated BMI Elevation Does Not Affect Outcomes in Major Head and Neck Surgery

As part of the Head and Neck Institute outcomes initiative to improve quality in major head and neck surgery, an evaluation of the effect of elevated BMI in major head and neck surgery was performed on >400 patients who underwent major surgery at The Mount Sinai Hospital. The analysis revealed that increased surgical complications did not occur with elevated BMI in major head and neck surgery, unless the elevated BMI was associated with diabetes, which resulted in approximately a >2.5X risk of surgical complications.

This data has been accepted for publication in the Journal of the American Medical Association – Otolaryngology Head and Neck Surgery and will be published in 2017. This effort follows the Inpatient Hospitalist Program collaboration between the Departments of Otolaryngology and Internal Medicine, which aims to provide comprehensive medical assessment and care for patients undergoing major head and neck surgery.

Head and Neck Institute: Tumor Cell Dormancy Research

How Primary Tumor Cells are Preset for Dormancy and Evade Chemo Post Metastasis

Mount Sinai researchers have discovered the conditions by which specific signals in primary tumors of the head and neck pre-program cancer cells to become dormant and evade chemotherapy after spreading. Their findings, published in the January 31, 2017 issue of *Nature Cell Biology*, could lead to new drug development and treatment options for patients with metastatic head and neck squamous cell carcinoma (HNSCC).

Hypoxia is a microenvironmental hallmark of solid tumors that induces stress responses, quiescence programs, and chemo and radio-resistance. Until now it has been unclear how hypoxic HNSCC influences the fate of disseminated tumor cells (DTCs) in target organs and how this is related to patient outcome. This study reveals that primary tumor hypoxic microenvironments give rise to a sub-population of dormant DTCs that evade therapy and may be the source of disease relapse and poor prognosis.

“This research highlights the signals in the primary tumor that instruct disseminated cancer cells to become dormant,” remarks Head and Neck Cancer Research Program Director Julio A. Aguirre-Ghiso, PhD, Professor of Medicine, Hematology and Medical Oncology, The Tisch Cancer Institute Icahn School of Medicine at Mount Sinai. **“Dormant cells must be targeted to address the whole spectrum of the disease. We hope this research may lead to the use of dormancy markers in primary tumors to assess the prevalence of disseminated cancer cells in secondary organs, and, thus, tailor treatments to eliminate these dormant and therapy-evading cancer cells.”**

Aguirre-Ghiso and a team of investigators from Albert Einstein College of Medicine, SUNY Polytechnic Institute and University of Wisconsin-Madison developed a device using a nanotechnology tool, biosensors, and advanced imaging technology to manipulate primary tumor microenvironments. They created controlled hypoxic and non-hypoxic niches in tumors by implanting the devices loaded with drugs that induced hypoxia. These ‘fine-tuned’ microenvironments in live tumors allowed the researchers to isolate the cancer cells to determine how they behaved when they moved from the primary tumor to the lungs. The investigators tracked the DTCs with genetically encoded biosensors to see which cells were exposed to low oxygen, which cells were dormant, and how they reacted to therapy.

This multipronged approach allowed linking primary tumor microenvironments to fate of DTCs in a way that was never before attempted and at single cell resolution, allowing definitive tests of mechanism. The investigators discovered DTCs from hypoxic regions were still able to metastasize and were more likely to enter dormancy, as opposed to cells from high oxygen levels in primary tumors. The researchers thus found that hypoxic regions of the tumor could not only spread rapidly, but also send a large amount of cells into a dormant mode, hence, creating cells that were more efficient at evading chemotherapy. This discovery of chemotherapy resistant behavior of cancer cells in distant organs suggests that a marker test might be able to predict which patients may be prone to carry more dormant drug resistant cancer cells.

“Recurrence of cancer after initial treatment remains a critical unsolved problem for too many patients,” said William Oh, MD, Chief, Division of Hematology and Medical Oncology, and Professor of Clinical Cancer Therapeutics at The Tisch Cancer Institute, Icahn School of Medicine at Mount Sinai. **“This highly innovative research provides a novel path forward for targeting dormant cancer cells that may be ‘hiding’ from our available therapies and which may need additional drugs to root them out and improve cure rates.”**



Director of the Head and Neck Cancer Research Program Dr. Julio Aguirre-Ghiso is one of world’s leading investigators of tumor cell dormancy research

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.”

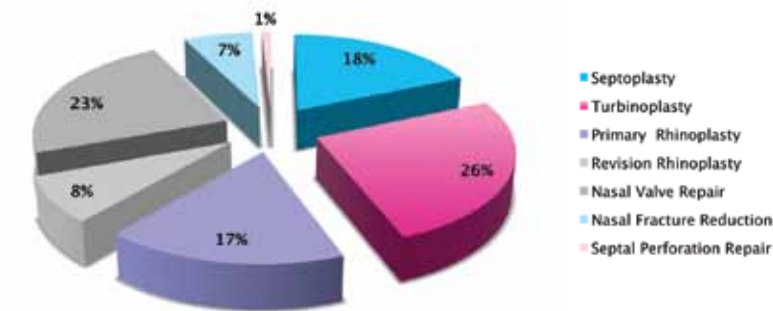
Dr. Joshua Rosenberg
Co-Chief of the Division of Facial Plastic and Reconstructive Surgery
The Mount Sinai Hospital

The Division of Facial Plastic and Reconstructive Surgery

offers the full range of reconstructive and cosmetic surgery

In 2016, the Division of Facial Plastic and Reconstructive Surgery harnessed its expertise in the areas of facial nerve paralysis, microtia, cleft lip/palate repair, skin cancer reconstruction, and complex free flap reconstruction post head and neck cancer surgery, as well as cosmetic facial surgery. Mount Sinai’s pioneering embracement of the cranial nerve 5 to 7 transfer approach for those suffering from Bell’s palsy drew patients from around the globe and started a national conversation as to how we can improve outcomes and ameliorate the disfiguring effects of long-term loss of smile movement. Additionally, our microtia volume in 2016 propelled us into the top tier of congenital ear anomaly surgical volume internationally. We also saw the breadth of our nasal surgeries broaden and an overall increase in cosmetic procedures.

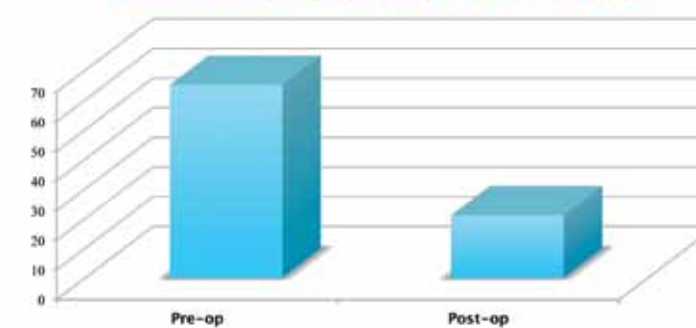
Nasal Surgery Performed in 2016



Improved Outcomes after Nasal Surgery

Rhinoplasty continues to be one of the most common plastic surgeries performed in the United States. Mount Sinai’s Division of Facial Plastic and Reconstructive Surgery performed a high volume of nasal surgeries in 2016 for both aesthetic and functional purposes.

Functional Outcomes after Septorhinoplasty



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. Scores can stratify the degree of patients’ nasal obstruction, ranging from normal breathing (NOSE < 25) to extreme nasal obstruction (NOSE > 75). Our patients’ average NOSE score was 65.0 on presentation and 20.8 at 3 months after surgery (Figure 1a). All patients showed improvement in NOSE scores, and the mean surgical improvement was 45.47.



Facial Plastic and Reconstructive Surgeon Dr. Matthew Hirsch reviews pre-surgical imaging with a patient



Dr. Joseph Rousso performs microtia surgery on a young patient

The Division of Facial Plastic and Reconstructive Surgery



Rehabilitation of Facial Nerve Paralysis

Mount Sinai's Facial Nerve Paralysis Program utilizes a multidisciplinary approach in order to facilitate all aspects of care in one setting and the best possible outcome for each patient. We understand that facial nerve paralysis can result in severe facial disfigurement with potentially devastating social, psychological, and functional problems for affected patients, which is why we are so passionate about forging new treatments for it.

Facial Reanimation Surgery Volume



Below are before and after photos of a patient whose facial nerve was sacrificed due to a parotid gland malignancy. She is shown here one year after nerve grafting, a tensor fascia lata sling and static eyelid surgery. Subsequent treatments have included BOTOX and dermal filler injections to improve facial balance.



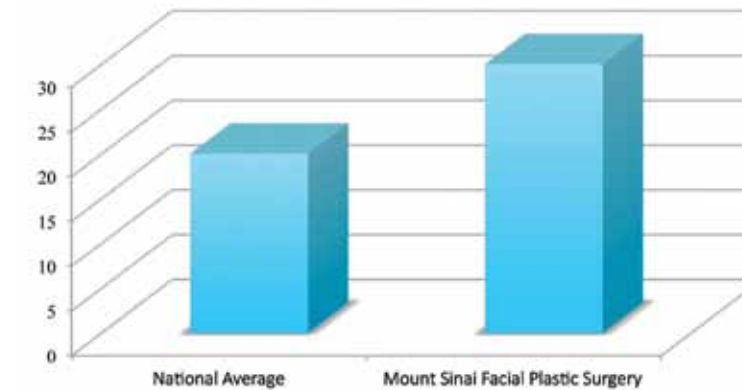
The Leon and Norma Hess Center for Science and Medicine houses 180,000 square feet of laboratory space

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. International trends and reports show that only 15% of ear reconstructive surgeons perform greater than 20 microtia repairs in a year. The Division of Facial Plastic and Reconstructive Surgery performed more than 30 of these procedures in 2016, placing us in the top tier of congenital ear anomaly surgical volume internationally.

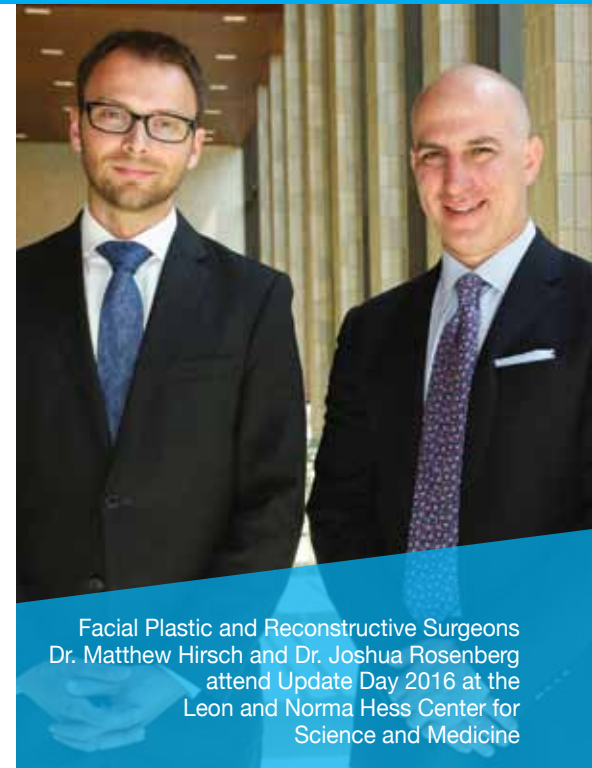
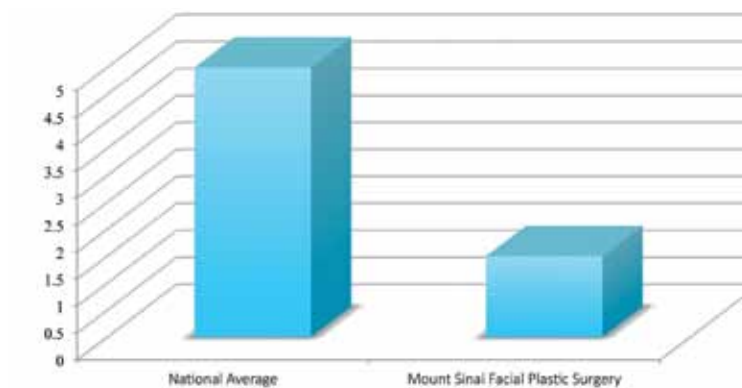
Average Number of Microtia Surgeries Performed Annually by Center



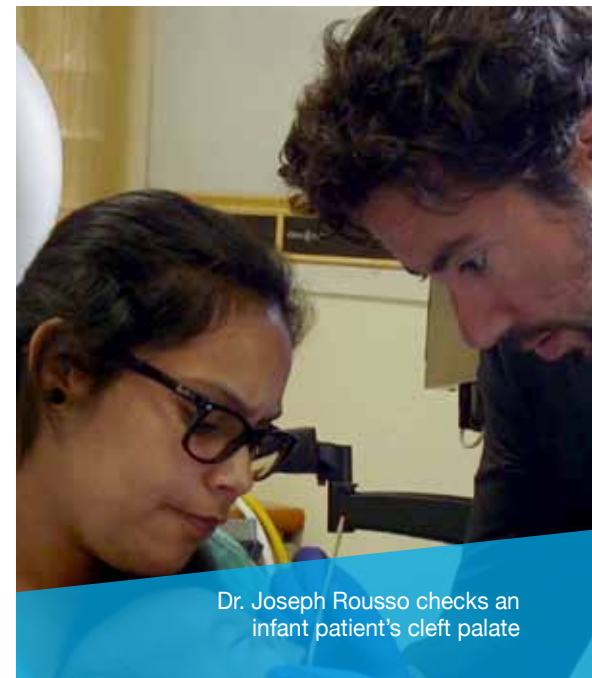
Shortened Hospital Admission after Microtia Repair

In 2016, the Division's average length of inpatient hospital stay after Stage 1 microtia repair was 35 hours. This was less than our averages in the prior two years and significantly less than the 3-7 day average post-operative inpatient hospital days to which most reconstructive ear surgeons adhere.

Length of Hospital Stay After Stage 1 Microtia Repair



Facial Plastic and Reconstructive Surgeons Dr. Matthew Hirsch and Dr. Joshua Rosenberg attend Update Day 2016 at the Leon and Norma Hess Center for Science and Medicine



Dr. Joseph Rousso checks an infant patient's cleft palate

The Division of Laryngology

“At the Grabscheid Voice and Swallowing Center we provide interdisciplinary care with laryngologists and speech-language pathologists. This practice improves communication, patient outcomes and satisfaction.”

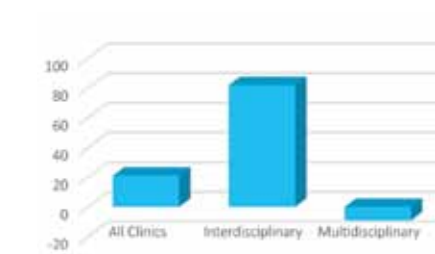
Dr. Mark S. Courey
 Chief of the Division of Laryngology
 Director of the Grabscheid Voice and Swallowing Center
 Mount Sinai Health System



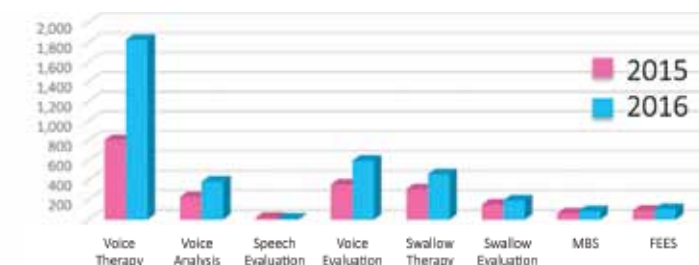
The Division of Laryngology is building on the interdisciplinary team approach to improve the patient experience and outcomes

Mark S. Courey, MD joined the Mount Sinai Department of Otolaryngology-Head and Neck Surgery as Chief of the Division of Laryngology in January 2016. Dr. Courey's early initiatives were to expand the Grabscheid Voice and Swallowing Center throughout the entire Mount Sinai Health System with practices in downtown, midtown and the Upper East Side of Manhattan, and to institute interdisciplinary voice and swallowing clinics with speech-language pathologists (SLP) and laryngologists. This resulted in a 21% increase in SLP clinic volume throughout the entire system. In locations where interdisciplinary clinics were fully instituted, SLP clinic volume increased by 82%. This also resulted in improved patient satisfaction and significant increases in patient compliance with SLP recommendations.

2016 Percent Change in SLP Clinic Visits



Interdisciplinary SLP Clinic Volume per Visit Type



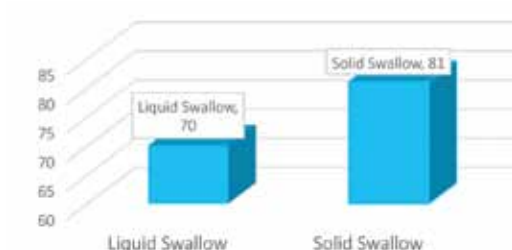
Dr. Courey has separated laryngology clinics into voice problems and swallowing problems. This allows SLP colleagues the opportunity to subspecialize into their area of clinical interest of vocology, dysphagia management, and/or head and neck cancer care. Patients with similar problems are evaluated in the same clinic and can provide support for each other.

Clinical Evaluation of Swallowing

In specialized dysphagia clinics, patients are often referred for evaluation of potential aspiration. The clinical evaluation of swallowing is only 50% accurate in identifying a safe swallow; therefore, patients at risk for aspiration usually require one visit for evaluation and a second visit for an objective test of swallow function.

Recognizing this additional time and costs, Dr. Courey sought to develop an accurate pass-fail screening test for patients with dysphagia and potential aspiration. The test, termed “Static Endoscopic Examination of Swallowing (SEES), is simple and can be performed during any indirect pharyngeal examination. Along with his colleagues at UCSF Medical Center, Dr. Courey established the validity and reliability of the test through comparison of SEES findings with Modified Barium Swallow findings.

Percentage of Agreement in Identification of Residue, Penetration or Aspiration Between SEES and MBS



SEES is an expedient, repeatable, and clinically relevant procedure that facilitates the accurate assessment of patients at risk for aspiration. SEES can be easily incorporated into a clinician's practice.



Speech Language Pathologist Leanne Goldberg examines a patient with muscle dysphonia



Dr. Matthew Mori, who joined Mount Sinai in October 2016, examines a patient's vocal fold

The Division of Oral and Maxillofacial Surgery

“We are continuing to routinely use and refine virtual surgical planning techniques and 3-D printing for complex oral and maxillofacial surgery. We are also actively measuring pre and postoperative outcomes using these technologies in an effort to deliver the best possible outcomes for our patients.”

Dr. Daniel Buchbinder
Chief, Division of Oral and Maxillofacial Surgery
Mount Sinai Health System

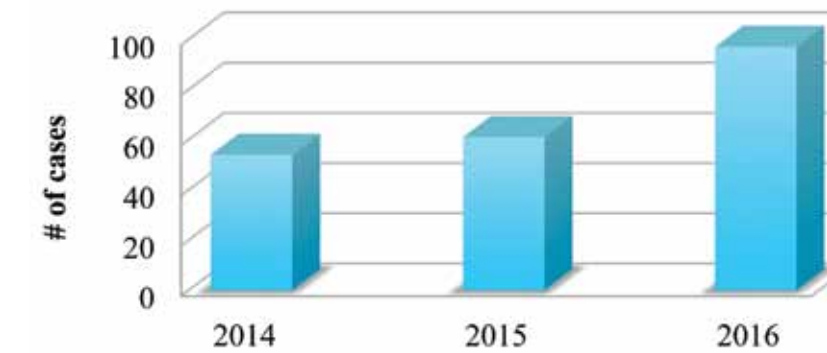


Our team utilizes cutting edge techniques

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 surgical planning (VSP) techniques and CAD-CAM based cutting guides, as well as 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 an excellent tool to utilize when planning an orthognathic surgical procedure. An extensive initial workup is first performed on the patient; this includes facial photographs, 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 appropriate treatment plan for the patient.



Dr. Fred Lin and Dr. Vincent Carrao perform a combination sinus and oral fistula case

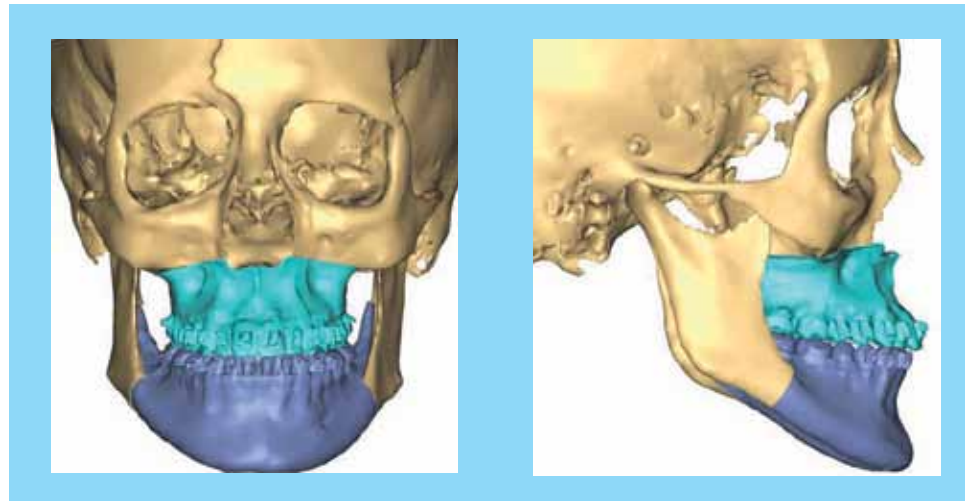


Dr. Devin Okay assesses a patient's oral rehabilitation after a reconstructive procedure

The Division of Oral and Maxillofacial Surgery



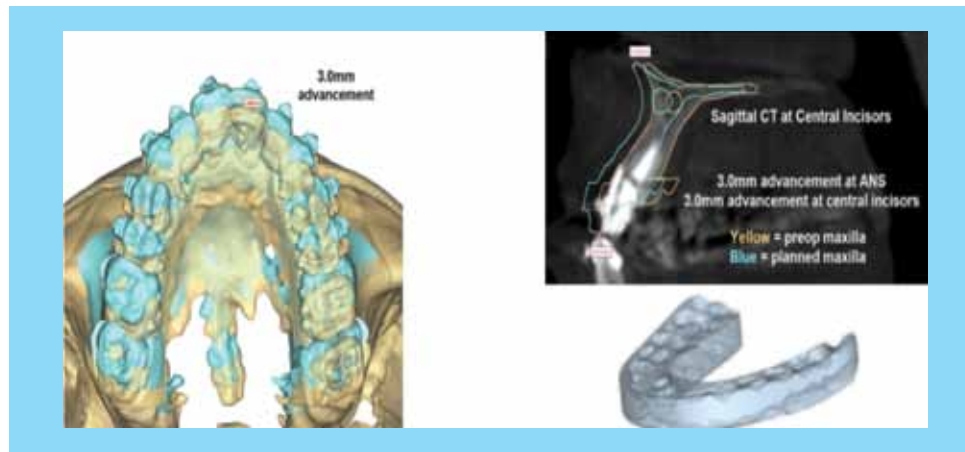
The use of virtual surgical planning (VSP) for oral and maxillofacial surgery is becoming a routine part of our treatment planning process. At the Mount Sinai Health System, the oral and maxillofacial surgeons utilize VSP for planning the vast majority of congenital deformity correction cases.



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 virtual surgical software. Once downloaded, 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, a surgical splint is fabricated via a 3D printer. The splint is used to help reproduce the movements desired during the surgical procedure in the operating room.



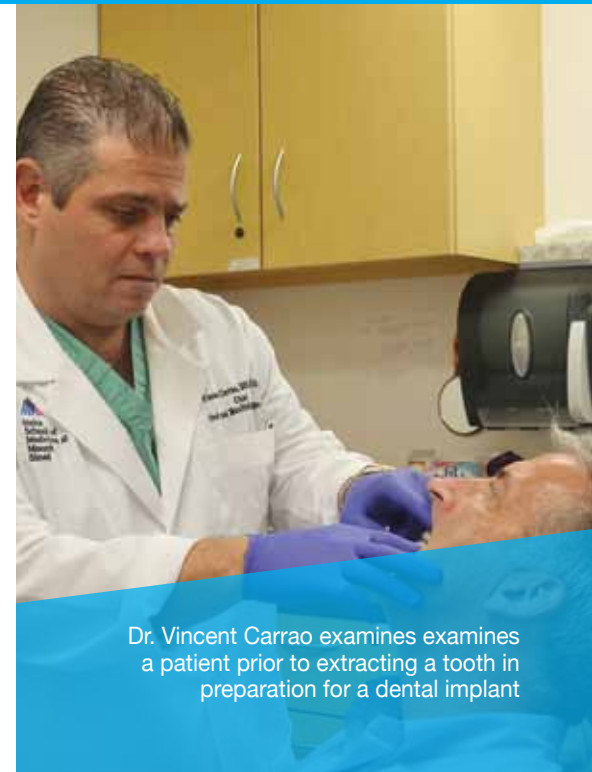
VSP: CAD-CAM generated surgical guide to aid in the accurate intra-operative repositioning of the maxilla

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

The Division of Oral and Maxillofacial Surgery

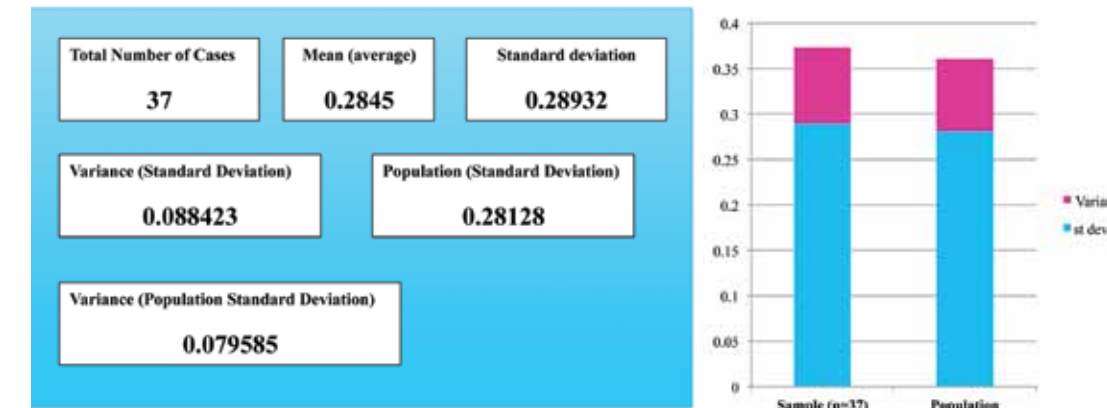
The clinical results achieved both in the OR and post operatively have been outstanding. In 2016, we challenged the VSP system and our clinical abilities by putting our post-operative results to a test. We decided to compare the amount of actual maxillary anterior movement achieved in the OR to the predicted VSP measurement derived preoperatively. All of the movements in orthognathic surgery are three dimensional movements, which make complete accuracy of post-operative bone movements somewhat difficult to do. With that in mind, we analyzed 37 orthognathic cases performed in the last 12 months where a maxillary anterior advancement was planned and performed. The goal was to determine if the advancement was equal to the prediction by a simple linear measurement.

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. Once the maxillary AP distance was measured, it was then compared to the VSP prediction.



Dr. Vincent Carrao examines a patient prior to extracting a tooth in preparation for a dental implant

Data Analysis of Maxillary Movement with VSP



The results of this analysis revealed an impressive level of accuracy, which landed a standard deviation for all of the procedures at 0.28mm from the predicted value, confirming the precision of this method of surgical planning.



Oral and Maxillofacial Surgeons Dr. Daniel Buchbinder and Dr. Mark Turner

The Division of Otology and Neurotology

“Hearing loss can lead to social isolation and even depression. At Mount Sinai, we are committed to the multidisciplinary approach to treating hearing loss - medication, surgery and hearing devices, including Cochlear implants and implantable hearing aids.”

Dr. Eric Smouha

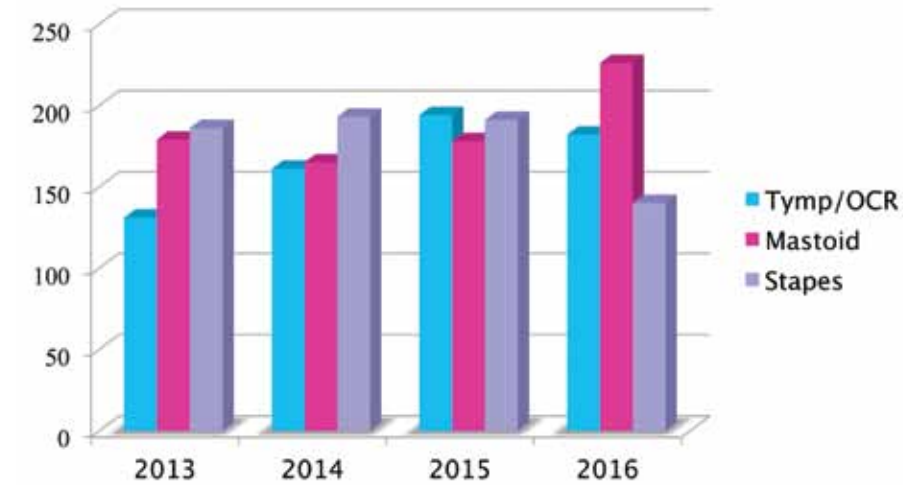
Director of Neuro-Otology and the Center for Hearing and Balance at The Mount Sinai Hospital

The Division of Otology and Neurotology

has a unique and dedicated team of highly specialized individuals

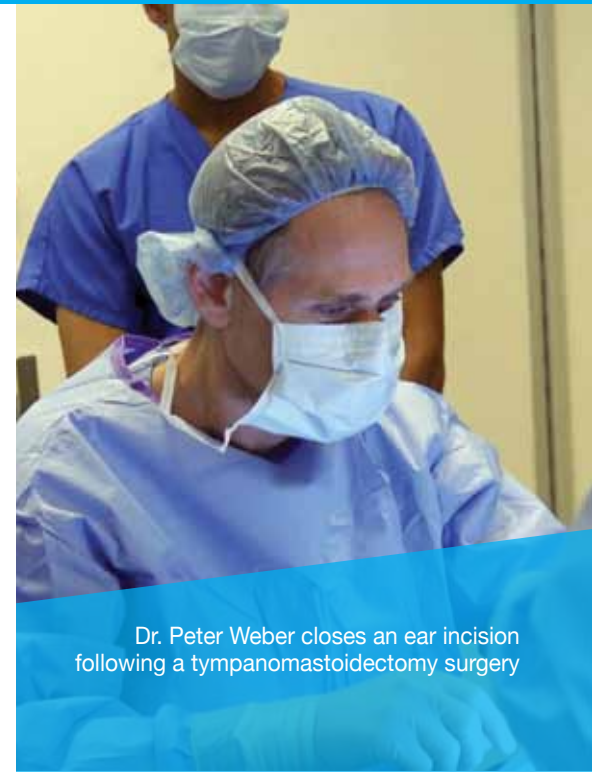
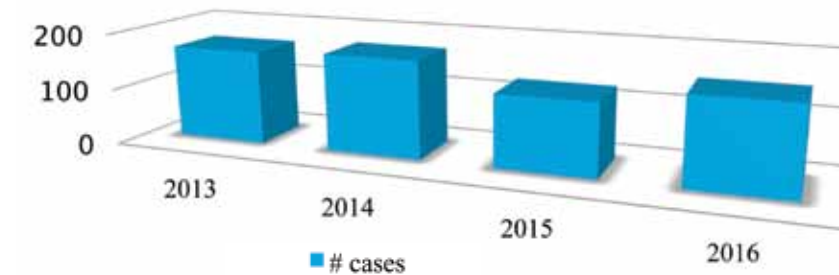
With ongoing integration of otologic, neurotologic and skull base expertise across the Mount Sinai Health System, the Division is poised to begin an exciting period of growth in the coming year. As the most comprehensive site for otologic care in the region, the Ear Institute at New York Eye and Ear Infirmary of Mount Sinai has a unique and dedicated team of highly specialized individuals working closely to provide comprehensive otologic/neurotologic care across the lifespan. Newly headed by George Wanna, MD, this unique team includes experts in otology/neurotology, skull base surgery, pediatric and cochlear implant audiology, speech language pathology and auditory verbal therapy, social work, education of the hearing impaired, and early intervention.

Surgical Case Volume for Common Otologic Procedures: Tympanoplasty, Mastoidectomy, and Stapedectomy



Surgical case volume for cochlear implantation has remained steady and is expected to increase in the coming year. Headed by Dr. Wanna and Dr. Cosetti, research and clinical offerings aimed at expanding candidacy groups, novel drug and device trials, Hybrid CI and electroacoustic stimulation, single sided deafness and others will position the Ear Institute as a regional and national leader in implantable hearing devices. Close partnership with the Department of Neurosurgery will allow expansion of an already robust Skull Base Surgery Center at Mount Sinai and increase the volume and breadth of services within the Division.

Surgical Case Volume for Cochlear Implant



Dr. Peter Weber closes an ear incision following a tympanomastoidectomy surgery



Dr. Maura Cosetti assesses a patient's hearing during a routine exam

The Division of Otology and Neurotology



Cochlear Implants: Employing Intraoperative Technology to Avoid Complications

In 2016, the Division of Otology and Neurotology performed 153 cochlear implants with no post-operative complications. Data suggests that use of intraoperative monitoring, specifically imaging confirmation of intracochlear electrode position, can reduce rates of revision surgery by allowing immediate repositioning of the electrode.

At our center, our intraoperative imaging algorithm identified two electrode malpositions: tip-rollovers. Both were successfully replaced and optimal position was confirmed prior to awakening from anesthesia, avoiding revision surgery.

As a center with access to the newest device technology, a systematic approach to complication avoidance, such as intraoperative imaging, plays an important role in patient outcomes.

Cochlear Implant Complications from 2016

Complication	Number
Vertigo (including immediate nystagmus or long-term dysequilibrium)	0
Facial Paralysis	0
Wound infections	0
Significant pain	0
Tympanic membrane perforation	0
Significant bleeding	0
Significant tinnitus	0
Non-user	0
Tip Fold-over *	2
* Both recognized and corrected in OR	
Patients with pain >2 yrs out from CI	2
both resolved with occipital nerve injections	

New York Eye and Ear Infirmary of Mount Sinai, conveniently located on 14th Street in Manhattan, is home to the Ear Institute

The Division of Otology and Neurotology

Malignant External Otitis: The Shifting Treatment Paradigm

Based on our recent clinical experience and literature review of malignant external otitis (MEO), we may be returning to an era of multi-drug and long-term parenteral antibiotic therapy. This study was based on tertiary referrals from other physicians who failed outpatient treatment. We have recognized that long-term antibiotic therapy can lead to stable outcomes for these patients.

Monotherapy with oral quinolones is no longer adequate for certain cases of MEO due to *Pseudomonas aeruginosa*, even for isolates that are initially sensitive to ciprofloxacin.

The combination of more aggressive bacterial strains with increasing antibiotic resistance and worsening host factors has led to treatment failures with conventional drugs.

ESRD, immunosuppression, and the development of bacterial resistance to antibiotics portend a poor prognosis.

A minority of patients will suffer a progressive course despite culture-directed antibiotic therapy, and some patients will even succumb to the "malignant" nature of the disease.

Clinical Research: Malignant External Otitis

N=12

Demographics	N(%)
Mean age +- SD (years)	70.1+/- 9.6
Male	11 (75%)
Diabetes Mellitus	9 (92%)
ESRD on hemodialysis	4 (33%)

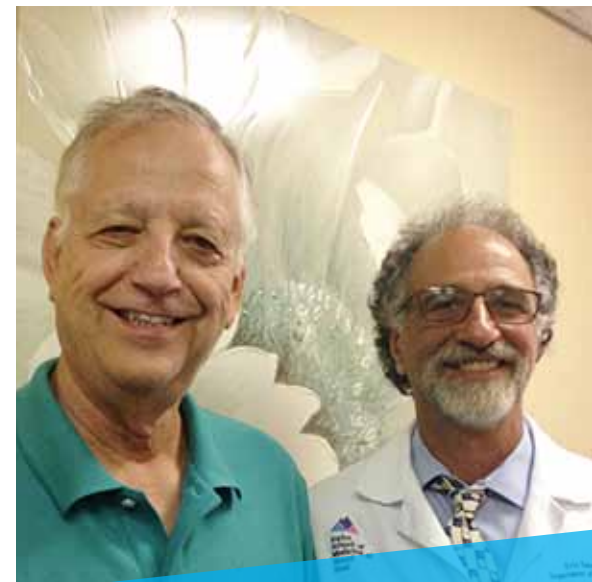
Microbiology



OUTCOMES	N (%)
Cured	4(25%)
Developed drug resistance during therapy	6 (50%)
Cranial nerve deficits	7 (58.3%)
Abscess formation	3 (25%)
Contralateral spread of infection	2(16.7%)



Department Site Chair of NYEE and Division Chief Dr. George Wanna examines a patient with a tympanic membrane perforation



"I am pain free and am hearing very well," says Norman, who underwent cholesteatoma surgery. "Dr. Smouha is an excellent otologist!"

The Division of Pediatric Otolaryngology

“The Pediatric Otolaryngology team is working vigorously to expand the quality of care it delivers to children with complex sleep disorders and congenital ear malformations through early intervention and collective multidisciplinary expertise across the Health System.”

Dr. Joseph Bernstein

Chief of the Division of Pediatric Otolaryngology
Mount Sinai Health System



The Division has introduced DISE to the pediatric population to help with sleep disorders

The Division of Pediatric Otolaryngology at the Mount Sinai Health System worked diligently in 2016 to expand the quality of care it delivers to children with challenging sleep disorders. Tonsillectomy and adenoidectomy (T&A) has been the mainstay of treatment for obstructive sleep apnea (OSA) and sleep disordered breathing (SDB) in children, but some children are incompletely treated by T&A alone and others may require sleep surgery in the context of palate surgery. The Division has also been working to improve awareness and management of congenital external ear malformations. If recognized and treated within the first few days of life, many of these malformations can be managed non-surgically, but time is of the essence.

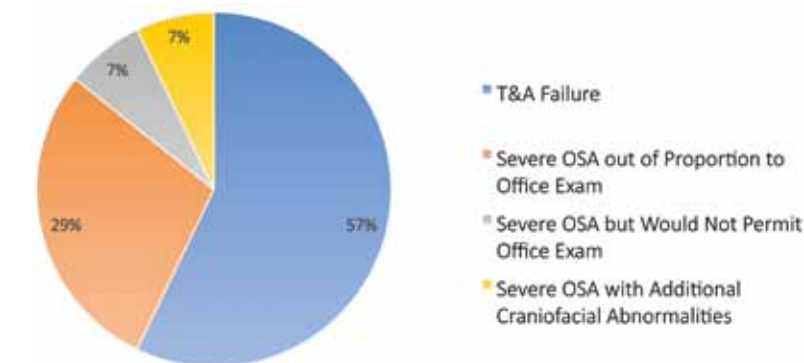
Over the coming year, we plan to work on expanding our outreach to the community to improve the awareness of these conditions and the many treatment options available through the Mount Sinai Pediatric Otolaryngology Division.

Drug Induced Sleep Endoscopy

Pediatric otolaryngologists are becoming increasingly sensitive to those children who are incompletely treated by tonsillectomy and adenoidectomy alone and may require additional procedures to manage the child's OSA. Drug induced sleep endoscopy (DISE) has been employed in the evaluation of adult sleep apnea for many years, and has more recently been introduced into the pediatric population. DISE can help the surgeon tailor a treatment plan for a child and assess the potential success or failure of both surgical and non-surgical management.

Over the past two years, 14 DISEs were performed on children age 19 months to 17 years at Mount Sinai. The most common indication was persistent OSA after tonsillectomy and adenoidectomy, followed by severe OSA. Thirteen children had causes of their obstructive sleep apnea identified via sleep endoscopy. The causes of OSA varied from ongoing tonsil or adenoid obstruction to more subtle causes, such as hypotonia of the tongue base or pharyngeal walls. Four children with micrognathia had been under evaluation for mandibular distraction to address their OSA but three of these four children did not have any evidence of tongue base collapse on DISE and thus an unnecessary surgery was avoided. In all cases, DISE allowed a treatment plan to be customized for each child, thereby improving the quality of care given to each child and allowing the family to make a more informed decision on how to address their child's OSA.

Indications for Drug Induced Sleep Endoscopy (DISE) for 14 Children in 2015-2016



Our team found that the best way to be successful in the management of OSA in these challenging patient populations is to employ DISE to help tailor a treatment plan – be it surgical or non-surgical – and to identify the individual cause(s) of obstruction.



Dr. Alyssa Hackett examines an infant with a tongue tie



Dr. Joseph Bernstein prepares for a tonsillectomy to treat a child's sleep apnea

The Division of Rhinology and Skull Base Surgery

“The Division of Rhinology and Skull Base Surgery continued to perform a high volume of complex inflammatory and neoplastic cases involving the paranasal sinuses and skull base in 2016. Our research team presented at multiple national meetings and participated in clinical trials that have already demonstrated a positive impact on our patients’ quality of life. Our goal is to treat each patient as an individual to optimize outcome - specialty care, one patient at a time.”

Dr. Satish Govindaraj

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

The Division of Rhinology and Skull Base Surgery

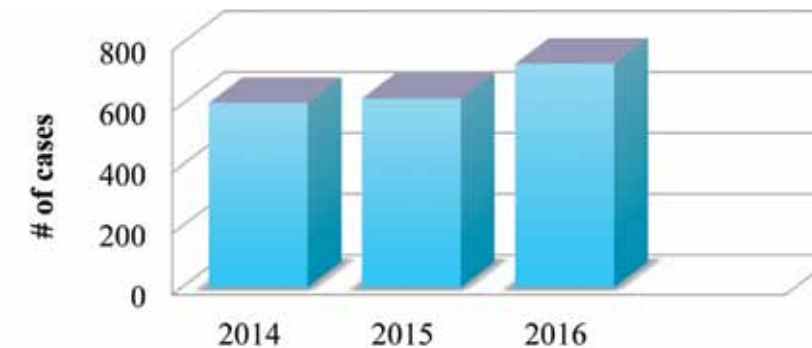
is one of the largest Divisions of its kind in the country

The Division of Rhinology and Skull Base Surgery at the Mount Sinai Health System is composed of five fellowship trained rhinologists and is one of the largest Divisions of its kind in the country. We continue to face the most challenging cases in both inflammatory and neoplastic paranasal sinus disease. Our Division authored more than 15 publications this year and has been an active participant in clinical trials that we hope will impact the future management of our patients.

This year our group, along with the Department of Neurosurgery, performed the first otolaryngology case utilizing Surgical Theater and has embarked on a program utilizing virtual reality technology to help educate our medical students in skull base anatomy. On the clinical side, our Division has created a formal relationship with The Mount Sinai-National Jewish Health Respiratory Institute, so our most challenging patients can benefit from a multidisciplinary approach to their care. We are excited about the future of rhinology in our health system as our group continues to push the boundaries of rhinology and skull base surgery, and deliver the highest possible level of care one patient at a time.

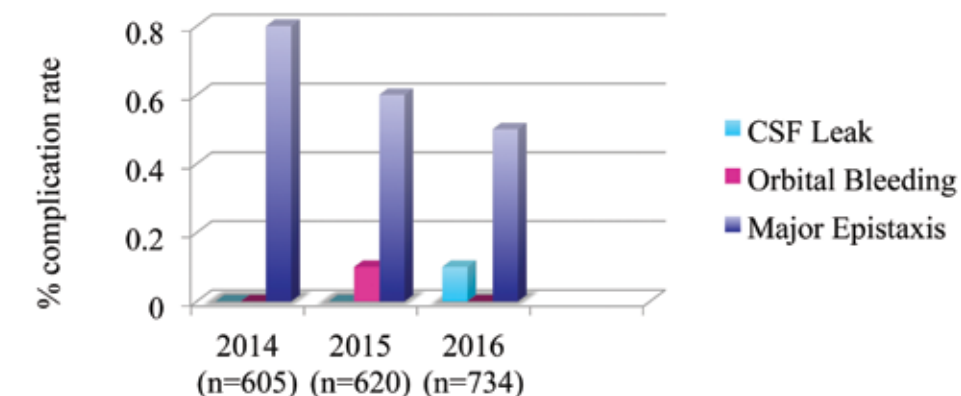
The Division specializes in the comprehensive management of neoplastic and inflammatory conditions that affect the nose and sinuses. One of the most commonly performed procedures is functional endoscopic sinus surgery.

Endoscopic Sinus Surgery Case Volume



Primary and Revision Endoscopic Sinus Surgery – Complications

Our fellowship trained rhinologists 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 one major complication (CSF leak) and a decrease in post-operative major epistaxis rate (defined as requiring post-operative packing placement or surgical control of bleeding).



Dr. Anthony Del Signore assesses Licelet’s healing of her meningioma reconstruction post—operatively. “I am extremely grateful for the care I received from Drs. Del Signore and Hadjipanayis,” she said.



Dr. Madeleine Schaberg of New York Eye and Ear Infirmary of Mount Sinai assesses a patient’s septum

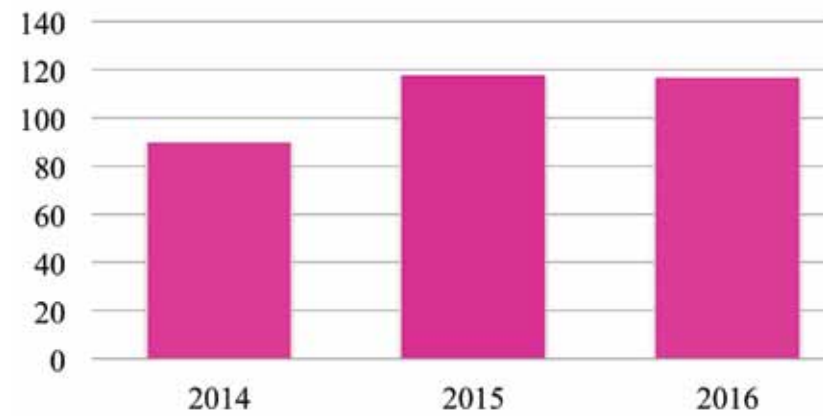
Division of Rhinology and Endoscopic Skull Base Surgery



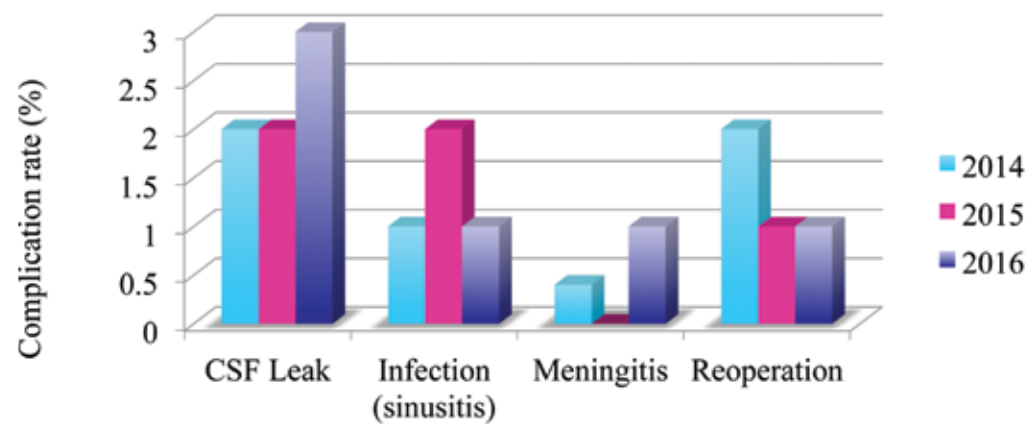
Drs. Constantinos Hadjipanayis and Anthony Del Signore working in tandem to transnasally resect a highly complex and large craniopharyngioma that had a great outcome with no leaks and excellent repair

The Rhinology and Skull Base Surgery team collaborates closely with the Department of Neurosurgery at the Skull Base Surgery Center in the management of skull base pathology. Over the past few years, this multidisciplinary center has garnered a reputation for excellence in endoscopic skull base surgery. 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 of pituitary patients and the effect of socioeconomic factors in this surgical population (*J Neurol Surg Skull Base* 2015 Aug;76(4):323-30).

Endoscopic Skull Base Case Volume



Our complication rate remained below 3% in 2016 and our length of stay for endoscopic cases also remained low. We have noted the primary reason for extended length of stay in these cases has been CSF leaks.



Dr. Iloreta and Dr. Genden (not photographed) removed a trigeminal schwannoma using Surgical Theater, marking the first time it was employed without neurosurgeons in the OR

Technological Advances in Clinical Care, Education and Research

One of the few multidisciplinary centers throughout the world dedicated to the evaluation and treatment of benign and malignant skull base tumors, the Skull Base Surgery Center at the Mount Sinai Health System bridges together experts from Neurosurgery and Head and Neck Surgery who have built a longstanding reputation as leaders in this field. Led by Dr. Joshua Bederson, Chair of the Department of Neurosurgery, and Dr. Eric Genden, Chair of the Department of Otolaryngology – Head and Neck Surgery, our team pioneered reconstructive and microvascular surgical techniques and forged the use of virtual reality (VR). Additionally, the Department of Neurosurgery developed the first-ever Simulation Core Program (<http://icahn.mssm.edu/neurosims>), initiated by Dr. Bederson, that has fostered the growth of advanced navigation, anatomical modeling and 3D software currently being used in the operating room and is featured in this report. This past year saw extraordinary advances in the technology space, further distinguishing the Center in setting new case planning standards, performing operations and medical education with the goal of improving outcomes.

For the past two years, Mount Sinai has been the only health system employing 7T MRI specifically for skull base tumors, thanks to neurosurgeon Dr. Raj Shrivastava's R01 NIH grant for which he is a Co-Investigator, along with TMII Scientist Dr. Priti Balchandani. Both neurosurgeons and head and neck surgeons utilize this powerful MRI to better detect and characterize the true nature of pituitary and skull base tumors. This clinical trial has aided tailoring the individual disease and forecasting the extent of surgery via the added layer of resolution used in 3D modeling, surgical navigation and VR.

The team has also employed the navigation software Surgical Theater since 2014, which has been extremely helpful in educating patients about their specific disease and formulating surgical approach plans. It gives surgeons the ability to simulate precise approaches through a variety of corridors so they may determine the optimal approach for tumor removal, while minimizing the probability of complications. Our team fuses Brainlab iPlan with Surgical Theater to aide in the segmentation of these complex lesions. Essentially, surgeons can 'paint' the areas requiring surgical treatment. Immersive VR hardware, such as Oculus Rift and HTC Vive, is also utilized, as well as advanced medical grade 3D printing, in conjunction with Surgical Theater and iPlan software to create models, enabling the full appreciation of patient-specific anatomy in relation to tumor pathology.

In 2016, the first ever ENDO SNAP case was performed at Mount Sinai by Dr. Anthony Del Signore, Director of Rhinology and Skull Base Surgery at Mount Sinai Beth Israel, and Dr. Joshua Bederson. This facilitates immersive neuro-navigation, which provides real-time, intraoperative awareness of the cranial anatomy. The technology, first used on an extensive supracellar craniopharyngioma, was specifically designed for endoscopic skull base surgery.

“By fusing these modalities and maximizing our utilization of cutting edge technology, we are prepared to deliver the most precise tumor resection and maximum safety for each patient,” notes Dr. Alfred Iloreta, skull base surgeon. “We believe these advances, which maximize accuracy and minimize invasiveness, represent the future of skull base surgery.”

These efforts also led to teaching these technologies to first and second year medical students. A randomized prospective trial with IRB approval was designed to investigate the use of immersive VR in teaching students human anatomy. Results overwhelmingly demonstrated that VR is a promising teaching tool that decreases students' cognitive load and encourages motivation to understand the 3D anatomical relationships of the skull base.



Drs. Del Signore and Dr. Joshua Bederson resect a highly complex pituitary tumor using the Surgical Theater ENDO SNAP – the first application of its kind in the U.S.



Dr. Alfred Iloreta reviews a case prior to surgery using virtual reality

The Division of Sleep Surgery

“In an effort to meet the needs of our patients experiencing difficulties breathing and sleeping, the Division of Sleep Surgery expanded its breadth of services to include Inspire Therapy for those unable to comply with CPAP. Outcomes have been outstanding and our patients are thrilled with their quality of life.”

Dr. Fred Lin

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



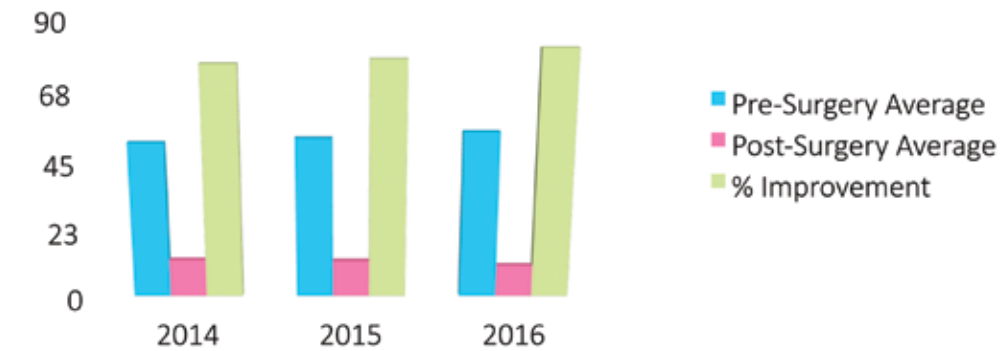
Obstructive sleep apnea

affects more than 18 million Americans; Mount Sinai offers the full range of surgical and nonsurgical treatment options, including mandibular advancement and hypoglossal nerve stimulation

The Division of Sleep Surgery specializes in the comprehensive management of obstructive sleep apnea, including nasal surgery, palate surgery, maxillofacial surgery, and surgery of the tongue to improve airway obstruction. Mount Sinai is also one of the few centers in the New York tri-state area performing the Inspire® therapy hypoglossal nerve stimulator for which we have begun tracking outcomes and associated benefits and risks of the surgery. Surgical volume steadily increased from 63 to 70 to 97 cases per surgeon from 2014 to 2015 and 2016 respectively, demonstrating a significant percentage increase each year.

The Division of Sleep Surgery continued to work closely with the Divisions of Pulmonology, Endocrinology, and Metabolic and Bariatric Surgery in 2016 to offer a multidisciplinary approach to the treatment of sleep apnea and snoring. We also provide a team-based approach within our Department, collaborating closely 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, and our results showed significant gain in improvement of sleep quality and daytime symptoms of night time sleep disturbances post-surgery.

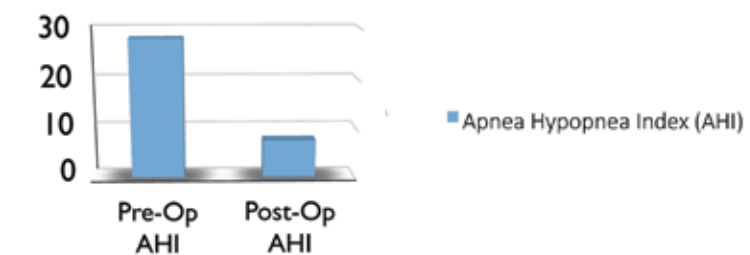
SNORE-25 Quality of Life Improvement



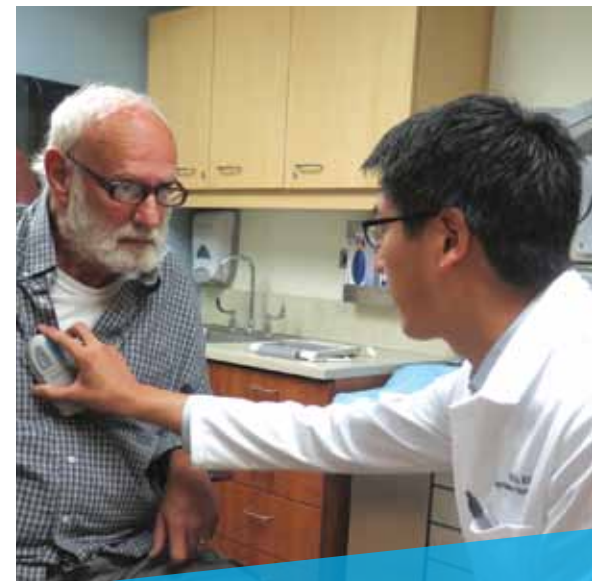
Additionally, in 2016 our sleep surgeons had a less than 1 percent complication rate regardless of OSA severity with no readmissions and no mortalities.

Hypoglossal nerve stimulation, which has proven effective for patients who fail CPAP, is performed at two sites at the Mount Sinai Health System. Nine patients were implanted in 2016 with no complications. Significant improvement was seen in sleep quality, quality of life measures and snoring, and a 72.9% increase was seen in Apnea-Hypopnea Index (AHI). We anticipate this program to expand significantly in the forthcoming year and plan to conduct research studies comparing the efficacy of it versus traditional therapies.

HgN Stimulator Implants



Dr. Boris Chernobilsky, Director of Sleep Surgery at Mount Sinai Beth Israel, performed the first Inspire Therapy implant at the Mount Sinai Health System in 2015



Dr. Lin demonstrates how to use Inspire Therapy to Peter Schectman, who declared, “I’m happy I did the surgery and it’s working well”

Vascular Birthmarks and Malformations Program

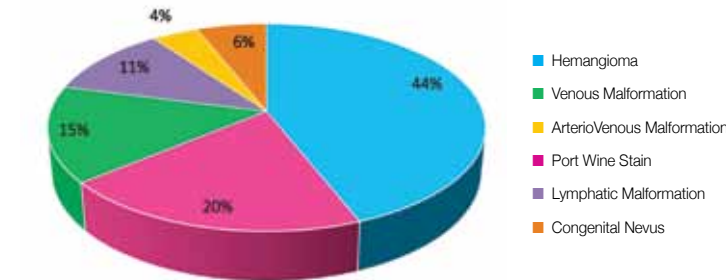
“As part of the Mount Sinai Health System, I am confident that we are at the leading edge of this specialty, and will expand our services even more in the coming years.”

Dr. Gregory Levitin
Director, Vascular Birthmarks and Malformations

Every year, more than 40,000 children in the U.S. are born with a vascular birthmark; at Mount Sinai, our highly skilled physicians are among few across the country specializing in these conditions

After several years of collaboration, the Department of Otolaryngology – Head and Neck Surgery formalized its relationship with Dr. Gregory Levitin in May of 2016, appointing him Director of Vascular Birthmarks and Malformations for the Mount Sinai Health System. Internationally recognized for his expertise in this field, Dr. Levitin has helped pioneer minimally invasive surgical techniques for complex vascular malformations of the head and neck. Offering a range of medical, laser, and surgical therapy, our highly skilled physicians treat all types of vascular anomalies, including hemangiomas, port wine stains, venous malformations, lymphatic malformations, arteriovenous malformations, and also congenital nevi.

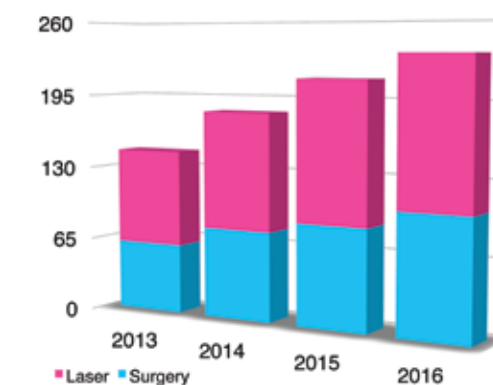
Conditions Treated



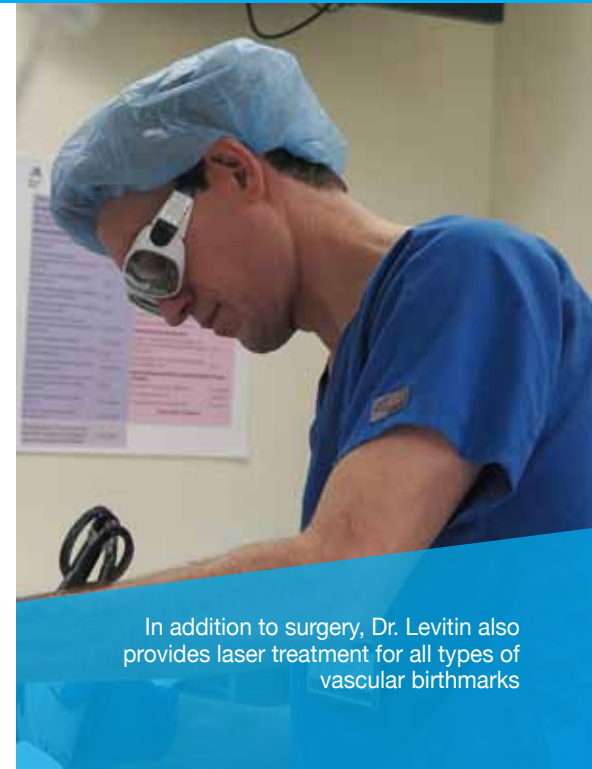
Over the last four years, Dr. Levitin has nearly doubled his case volume in this niche specialty. For vascular anomalies, the most common types of postoperative complications include bleeding, hematoma, infection, and facial nerve injury, particularly with vascular malformation surgery. However, by utilizing intraoperative facial nerve monitoring and hemostatic perioperative techniques, we have experienced less than 1% rate of complications each year despite the dramatic increase in case volume and complexity of disease.

In addition to heading up the surgical team at New York Eye and Ear Infirmary, Dr. Levitin has recently developed a unique approach using laser therapy for treating difficult port wine stains and venous malformations. By focusing on the deeper portions of these malformations first, his team has been able to target the larger, dilated venous channels without relying on further invasive sclerotherapy or even surgery. Early results have shown that patients have achieved better and lasting results with this technique.

Total Procedures



The surgical team plans to broaden interdisciplinary reconstructive services in 2017. This includes tissue targeted surgical debulkings for malformations of the extremities, tissue expanders for giant congenital nevi of the face and body, and orthognathic procedures to correct jaw and craniofacial deformities caused by large vascular anomalies.



In addition to surgery, Dr. Levitin also provides laser treatment for all types of vascular birthmarks



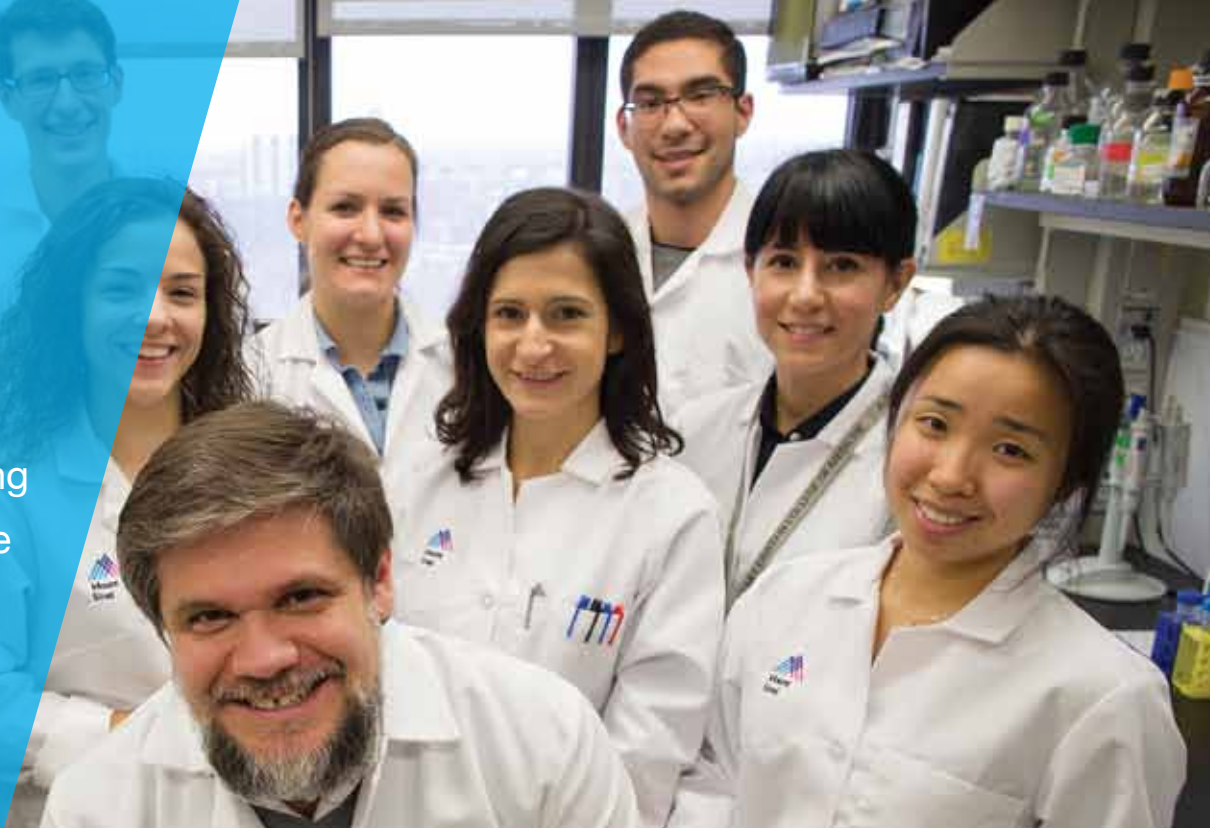
A patient receives additional laser treatment after undergoing a resection of a large venous malformation on the extremity

Research and Clinical Trials

“At the Head and Neck Cancer Research Program, we are studying the microenvironments that induce dormancy of disseminated cancer cells and their chemo and radio-resistance. Our latest achievements bring us closer to the goal of preventing metastasis and local recurrences by eliminating dormant residual cancer cells.”

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.

Functional Outcomes and QOL following Transoral Robotic Surgery (TORS) for Head and Neck Cancer Treatment

Principle Investigator: Ray Chai, MD
This study examines the effects of TORS on swallowing and quality of life in oral and oropharyngeal cancer patients.

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.

The Effects of Early vs. Late Active Jaw Range of Motion Exercise Intervention on Jaw Opening and Quality of Life in Surgically Treated Oral and Oropharyngeal Cancer Patients

Principle Investigator: Cathy Lazarus, PhD
This pilot randomized study examines the effectiveness of early vs. late introduction of jaw opening exercises on jaw function, swallowing, and quality of life after oral and oropharyngeal cancer surgery.

Integrative Therapy to Reduce Head and Neck Cancer Pain During Radiotherapy: A Feasibility Study

Principle Investigator: Ilya Likhterov, MD
This randomized study examines the use of self-hypnosis to reduce pain and improve swallowing and quality of life during radiotherapy in patients treated with primary or adjuvant radiotherapy for head and neck cancer.

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

Principle 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).

The Department of Otolaryngology – Head and Neck Surgery

offers a broad spectrum of clinical trials, and is leading the way with dormant tumor cell research and personalized tumor vaccine therapy

Papillomavirus Role in Oral Cancer Viral Etiology (PROVE)

Principal Investigator: Brett Miles, DDS MD (Sinai) Amber d’Souza, PhD, Carole Fakrey, MD (Hopkins)
This is an epidemiological study evaluating the influence of social history on the development of HPV related oropharyngeal cancer and oral cancer.

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 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.

Effects of Thyroid Transfer to Reduce Hypothyroidism Post-Radiotherapy in Head and Neck Cancer Patients.

Principle Investigator: Mark Urken, MD
This pilot study examines the feasibility and efficacy of preserving thyroid function by transferring the hemi-thyroid gland outside of the field of radiation in patients undergoing radiotherapy following head and neck cancer surgery.

Sensation Restoration in the Lower Lip Post-Mandibulectomy

Principal Investigator: Mark Urken, MD
The purpose of this prospective study is to determine the extent of sensory recovery in patients who undergo oromandibular reconstruction with an osteocutaneous free flap and nerve graft following segmental mandibulectomy. A secondary aim is to determine the quality of life, diet, and performance status of patients who have undergone this reconstructive procedure.

Facial Plastic and Reconstructive Surgery

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

Research and Clinical Trials

Otology and Neurotology

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

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

Rhinology and Skull Base Surgery

Acute Invasive Fungal Sinusitis – Retrospective Review of Cases

Principal Investigator: Alfred Iloreta

This is a retrospective review of acute invasive fungal sinusitis at Mount Sinai and its affiliated hospitals. In particular, the study will investigate the incidence of neurovascular complications from the disease. Several aspects of patient background and hospital course will be assessed.

Enhanced Chronic Rhinosinusitis Patient Education: Randomized Controlled Trial of a Web-Based Platform

Principal Investigator: Alfred Iloreta

Prospective randomized controlled trial investigating a web-based platform for educating patients with CRS about their disease, medical, and surgical treatments. Subjects in the experimental arm will receive texts and email reminders about medication compliance as well as links to educational videos. These videos feature the patient's doctor explaining

features of their care. The control group will receive electronic copies of standard pamphlets with information on chronic rhinosinusitis. Outcomes measured will be SNOT-22 scores, patient satisfaction, patient disease-specific knowledge, and hospital resource utilization.

Incidence of Sphenoid Mucocoeles after Endoscopic Transphenoidal Approach w/ Sphenoid Obliteration
Principal Investigator: Alfred Iloreta

The study reviews postoperative scans in patients who underwent transphenoidal 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.

Immersive Virtual Reality as a Teaching Tool for Neuroanatomy

Principal Investigator: Alfred Iloreta

This randomized controlled trial investigated the effect of a novel, virtual reality model for teaching neuroanatomy to medical students. The experimental group used a virtual reality headset while the control group used traditional studying methods. Post-test scores, mental workload, motivation, and engagement were compared between the two groups.

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.

Morphometric analysis of the pyriform aperture: correlation of aperture size with patient demographics and association of pyriform aperture size with persistent nasal obstruction following endoscopic sinus surgery.

Principal Investigator: Alfred Iloreta

This study was a retrospective review of 447 patients at our institution. The purpose was to examine a correlation between pyriform aperture size and patient demographics (age, sex, race, BMI) as well as a correlation between pyriform aperture size and persistent nasal obstruction following endoscopic sinus surgery. The pyriform aperture was measured using triplanar reformats of pre-operative CT scans.

Preoperative Steroids in Endoscopic Sinus Surgery
Principal Investigator: Alfred Iloreta

This is a prospective study to investigate the effect of preoperative corticosteroids in endoscopic sinus surgery. Various doses of corticosteroids will be administered and the amount of intraoperative bleeding will be measured.

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 Iloreta

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 Iloreta

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.

Spirox Latera™ Implant Treatment of Nasal Lateral Wall in OR and office settings

Principal Investigator: Alfred Iloreta

A multi-center, non-randomized, single arm study to assess the effectiveness of the Spirox implant to alleviate nasal obstruction caused by nasal valve collapse. Outcome data will be gathered from patients who have implants placed in the OR and those who undergo an office procedure for implant placement.

Surgical ExplORer™: a playbook for the operating room

Principal Investigator: Alfred Iloreta

This study will investigate the usefulness of a web-based application designed for use in the operating room. The application has unique portals for the surgeon, the circulator, the scrub tech and anesthesiologist to access and follow the same active surgical case. The capabilities of the application for training and operating room efficiency will be investigated.

The presentation and outcomes of mucosal melanoma in 695 patients.

Principal Investigator: Alfred Iloreta

This was a retrospective study of mucosal melanoma cases in the National Cancer Data Base (NCDB). 695 patients were identified and then analyzed based on treatment modality and overall survival.

Treatment modalities in sinonasal undifferentiated carcinoma: an analysis from the national cancer database.

Principal Investigator: Alfred Iloreta

This was a retrospective study of sinonasal undifferentiated carcinoma (SNUC) cases in the National Cancer Data Base (NCDB). 460 patients were identified and the cases were analyzed for mortality and treatment modality. Analysis was stratified based on tumor stage. Age, gender, race, Charlson-Deyo score, and facility type were also included in the analysis.

Grants and Honors

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.

Grants 2016

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

Co-Investigator:

Cathy Lazarus, PhD, 2015-present

Project Title: Exploring the Relationship between Age-related Pharyngeal Muscle Atrophy and Difficulty Swallowing
Sponsor: NIH/NIA

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:

Brett Miles, MD DDS, 2016-present

Project Title: Papillomavirus role in oral cancer viral etiology (PROVE)
Sponsor: NIH/SPORE

Principal Investigator:

Arjun Parasher, 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)

Honors/Awards 2016

Joseph Bernstein, MD: Cullman Family Award for Excellence in Physician Communication for 2016

William Lawson, MD, DDS: Jacobi Medallion Award 2016 for his contributions to the advancement of medicine.

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"; results presented at the Triologic Meeting in Miami, FL, January 2016

Mike Yao, MD: Cullman Family Award for Excellence in Physician Communication for 2016

George Wanna, MD: Induction into the Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum (CORLAS); Honor Award from the American Academy of Otolaryngology-Head & Neck Surgery (AAO-HNS)





Head and Neck Oncology

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Madeleine Schaberg, MD

Sleep Surgery

Boris Chernobilsky, MD
Fred Lin, MD

Vascular Birthmarks and Malformations

Gregory Levitin, MD



Vice Chair of Mount Sinai Downtown
Dr. Edward Shin explains the sinus anatomy to a patient



Rhinology and Skull Base Surgery team:
Drs. Del Signore, Iloreta and Lawson (back row),
and Drs. Govindaraj and Schaberg (front row)

Clinical Specialists



Jessica Van Manen, MS, CCC-SLP, in a speech session with Maya



Shelly Ozdamar, AuD, programs Juan's cochlear implant

Audiologists

Stella Agrapidis, AuD, CCC-A
 Meghan Brady, AuD, CCC-A
 Sandra Delapenha, MA, CCC-A
 Michele DiStefano, MS, CCC-A
 Jillian Friedman, AuD, CCC-A
 Karla Fernandez, AuD, CCC-A
 Nancy Gilston, AuD, CCC-A
 Lisa Goldin, MPhil, CCC-A
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 Sabrina Mussawar, AuD, CCC-A
 Bess Nagler, AuD, CCC-A
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Vestibular Therapists

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 Jennifer Kelly, DPT
 Santosh Krishnamoorthy, DPT
 Laura Lei-Rivera, DPT
 John Sutera, DPT
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