

St. Peter's Hospital Cancer Care Center Annual Report 2012

HEAD & NECK CANCERS



St Peter's Hospital

Cancer Care Center

ST PETER'S HEALTH PARTNERS

Mission Statement

The mission of St. Peter's Cancer Care Program is to provide quality cancer care.

Guided by the spirit of the Sisters of Mercy, the values that provide direction to the program include:

- Ministry with compassion and caring to the physical, psychological and spiritual needs of cancer patients
- Respect for human life and the dignity of the individual

Dedicated to offering a continuum of services to support the optimal well being of patients and their families, St. Peter's Cancer Care Program is committed to the promotion of:

- The art of caring, balanced with technology
- Continuous improvement and innovation
- Prudent use of resources
- Excellence through collaboration with existing community organizations
- Facilitation of access to care
- Community and professional education



ST PETER'S HEALTH PARTNERS

Dear Colleague,

I am pleased to share with you the St. Peter's Cancer Care Center's Annual Report for 2012 focusing on the diagnosis and treatment of head and neck cancers.

Since 1985, St. Peter's has been continually accredited as a Comprehensive Community Cancer Care Program by the American College of Surgeons Commission on Cancer. In its most recent reaccreditation survey, the Commission commended the St. Peter's Cancer Care Program for its volume of cancer-related quality improvements, its prevention and early detection activities, and the quality of its data submissions and published annual report.

St. Peter's program is fully comprehensive, encompassing state-of-the-art screening and diagnostics, a full range of surgical, medical and radiological oncologic treatment options, and expanded access to clinical trials. The program sponsors a wide range of ongoing cancer conferences for multidisciplinary treatment planning.

Services include a full range of external beam and brachytherapy, as well as the pinpoint precision of Novalis® Shaped Beam stereotactic radiosurgery and radiotherapy. A full-service medical oncology practice offers systemic therapies, genetic counseling and outpatient infusion.

If you would like additional information regarding the services offered at St. Peter's, call our Cancer Information Line (518-525-1547) or visit our website at www.sphcs.org/CancerCareCenter.

Finally, I would like to thank all those involved in making this publication possible.


Sincerely,

A handwritten signature in black ink, appearing to read "Wayne Holmen", with a long horizontal line extending to the right.

Wayne Holmen

DIRECTOR, CANCER CARE SERVICES

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GENETIC COUNSELING

Genetic Counselors and Counseling

Genetic counselors are health professionals with specialized graduate degrees and experience in the areas of medical genetics and counseling. Genetic counselors work as members of a health care team.

Genetic counseling is, “the process of helping people understand and adapt to the medical, psychological and familial implications of genetic contributions to disease. This process combines interpretation of family and medical histories to determine the risk for a disease or recurrence of the disease, education about inheritance, testing, management, prevention, resources and research, and counseling to promote informed choices and adaptation to the risk or condition.” (National Society of Genetic Counselors, 2005)

Assessing Family History for Hereditary Cancer Risk

Genetic counselors who work in familial cancer risk assessment assist patients and their doctors with determining whether a patient’s personal and/or family history is suggestive of hereditary risk. It is believed that only 10 percent of cancers are caused by an inherited predisposition. Clues to hereditary cancer include cancer at a young age; multiple individuals in the family with the same or related cancers; multiple cancer diagnoses in one individual; rare cancers; bilateral cancer and ethnicity.

During a cancer genetic counseling session, patients learn that any type of cancer present in



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their family is important to report, as some cancer risk genes increase risk for multiple types of cancer in one family. It is also stressed to patients that both maternal and paternal family histories are critical. This is particularly relevant when considering cancers that more commonly affect females such as breast cancer, as men can carry and pass on genes which increase cancer risk for women and vice-versa.

Cancer risk genetic counselors create a three to four generation pedigree (family tree) to look for these risk factors and make recommendations regarding genetic testing. The pros, cons, possible outcomes, and familial implications of genetic testing are reviewed to help make an informed choice about whether or not to proceed with genetic testing. In some cases the counselor may recommend that a different family member consider testing first. When the genetic counselor interprets the test results for the patient, positive and negative test results are considered for the patient as well as their entire family.

Genetic Counseling services are provided at St. Peter’s Cancer Care Center by the Ferre Institute. ■

A SURVIVOR'S STORY

The Gift of a Lifetime

Although Frank Arnold had experienced sore throats, he got worried when he started losing his voice.

An exam with Dr. Dominick Paonessa, MD, PC, an otolaryngologist, revealed cancer of the larynx and quickly led to surgery to remove the growth, followed by radiation treatment.

For Arnold, a retired maintenance worker at a Guilderland apartment complex, treatment was a two-way street. The physicians and staff at St. Peter's Cancer Center helped him back to health. Meanwhile, the skilled craftsman brought them intricately-made, small wooden Christmas trees, complete with electric lights, ornaments and presents.

"When I first went there, I was frightened to death," he recalls, "But the people were wonderful. God bless them."

During the month Arnold made daily trips for his radiation sessions, he carried a string of wooden rosary beads to help get past his anxiety over wearing a mask to protect other areas of his face and neck.

"By the time I got to 10, it was usually done," he said. "They kept me so busy, I hardly paid any attention."

In the meantime, he started making the trees, about 12 to 15 inches tall. He drilled 35 holes for the lights and added ornaments and little gifts at the base. He also made wooden plaques with logos of professional teams, such as the Yankees and Red Sox.



"Lots of doctors wanted them. I kept so busy, I hardly noticed the time going by."

Four years later, the annual checkups show he's still cancer-free and the mask resides in a closet at his Hanacroix home.

Besides the treatment from Dr. Paonessa and Dr. Christian Gasson, a radiation oncologist, he credits Sharon Thomas, RN, and the other nurses at the cancer center with making the visits as easy as possible.

"They cheered me up and told me what to expect. I love them all. They're all great people."

"Today, when I hear people coughing, I advise them to get checked out right away," Arnold said. "I want everyone to know that if they feel their voice start to go, they should get it looked at."

"Anyone who gets sick, I tell them to go to St. Pete's." ■

CANCER PROGRAM ACTIVITY REPORT

Arthur Sunkin, MD

ATTENDING PHYSICIAN,
CANCER COMMITTEE CHAIR

MEDICAL ONCOLOGY
ST. PETER'S CANCER CARE CENTER



St. Peter's Cancer Care Program continues to offer a comprehensive range of cancer care services to adults in the Capital Region. In its most recent complete reporting year (2011), St. Peter's diagnosed and/or treated 2,332 new (analytic) cancer cases and participated in the care of an additional 673 (non-analytic) cases. St. Peter's Cancer Committee continues to provide direction and oversight to the program.

Among the recent accomplishments of the program are:

- Successful completion of American College of Radiation Oncology accreditation survey
- Implementation of Clinical Pathways for breast, as well as head and neck cancers
- Continued expansion and integration of the Center's electronic medical record
- Implementing the further technical refinements of 4D Imaging, Cone Beam CT and Respiratory Gating for targeting tumors in radiation therapy
- Fully implemented 2012 Commission on Cancer Program Standards

- Expanded the clinical trials program to include patients with a diagnosis of pancreatic, breast or prostate cancer
- Launched a Medical Physics Residency Program with McGill University and initiated a Community Oncology Elective with Albany Medical College 4th year medical students
- Expanded an affiliation with The Ferre Institute, establishing on-site genetic counseling and risk assessment program

Cancer Program Goals for 2013

- Successful completion of the American College of Surgeons Commission on Cancer re-accreditation survey
- Installation of a new linear accelerator and upgrade to RapidArc technology
- Pursue collaborative and integrative activities toward service line development within St. Peter's Health Partners ■

CANCER DATA MANAGEMENT ACTIVITY REPORT

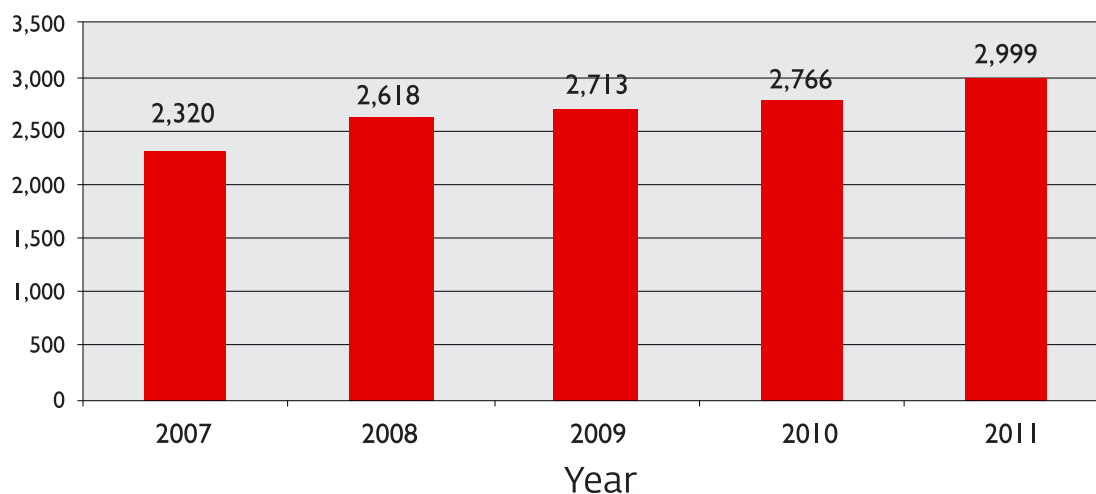
Evelyn Hamm, BS, CTR

CANCER REGISTRY
ST. PETER'S CANCER CARE CENTER



The Cancer Data Management department maintains the Cancer Registry database in accordance with standards set forth by the Commission on Cancer. During 2011, the registry collected data on 2,999 new cases. This case volume represents an 8 percent increase over the previous year's volume of 2,766. The following graph indicates the five-year growth in all accessioned cases.

5-Year Cancer Registry Activity



Registry data are submitted weekly to the New York State Central Cancer Registry and annually to the Commission on Cancer's National Cancer Database.

St. Peter's Cancer Committee provides direction and oversight of registry activities. The Quality Improvement Manager oversees the day-to-day operations of the department. All data abstraction on cases is performed by tumor registrars certified through the National Cancer Registrar's Association.

Cancer Registry Activities

The Cancer Committee uses registry data to determine areas of need and establish program goals and objectives. In addition, the Cancer Care Quality Improvement program relies on registry data to assess program-specific disease incidence and to document the efficacy of treatment outcomes. Community outreach efforts are also data driven. The need for educational programs, screenings, and participation in regional events, as well as requirements for new technology, are supported by registry incidence data.

In addition to maintaining an up-to-date cancer database, the department also facilitates regular cancer conferences, multidisciplinary forums for prospective case presentation, AJCC staging discussion and treatment planning. Conferences focus on breast, gastrointestinal tract, genitourinary tract, gynecological, hepatobiliary and thoracic sites. A new general tumor board to discuss any type of case, but focusing on head and neck cancers in addition to hematologic sites, was added in 2012. Surgeons, radiation and medical oncologists, diagnostic radiologists and pathologists, as well as other practitioners, attend cancer conferences. In 2011, 671 patient cases were discussed at 117 cancer conferences.

Quality of Cancer Data

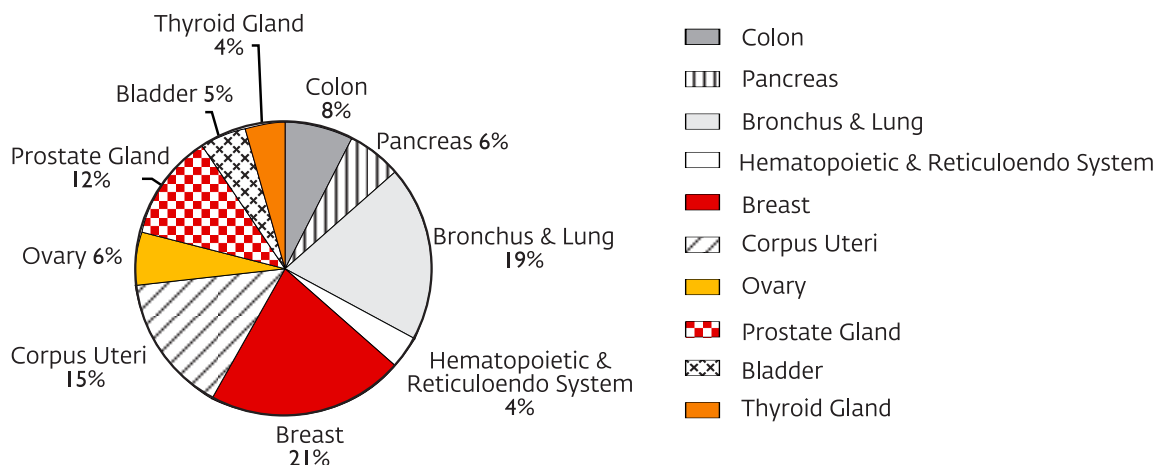
The quality of cancer data abstraction is monitored and reported regularly to the Cancer Committee. Registry quality monitoring activities include:

- Physician review of a minimum of 10 percent of annual analytic abstracts. These audits identify additional training and resource needs.
- Timeliness of case abstraction and completion is monitored and reported to both the Cancer Committee and the New York State Cancer Registry.
- Annual follow-up of at least 90 percent of all active cases to ensure that up-to-date health status and survival information is in the database.
- Regular coding edit checks for format accuracy. Inter-field edits ensure internal data consistency within records.
- Registrar attendance at continuing education and training sessions.

SPH Cancer Incidence 2011

Of the new cancer cases seen in 2011, breast cancer continues to be the most commonly occurring cancer at St. Peter's Hospital (SPH) representing 21 percent, followed by (in descending order) bronchus and lung (19 percent); corpus uteri (15 percent); prostate (12 percent); colon (8 percent); pancreas (6 percent); ovary (6 percent); bladder (5 percent); thyroid (4 percent); and hematopoietic and reticuloendo system malignancies (4 percent). Relative proportions of cancer sites are shown below: ■

Top 10 Sites 2011



Diagnosis, Radiology

Imaging of Head and Neck Malignancies

Malignancies of the head and neck account for 3 percent of all cancers in the United States. While these tumors can be particularly debilitating due to the critical structures involved, many patients are successfully treated using modern surgery, radiotherapy, and chemotherapy. Imaging techniques play an integral part of the diagnosis, treatment, and long-term monitoring of patients with head and neck cancers.

The most common head and neck malignancy is squamous cell carcinoma (HNSCC). HNSCC encompasses tumors of the upper aerodigestive tract, most commonly the oral cavity, pharynx, and larynx. Other forms of head and neck malignancy, such as lymphoma or thyroid cancer, routinely undergo similar imaging evaluation.

The Role of Imaging

The radiologist contributes to the care of patients with HNSCC in several ways:

- **Delineation of the anatomic extent of the primary tumor:** Cancer extending beyond the mucosal lining of the upper aerodigestive tract may be difficult for otolaryngologists to evaluate. Several important structures, such as the paranasal sinuses, parapharyngeal space and skull base are very difficult to examine clinically, and are best evaluated with imaging techniques.
- **Assessment of lymph node metastases:** The presence, size, number, distribution, and imaging appearance of metastases to the lymph nodes of the neck all affect prognosis and treatment planning. It is not unusual for imaging studies to reveal abnormal lymph nodes in patients with a normal clinical examination.



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- Evaluation of patients presenting with cervical lymph node metastases, but have no clinically identifiable primary head and neck tumor.
- Detection of unsuspected second primary tumors: Some patients with HNSCC will have another primary cancer of the head and neck, or may have a coincidental lung carcinoma.
- Direct guidance for biopsy procedures, such as fine-needle aspiration, or for surgery and radiotherapy planning.
- Follow-up of patients who have completed treatment: Imaging surveillance may detect recurrent disease before it is clinically visible.

Imaging Modalities

Computed Tomography (CT) is the primary imaging examination for most patients with HNSCC and other malignancies of the head and neck. CT passes very thin X-ray beams through the relevant part of the patient's body, measuring absorption of X-rays by the tissues. The data is processed by a computer to create detailed, thin-section images in any desired orientation (top-to-bottom, side-to-side or front-to-back). Often, iodine-containing contrast liquid is given intravenously during the scan to highlight potential abnormalities.

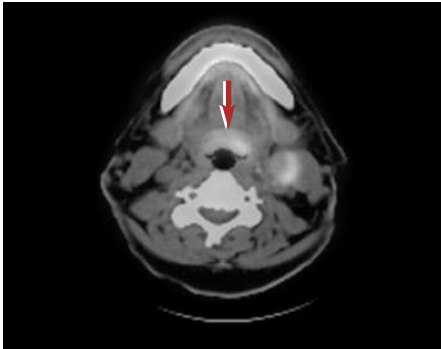
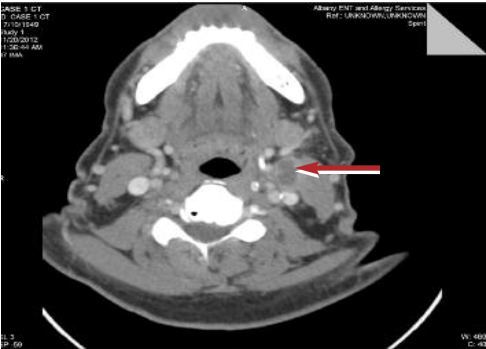
Magnetic Resonance Imaging (MRI) is a valuable adjunctive imaging modality and is superior to CT for extension of tumor to the skull base or into the brain. It is often valuable in clarification of doubtful or nonspecific findings on CT. MRI utilizes a powerful magnet, radiofrequency

energy pulses, and a powerful computer to create diagnostic images. There is no radiation involved. MR contrast solution is often given intravenously during the examination.

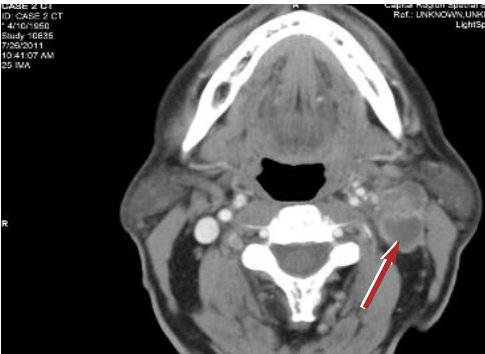
Positron Emission Tomography (PET) has revolutionized diagnosis and treatment of many types of cancer over the past 15 years, and has a high utility in patients with HNSCC. PET involves intravenous injection of special radioisotopes that give off positrons (positively charged electrons). When these positrons interact with electrons, detectable radiation is produced which can be used to create images. Radioisotopes used in PET scanning are handled by the body in an identical fashion as glucose. Since tumors typically have high metabolic rates compared to adjacent normal tissues, and therefore have a higher utilization of glucose, the positron-emitting radioisotopes accumulate in these areas of hypermetabolism. Most often, PET data is superimposed on CT images providing an anatomic depiction of the areas of hypermetabolism. PET-CT may detect subtle primary tumors in patients presenting with metastatic disease to the neck lymph nodes, even though these small primary tumors are not discernable on CT scan alone.

Conclusion

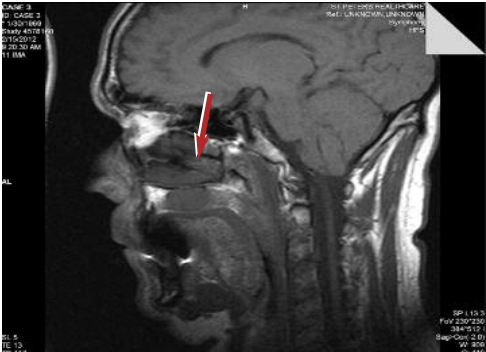
Imaging plays a major part in clinical decision-making by allowing physicians to appropriately and fully treat each individual HNSCC patient while avoiding procedures unlikely to change the outcome. ■



Case 1.
Unknown Primary Tumor
 CT scan (left) reveals metastatic disease to neck lymph node, but primary tumor is not visible, PET scan (right) identifies primary tumor at the tongue base to the left of midline. Hypermetabolism is also demonstrated in the metastatic neck node.



Case 2.
Metastasis to Neck Lymph Node
 CT scan shows a markedly enlarged lymph node with several areas of necrosis.



Case 3.
Carcinoma of the Palate
 Sagittal precontrast (left) and coronal postcontrast (right) images illustrate an enhancing soft tissue mass involving the left side of the palate.

A Surgical Perspective

The Use of Surgery in the Treatment of Laryngeal Cancer

Laryngectomy used in the treatment of advanced tumors significantly changed when a Veterans Administration Study was published in 1991. This study showed that patients who either partially or completely responded to chemotherapy were then successfully treated with radiation therapy. In 2003 the results of the RTOG-93-11 trial utilizing concomitant chemoradiotherapy as initial treatment showed an even higher rate of laryngeal preservation.

The role of total laryngectomy was subsequently relegated for treatment failures. With the advent of these new treatments, the previous standard techniques of open, partial laryngectomy for early cancer and total laryngectomy followed by radiation therapy for advanced lesions has been greatly reduced. However, newer techniques of transoral endoscopic laser microsurgery (TLS), transoral robotic surgery (TORS), and photodynamic therapy do have a role in the treatment of glottic cancers. With these newer surgical procedures, the role of surgery in selected glottic cancers has again become a part of the treatment paradigm for certain lesions.

Treatment of Early Glottic Carcinoma

Early glottic cancers are considered Tis, T1, and T2 lesions which, for purposes of this discussion, do not involve the anterior commissure. Vocal fold stripping, transoral endoscopic laser resection, have been used in the treatment of these lesions. The initial control rate for Tis lesions ranges from 56 to 92 percent with surgery and 79 to 98 percent with radiation therapy. With



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HEAD AND NECK GROUP

surgery for salvage for recurrence, the ranges are 90 to 100 percent for both modalities. Because of the similar oncologic outcomes and the duration of radiation therapy as well as the “one-shot” nature of radiation, some have suggested surgery as the initial treatment, especially in younger patients, and that radiation be used if all other modalities have failed. For T1 lesions, transoral laser resection has shown to be equal to control rates for radiation therapy. In a study by Higgins et al., they found no significant difference in local control rates or larynx preservation between transoral laser surgery and radiation therapy when looking at 7,600 pooled patients (1). There has always been the feeling that radiation therapy resulted in better vocal quality than surgery for these lesions. There is no high-level evidence to support which treatment results in better vocal quality, however, the depth of invasion likely plays a role in voice outcome. Laser cordectomy for early glottic cancers has been reviewed based on European Laryngological Society guidelines, which use depth of resection of the cord as a guide. Using these guidelines in the future may allow better comparisons of the various treatment outcomes with regard to vocal quality. Lastly, with metachronous second primaries developing in up to 21 percent of patients with early laryngeal cancers, some favor surgery in younger patients to “save” radiation therapy as a treatment option.

Treatment of the Anterior Commissure

The role of surgery in treating these lesions has little data to support open versus laser resection. The complex nature of these lesions, depth of invasion, cartilage involvement, and subglottic extension at the time of diagnosis make comparisons of treatment modalities difficult. The choice of open versus laser resection, in large part, has to do with the ability to visualize the tumor and the ability to determine cartilage involvement. There seems to be similar recurrence rates with both procedures and perhaps a lower morbidity with laser resection. Precise staging of the cartilage is important but difficult for early-stage tumors of the anterior commissure.

Treatment of T2 Carcinoma

For T2 tumors with normal vocal cord mobility treated with open conservation surgery, transoral laser resection or radiation therapy has initial control rates from 84 to 95 percent. For T2 tumors with impaired mobility of the cord, all modalities have local control rates as low as 50 percent. This may be secondary to early cartilage invasion. Of the surgical techniques, transoral resection has become the main approach for conservation laryngeal surgery. There is, however, a body of literature showing high rates of local control and preservation of a functional larynx with open surgery in experienced hands.

Treatment of T3-T4 Carcinoma

The role of surgery in these advanced lesions has become mainly relegated to surgery for salvage. There are, however, some studies that have shown 5-year survival rates as high as 59 percent with larynx preservation for T3 tumors. Supracricoid laryngectomy has been used in Europe for many years with reported locoregional control rates as high as 75 percent and 5-year survival of 60 percent. The severe morbidity of deglutition, however, limits its choice as a treatment versus total laryngectomy for salvage. Although total laryngectomy has

been relegated to a treatment for salvage, there are some who feel it may be appropriate as an initial treatment for advanced laryngeal cancer. Non-compliant patients, patients in under-served countries or where more sophisticated treatments are not available would be candidates for total laryngectomy as primary therapy.

Robotic Surgery

Transoral robotic surgery (TORS) is a new approach to laryngeal surgery which allows improved optics, increased instrument degrees of rotation and tremor modulation. This technology is presently being used in some larger centers for laryngeal lesions. The exposure can be difficult and the setup and instrumentation positioning can be time-consuming and cumbersome. As the robotic systems improve it may prove to allow for much finer procedures with fewer traumas to surrounding normal vital structures with the hope of improved function.

Summary

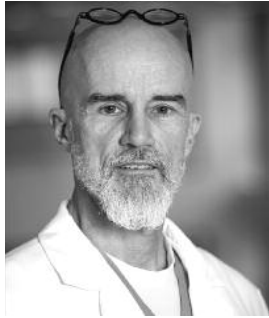
The role of open surgery for the management of laryngeal cancer has greatly diminished during the last decade. Conservation surgery, open or transoral laser resection, and radiation therapy are still valid options for treating Tis, T1 and selected T2 glottic lesions. Individual patient selection based on subjective selection criteria still makes patients candidates for initial surgical treatments. The advancement of robotic surgery may also allow for improved surgical outcomes and organ preservation. The experience and expertise of the surgical oncology specialist is also a key element in the use of conservation laryngeal surgery. ■

References:

- 1) Higgins KM, Shah MD, Ogaick MJ, Enepekides D. Treatment of Early-Stage Glottic Cancer: Meta-Analysis Comparison of Laser Excision versus Radiotherapy. *J Otolaryngol Head Neck Surg.* 2009;38(6):603-612.

Pathology

Head and Neck Squamous Cell Carcinomas



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Head and neck pathology spans a wide range of tissue types and tumors that can arise from those tissues. Most malignant tumors of this region come from the squamous epithelial lining that covers the majority of these mucosal surfaces, resulting in squamous cell carcinomas. Head and neck squamous cell carcinomas (HNSCC) are the eighth most common cancer worldwide with 650,000 new cases reported each year. Historically, most of these tumors arise in relationship to cigarette smoking, often combined with alcohol consumption. The typical patient who presents with HNSCC is an older male with a significantly long history of smoking and alcohol use. The US incidence in the last few decades has been declining related to increased efforts to decrease smoking.

As progress has been made in smoking cessation, there has been an increase in a particular subtype of HNSCC which arises in the oral pharyngeal region of the head and neck. These oral pharyngeal squamous cell carcinomas are related to infection with oncogenic subtypes of human papilloma virus (HPV). Patients with this entity present at a younger age and often have little or no smoking/alcohol consumption history. The causative HPV infection is acquired via sexual contact in which there tends to be high numbers of sexual partners and a history of oral-genital/anal sex.

HNSCC develops through a series of changes in the squamous epithelium that are collectively referred to as dysplasia. Squamous cells normally mature from the base of the multilayered epithelial lining in an orderly fashion through defined morphologic cellular changes that are easily recognized. The basal cells are smaller and nonkeratinized. As the cells mature towards the mucosal surface they acquire more cytoplasm containing keratin, are joined to neighboring cells by tight junctions, and orient themselves in an orderly fashion parallel to the mucosal surface. These maturational changes result in an epithelium suited for the wide array of environmental exposures that occur in the head and neck region. As dysplasia develops these changes are gradually altered by a much more disordered maturation, which includes cellular atypia, nuclear enlargement, increase in nuclear to cytoplasmic ratio, and an overall disorganized appearance. As the dysplasia worsens the atypical cells involve the full thickness of the epithelium and are referred to as high-grade dysplasia or carcinoma in situ (tumor that has not invaded the underlying tissues). Once the carcinoma cells invade below the basement membrane of the epithelium into the underlying connective tissues, this becomes invasive HNSCC (Figure 1).

When invasive HNSCC is caused by smoking/alcohol consumption the tumors tend to retain their cellular ability to keratinize and a series of molecular changes are noted by genomic

studies. These molecular changes can be found within the dysplastic and subsequent invasive squamous carcinoma cells and are, for the most part, related to loss of tumor suppressor genes. These abnormalities are often multiple in any given tumor and result in a cell population that proliferates out of control with the ability to invade and spread. Further study of these mutations may eventually be tied to novel treatments and become important in the diagnosis and treatment of these types of smoking/alcohol related HNSCC's (Figure 2).

The HPV-related tumors arise in the oral pharyngeal region of the head and neck typically at the base of tongue or involving the tonsils. These tumors have a somewhat different histologic appearance than the smoking/alcohol related tumors. The tumor cells tend to be smaller with a more basaloid appearance and tend to be non-keratinizing. HPV can be detected within the tumor cells by several methods, with subtype HPV-16 being the most common. This is one of the oncogenic subtypes of HPV, which is well known for its association with invasive squamous cell carcinoma of the female cervix. Interestingly, the HPV-related HNSCC's can present as lymph node metastases in the neck with no gross primary tumor detected. Subsequent random biopsies of base of tongue or tonsillectomy reveal a microscopic sized tumor. These HPV-related carcinomas tend to have a better prognosis than the smoking/alcohol related tumors. This may be related to immune surveillance attacking cells infected with the virus. Also, genetic studies of this type of tumor reveal an absence of the widespread molecular damage that is often associated with the smoking/alcohol related tumor. This is understood to result in a less aggressive tumor. There is hope that vaccination for HPV, now done to prevent genital HPV, may have an important impact on prevention and possibly treatment of these HPV-related oral pharyngeal squamous cell carcinomas (Figure 3).

The current surgical pathology evaluation of HNSCC usually starts with the histologic study of biopsy material taken from mucosal abnormalities noted upon examination. Dysplasia, grade of dysplasia, the presence of squamous carcinoma in situ, and particularly the presence of invasion into included submucosal tissues are reported. The histologic appearance of the invasive carcinoma is described with particular attention to grade of tumor and the presence of keratinization. Subsequent HPV testing is performed, in part, depending on the clinical presentation, the location of the tumor, and its histologic appearance. With advances in radiation and oncologic treatment of these tumors in recent years, the number of subsequent surgical resections in these cases has dramatically declined. In the recent past, it was common for pathology to see radial resection specimens and neck lymph node dissections for HNSCC. This occurrence has decreased to a rare event by the aforementioned advances. ■

Figure 1



To the left of center is normal, albeit inflamed and hyperplastic, squamous lined mucosa. Right of center illustrates the place where dysplastic changes with progression to in situ carcinoma and underlying invasive squamous cell carcinoma develop.

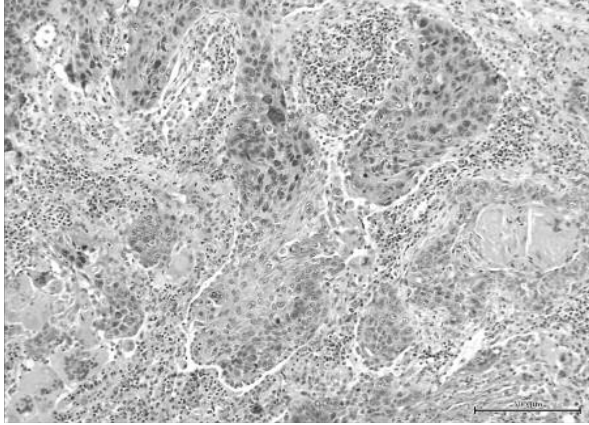


Figure 2

HNSCC Irregular groups of cancer cells invading inflamed submucosal tissues. Some cells are poorly differentiated with marked atypia (large cell with dark purple nucleus, upper center). Note that some of the cancer cells have retained the ability to keratinize (eosinophilic cells in center). This patient had a long history of smoking/alcohol consumption.

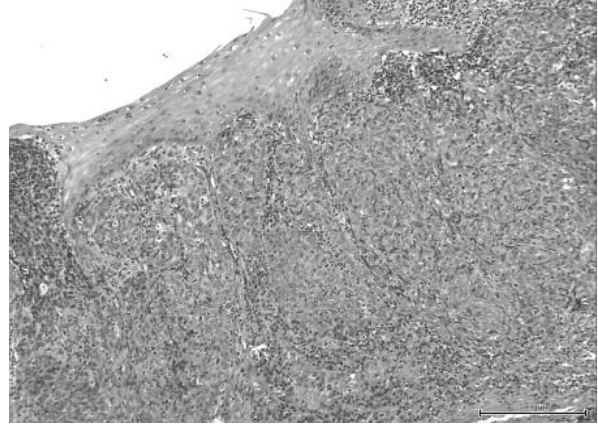


Figure 3

HNSCC; Note that the cancer cells have high nuclear to cytoplasmic ratios and appear smaller and darker than the cells in Figure 2 due to lack of keratin. This is referred to as basaloid appearance as the cells look like the basal cells of the normal squamous epithelium (the top of the photo shows a strip of normal epithelium with the basal cells oriented along the base). This patient had HPV-related HNSCC at the base of the tongue.

Medical Oncology

The Role of Chemotherapy in the Treatment of Larynx Cancer



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Although early cancer of the larynx can be successfully cured in many patients without removal of the entire larynx (total laryngectomy), through the use of minimal surgical techniques or radiation therapy, more advanced tumors are now usually treated with a combination of chemotherapy and radiation therapy. This has been shown to improve control of the tumor compared with radiation therapy alone and allows for the preservation of the larynx so that patients can retain natural speech. Cure rates are very close to those of total laryngectomy, making this a preferred treatment for most patients.

Chemotherapy is also used for patients with very advanced larynx cancer, or cancer that has come back after initial treatment.

The best type of chemotherapy to use for the treatment of larynx cancer and the optimal way to combine it with radiation therapy has not yet been standardized. The following is a general outline of how chemotherapy is used for the treatment of larynx cancer at St. Peter's Hospital in accordance with our Head and Neck Cancer Pathway for Medical Oncology. This pathway is based on a thorough review of the medical literature and current national guidelines.

Types of Chemotherapy Used

Cisplatin is one of the most active agents against squamous cell carcinoma, the usual type of cancer cells that affect the larynx. Cisplatin is also known to make cancer cells more sensitive to the toxic effects of radiation therapy. For this reason, when patients are treated with a combination of chemotherapy and radiation therapy for larynx cancer to avoid total laryngectomy, cisplatin is usually the first choice.

Cisplatin, however, has the potential to cause serious side effects, including kidney damage, hearing loss, severe nausea and vomiting, and an increase in the mouth sores that may be caused by radiation therapy. In order to limit the severity of some of these side effects, especially kidney damage, cisplatin must be given along with large amounts of intravenous fluids. Some patients may be unable to tolerate treatment with cisplatin and other treatments may need to be considered.

Cetuximab is a drug that is unlike other chemotherapy agents. It is a biologic agent that contains an antibody that blocks epidermal growth factor (EGFR) by binding to its receptor on cells. Some cancer cells require the stimulation from epidermal growth factor for continued growth. Many squamous cell cancers of the larynx have this requirement and are therefore sensitive to

cetuximab. Since studies have shown that the combination of cetuximab and radiation therapy improves survival of patients with advanced cancers of the head and neck region, including patients with advanced larynx cancer, patients who are not candidates for treatment with cisplatin, or who do not tolerate cisplatin, may be alternatively treated with cetuximab plus radiation therapy.

Carboplatin is a drug that has similarities to cisplatin, but does not cause kidney damage. The benefit of adding carboplatin to radiation therapy for organ preservation in larynx cancer treatment is not as well established as that for cisplatin. However, it is another option for patients who cannot tolerate cisplatin.

Some patients with very advanced, but still potentially curable, larynx cancers may require rapid control of their tumor. Since it can sometimes take several weeks to complete the arrangements and the complex treatment planning required for radiation therapy, initial treatment with chemotherapy, induction chemotherapy, is sometimes considered. When this is done, combination chemotherapy with three drugs is usually used in order to obtain the maximum effect to control the tumor before beginning radiation therapy. This usually involves the use of docetaxel and fluorouracil in addition to cisplatin. This treatment can cause significantly more side effects than treatment with cisplatin alone, with a much higher risk of low blood counts. This may lead to the need for transfusions or hospitalization for treatment of serious infections. Patients are carefully selected for this treatment and are monitored very closely. Most patients recover from side effects very well. After completion of induction chemotherapy, patients are then treated with radiation therapy in combination with low doses of carboplatin.

Metastatic and Recurrent Larynx Cancer

Some patients with larynx cancer may be diagnosed when their disease has already spread to areas beyond the larynx and surrounding lymph nodes to distant organs, such as the lungs, liver or bones, at which point the disease is considered metastatic cancer. In such cases, chemotherapy can also be used to try to reduce the disease burden and improve symptoms, which is considered palliative treatment. If the tumor in the larynx is causing symptoms, radiation therapy may be added to chemotherapy to help control symptoms, but treatment may be less aggressive in order to minimize side effects.

Other patients may have the cancer come back some time after their original treatment, which is known as recurrent cancer. If more surgery or radiation is not feasible, chemotherapy may also be helpful for these patients to reduce disease and improve symptoms.

In addition to the drugs used in combination with radiation therapy for locally advanced larynx cancer, a number of other drugs may be useful in patients with metastatic or recurrent larynx cancer, including paclitaxel and methotrexate, as well as others. Some patients may be treated with a series of drugs if the cancer does not improve after treatment with one drug, or improves initially and then begins to grow again.

Infusion Center

Chemotherapy is usually administered in St. Peter's Outpatient Infusion Center with the assistance of a team of highly qualified staff dedicated to ensuring the highest quality care to maximize the safety and comfort of our patients in the outpatient setting. ■

Radiation Oncology

The Role of Radiation Therapy in the Treatment of Advanced Larynx Cancer

Until 20 years ago, the widely accepted dogma was that removal of the larynx (laryngectomy) was necessary to cure patients with advanced larynx cancer. The role of radiation therapy was relegated to surgically inoperable patients, palliation, and as an adjunct to surgery. However, a landmark study published in the *New England Journal of Medicine* in 1991 transformed the standard of care. The addition of chemotherapy to radiation therapy was shown to cure patients with larynx cancer and preserve the larynx.

In that study, patients were assigned to undergo surgery or chemotherapy followed by radiation therapy, sequential therapy. Surgery could be used in the event that the radiation and chemotherapy were not effective. The researchers reported that at two years, survival for the two groups of patients was equivalent. Moreover, 67 percent of patients assigned to the non-surgical group were able to preserve the larynx (1).

Since that seminal study, there have been tremendous advances made both in defining optimal chemotherapy regimens, integrating the chemotherapy with radiation and radiation delivery techniques.

Administering the chemotherapy and radiation at the same time, concomitantly, has been found to have superior outcomes as opposed to giving the chemotherapy first, then the radiation therapy, sequentially, as found by the RTOG 9111 intergroup study (2).

Delivery of radiation therapy to the head and neck cancer is a complex task. Tumoricidal doses of radiation need to be delivered to cancer, however, these regions are adjacent to normal structures



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that are susceptible to radiation injury. While it is desirable to administer approximately 7000 cGy to sites of active cancer, other regions in the head and neck can be damaged by much lower doses of radiation therapy. For example, the spinal cord cannot tolerate more than 5000 cGy without risking permanent spinal cord injury and the salivary gland can cease functioning after 2500 cGy.

Intensity Modulated Radiation Therapy (IMRT) is a technique of radiation delivery that allows "painting" the dose of radiation where it is needed while avoiding delivery of high dose radiation to normal structures. The radiation beam is pointed at the tumor in different directions. While the beam is being directed at the tumor, the shape of the beam changes with time. A complex dose distribution is generated, sparing susceptible tissues. A dose distribution is illustrated in Figure 1, which shows a horseshoe-shaped distribution in order to avoid radiation delivery to the spinal cord and salivary glands.

Initially, there was concern that this technique would "miss" potential sites of microscopic disease. Those concerns, however, were unfounded. A study published in 2003 by a group at University of Iowa found that the local failures after IMRT occurred in the high-dose regions of treatment, rather than in the regions that are spared (3).

While there has been improvement in tumor control with modern radiation techniques, great care needs to be taken to protect normal structures and minimize long-term damage from the radiation therapy. The radiation effects on the

Figure 1



pharynx and upper esophagus can be severe, often making swallowing nearly impossible, due to significant irritation in this region. For many patients, a feeding tube is placed to ensure adequate nutrition during the course of treatment. There can be permanent swallowing difficulties following the completion of treatment. New research suggests that some of the muscles lining the pharynx may be damaged from the radiation. Several centers are exploring whether “shielding” these muscles from the radiation beam can help preserve normal swallowing function (4).

Dry mouth, or xerostomia, can be a permanent issue after radiation therapy to the head and neck region. While this might sound like a trivial problem, dry mouth can negatively impact the quality of a patient’s life. These individuals have altered taste, increased risk of tooth decay and difficulty swallowing. It is extremely important that patients who will undergo a course of radiation therapy to the head and neck region have a full dental evaluation to remove any diseased teeth prior to treatment. New techniques are being studied to avoid radiation to the submandibular glands, which traditionally have been included in the target volume. As the research evolves to see whether other structures can be shielded during

the course of radiation therapy, it will be essential to ensure that patient outcomes are not jeopardized by a high local failure rate.

The new paradigm for patients with tumors of the oropharynx, larynx, and hypopharynx is to cure the disease with organ preservation. The importance of accomplishing this goal without undue acute and long-term toxicity to the normal structures remains an ongoing challenge. ■

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Rehabilitative Treatment

The Role of Speech Pathology in Head and Neck Cancers



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Patients with head and neck cancer have a variety of speech and swallowing problems. These problems can include altered dentition, decreased saliva, mucositis, odynophagia, dysphagia, trismus, malnutrition, weight issues, and communication deficits.

Radiation therapy can cause induced fibrosis, tissue changes, altered sensory awareness, restricted laryngeal movements, and reduced tongue and jaw movements. Patients who have a laryngectomy may need alternative means of communication such as a communication device, electrolarynx, or may need to be taught esophageal speech.

Speech pathologists assess the oral and pharyngeal stage of the swallowing mechanisms. An oral peripheral examination will assess the strength, movement, and rate of the tongue, lips and palate; it will also generally look at the dentition. Once the patient has been evaluated, specific exercises such as oral motor exercises, tongue base retraction, laryngeal elevation exercises in addition to compensatory strategies and techniques will be provided to the patient. Some patients may benefit from neuromuscular electrical stimulation to re-educate the swallowing muscles.

Patients diagnosed with brain tumors may have cognitive deficits, which may affect long- and short-term memory, problem solving, reasoning, concrete and abstract thinking deficits, as well as expressive communication, auditory and reading comprehension deficits.

Speech Pathologists work very closely with physicians, nurses, nutritionists, and radiologists to determine if a patient is getting adequate nutrition and hydration. Swallowing therapy focuses on educating the patient on the safest food and liquid consistencies for consumption. Patients who experience lack of or poor dentition may require a change in diet to include softer foods with a liquid-like consistency. The primary goal for at-risk patients is to have the proper nutrition to maintain a healthy body weight and to reduce the risk of aspiration pneumonia. Some patients require alternative means of nutrition due the severity of oral and pharyngeal dysphagia. ■

Rehabilitative Treatment

The Role of Physical Therapy in Head and Neck Cancers



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Patients in the survivorship phase of cancer care may benefit from Physical Therapy. It is not unusual for patients to have pain and soft tissue restrictions from scar tissue around surgical sites and/or radiation fibrosis. These restrictions may lead to neuromuscular and musculoskeletal deficits such as difficulty with swallowing, loss of range of motion of the jaw, neck and shoulders, and sensory deficits and weakness in the musculature of the neck and upper back.

Fatigue, vestibular issues, and core muscle weakness after chemotherapy may cause patients to have difficulty with ambulation and dizziness. Patients can also experience difficulty performing general activities of daily living due to weakness and incoordination. Physical therapists can evaluate a patient's posture, range of motion, strength, gait, coordination, and pain. Based on their findings, a treatment program as well as an individualized home exercise program is developed to help patients maximize their potential to return to prior levels of function. ■

Community Outreach and Education

Promoting Prevention and Awareness in Head and Neck Cancers



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The National Cancer Institute estimates that 53,000 people are diagnosed with head and neck cancers annually. Of those 53,000 cases, 85 percent are associated with tobacco use. Tobacco use is not only the leading cause of head and neck cancers but also the leading cause of other cancers and cancer-related deaths. There are over 7,000 chemicals in tobacco smoke with at least 69 of those chemicals as known carcinogens, cancer-causing agents. Because the main risk factor for head and neck cancers is tobacco use, the Community Outreach Nurse (CON) at St. Peter's Cancer Care Center works diligently to educate the community on the dangers of smoking and "how to" strategies to increase smoking cessation.

The CON educates the general public about personal risk factors for head and neck cancers, promotes healthy lifestyles and teaches the dangers of smoking. Outreach is done at St. Peter's Cancer Care Center as well as at health fairs and other facilities within the Capital Region, including schools and colleges.

The CON also works collaboratively with other community organizations such as the New York State Department of Health Tobacco Control Program, the Capital District Tobacco-Free Coalition, and the Healthy Capital District Initiative. These organizations help by providing resources to local facilities and educators to provide outreach and education within the community. Some of the support resources utilized by the CON include a toll-free smoker quit-line, printed materials, and an online website for patients and families.

In addition to these activities, the CON helps to facilitate The Butt Stops Here Program that meets every Monday at St. Peter's Cancer Care Center as well as conducting meetings at our Legacy Partner, St. Mary's Hospital in Troy. This group provides smoking cessation counseling, support from others who are trying to quit and nicotine replacement. The CON also refers patients, families, and survivors to the Support for People with Oral, Head and Neck Cancers (SPOHNC) group that meets monthly at the American Cancer Society's Hope Club. Useful resources that support smoking cessation and those with head and neck cancers are listed below:

- American Cancer Society: www.cancer.org, 1-800-227-2345, 518-220-6960
- American Lung Association: www.americanlungassociation.org, 207-785-3355
- Capital District Tobacco-Free Coalition: www.smokefreecapital.org, 518-459-2388
- National Cancer Institute: www.cancer.gov, www.betobaccofree.gov, 1-800-4-CANCER (1-800-422-6237)
- NYS Smokers' Quitline: www.nysmokefree.com, 1-866-NY-QUITS (1-866-697-8487)
- Support for People with Oral, Head and Neck Cancers (SPOHNC): www.spohnc.org, 1-800-377-0928 ■

Statistical Analysis for St. Peter's Hospital

Head and Neck Cancers

Report Parameters

This report presents an overview of the St. Peter's Hospital (SPH) experience in diagnosing and treating head and neck cancers. It also examines how that experience compares with other hospitals, both state and nationwide, specifically for tongue, tonsil, and oropharynx cancers.

The primary data source for this report is the database of cancer cases encountered and documented at SPH which is maintained by St. Peter's Cancer Data Management Department in its Cancer Registry. Cancer Registrars in this department collect data on all identified cases of cancer that are diagnosed and/or treated at the institution. Data is compiled according to the Facility Oncology Registry Data Standards (FORDS) established by the Program's accrediting body, the American College of Surgeons Commission on Cancer (ACoS-CoC).

FORDS establishes criteria for designating cases as either analytic or non-analytic. Analytic cases have a significant proportion of their diagnosis and/or treatment performed at the reporting institution. Only analytic cases were counted in compiling case volumes for this report. Depending on the context of comparison, data may encompass various time periods. Date ranges throughout this report are clearly identified.

Data submitted to the Commission on Cancer (CoC) by accredited programs across the country are aggregated into National Cancer Database (NCDB) Benchmark Reports. These site-specific reports encompass data from years 2000 through 2010. For this report, aggregates of all 11 years' data were used to obtain a



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meaningful local sample size. The use of the term 'head and neck cancers' throughout this report refers only to data for tongue, tonsil, and oropharynx cancers. Additionally, data for tongue, tonsil, and oropharynx were compiled to specifically focus on cancers which share a potential risk factor of the Human Papillomavirus (HPV).

For the 11-year period evaluated, an average of 1,365 hospitals across the United States reported a total of 144,976 cases of combined tongue, tonsil, and oropharynx cancers. During that same period, an average of 67 hospitals within New York state reported a combination of 8,783 cases, while SPH reported a combined 171 cases. Proportional (relative percent) rather than numerical data have been used in much of this report to allow comparison between these disparately sized data cohorts.

Head and Neck Cancers at St. Peter's Hospital

St. Peter's Cancer Registry has been tracking cancer cases since 1985. In 2010, FORDS changed the abstracting rules to only include cases from the reference year forward as analytic. Cases between 2003 (current reference year) and 2011 (the last complete year of data collected), are currently followed. St. Peter's Cancer Care Center diagnosed and/or treated 91 combined analytic tongue, tonsil, and oropharynx cases between 2003 and 2011. The volume of analytic cases is broken down by stage, as shown below. Stage 0 is also known as cancer in situ or

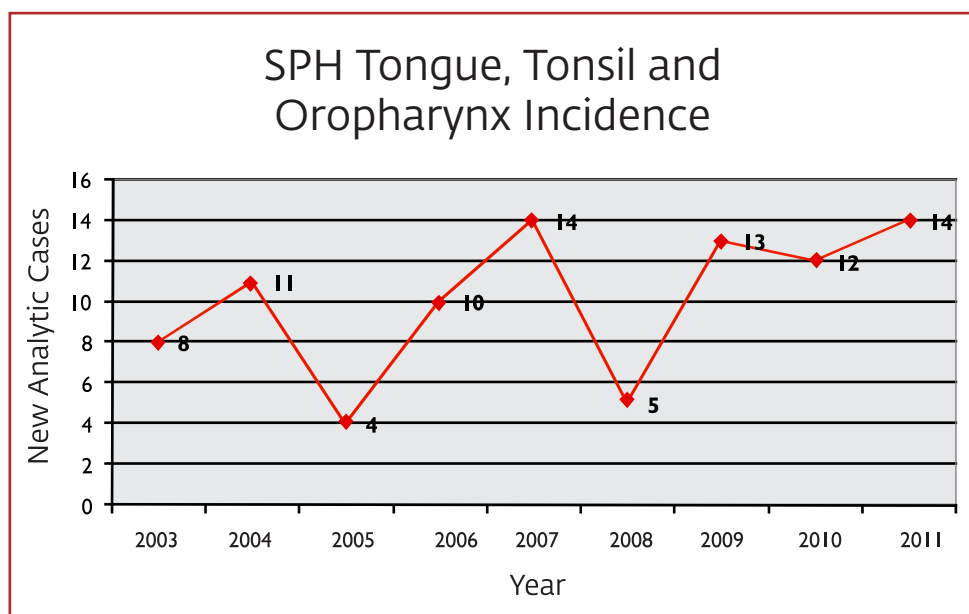
non-invasive cancer. There are some histological grades of cancer that are not necessary to stage by AJCC guidelines. These grades are denoted by N/A throughout the report. The largest proportion of cases present as Stage IV disease followed by Stage I disease. Of the 16 unknown cases, five of those cases are categorized as Class of Case 00, which indicates the patient had an initial diagnosis at SPH and all treatment or a decision not to treat was performed at another facility. This reduces the actual number of unknown cases to 11, which is equal to 12 percent of all cases at SPH.

TABLE 1

STAGE AT DIAGNOSIS	0	I	II	III	IV	N/A*	UNKNOWN
Volume of Analytic Cases	4	18	14	8	30	1	16
Percent by Stage	4.4%	19.8%	15.4%	8.8%	34.0%	1.0%	17.6%

* N/A Represents cancers by histology that are not necessary to stage by AJCC guidelines.

Figure 1



In the most recent nine-year period, including the most recent complete year of data (2011), new analytic cases of head and neck cancers had an erratic trend, with an average annual incidence of 11.7 cases. There was a dramatic dip in 2005 and 2008. The average change over the nine-year period was 3.2 percent. The incidence data for the nine-year historical period are depicted in Figure 1.

Incidence by Year of Diagnosis

Between 2000 and 2010, newly diagnosed cases of head and neck cancers had a turbid trend over the 11 years for SPH and NY state, but had an increased trend over time in the United States. A general 3.3 percent increase was seen nationwide over 11 years. SPH saw the highest percentage of cases in 2007 (Table 2).

Table 2

Diagnosis Year	Head and Neck Cancers by Diagnosis Year		
	SPH %	NY %	US %
2000	10.5	6.9	7.2
2001	4.1	8.0	7.4
2002	8.8	8.1	7.9
2003	7.0	8.6	8.3
2004	9.4	9.3	8.5
2005	4.1	8.3	8.8
2006	11.7	9.3	9.3
2007	13.5	9.9	10.0
2008	6.4	9.5	10.6
2009	11.7	11.2	11.1
2010	12.9	10.6	10.7

Demographic Factors

Incidence by Age at Diagnosis

Nationally, over 34 percent of patients are diagnosed with head and neck cancers between the ages of 50 and 59. This percentage carries through to both NY state and SPH data. Approximately 28 percent of patients are diagnosed between the ages of 60 and 69 and 15 to 18 percent of patients are diagnosed between the ages of 70 and 79 for all three cohorts. Few patients are diagnosed at a younger age (Table 3).

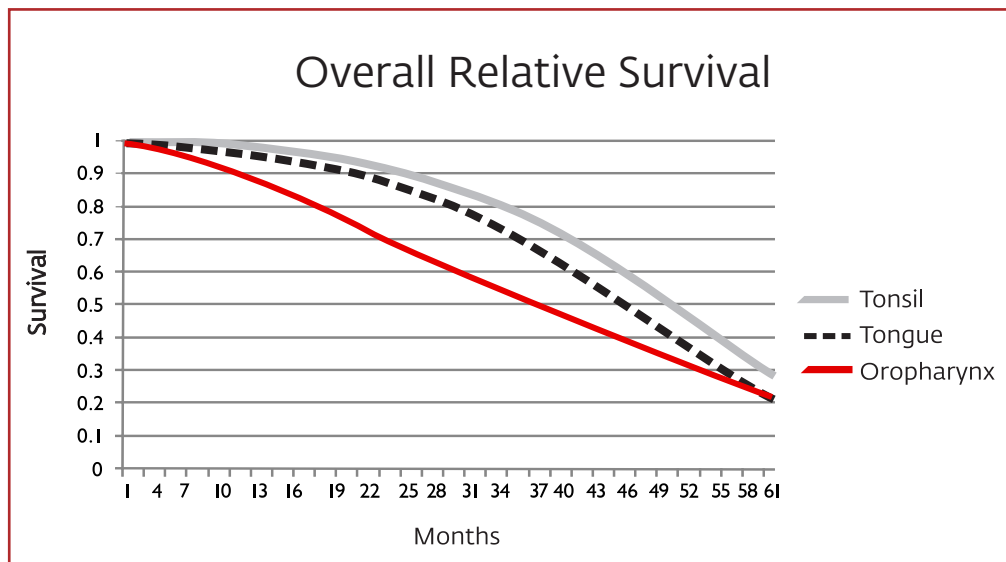
Table 3

Age at Diagnosis	Head and Neck Cancers by Age		
	SPH %	NY %	US %
< 20	0.6	0.1	0.1
20-29	0.6	0.8	0.1
30-39	4.1	2.1	0.6
40-49	8.2	14.8	2.9
50-59	33.9	31.8	10.5
60-69	28.1	28.1	28.0
70-79	18.7	15.8	16.3
80-89	5.8	6.0	6.2
90+	0.0	0.6	0.7

Overall Survival for Head and Neck Cancers

Figure 2 shows the relative survival for cases of tonsil, tongue, and oropharynx, respectively, diagnosed at SPH between 2003 and 2007. Oropharynx has the lowest survival rate of the three groups, but also has the smallest number of inclusive cases. Tonsil has the best survival, followed by tongue. The average overall survival rate is 25.5 percent for all three groups. Survival data at SPH is dependent on follow-up data obtained by the return of mailed letters to patients and physicians and various sources of vital status indicators.

Figure 2



Incidence by Race

As a proportion of overall cases, the Caucasian population is most heavily affected by head and neck cancers. Caucasians represent a higher proportion of total patient numbers in the SPH population than is reported in both the state and the nation. The African American population presenting with head and neck cancers to SPH is less than 2 percent; however, at the state and national level, the burden of head and neck cancers on the African American population is an average of 10 percent. The Hispanic population does not present with head and neck cancers at SPH. However, the incidence of head and neck cancers at the state and national levels is 7.5 and 4 percent, respectively. The Native American population appears to be the least affected by head and neck cancers across all three cohorts (Table 4).

Table 4

Race	Head and Neck Cancers by Race		
	SPH %	NY %	US %
Caucasian	96.5	73.8	83.2
African American	1.8	11.2	9.3
Hispanic	0.0	7.5	4.0
Asian/Pacific Islands	0.0	2.9	1.6
Native American	0.0	0.1	0.2
Other/Unknown	1.8	4.5	1.7

Incidence by Gender

In comparing incidence by gender, males have a predominately higher proportion of head and neck cancers across all three cohorts. At SPH, the ratio of males to females is approximately 2:1 and the ratio for the state and the nation is approximately 3:1. There are several risk factors for head and neck cancers that could potentially explain the great divergence in incidence between genders (Table 5).

Table 5

Race	Head and Neck Cancers by Gender		
	SPH %	NY %	US %
Male	67.3	73.5	74.7
Female	32.7	26.5	25.3

Insurance Coverage

Incidence by Insurance Coverage

The largest proportion of patients seen at SPH, within NY state, and nationally, are served by managed care. Medicare with Supplement (Medicare with an additional private insurance coverage) is the second largest group across all three cohorts. The large portion of Medicare with Supplement group follows the age trend for SPH whereas greater than 70 percent of patients diagnosed with head and neck cancers are over the age of 50, which is the same for NY state and the nation. The percentage of patients who are uninsured is less than 6 percent across the three cohorts and an average of 7.3 percent for Medicaid coverage (Table 6).

Table 6

Insurance	Head and Neck Cancers by Insurance Type		
	SPH %	NY %	US %
Not Insured	1.2	2.6	5.3
Private Insurance	8.8	11.2	13.4
Managed Care	52.6	38.1	32.3
Medicaid	2.9	10.7	8.2
Medicare	7.6	12.8	11.3
Medicare W/Supplement	26.9	18.1	19.5
Veterans Affairs	0.0	4.1	4.8
TRICARE®/Military	0.0	0.1	1.1
Indian/Public Health Service	0.0	0.0	0.1
Unknown	0.0	2.3	4.0

Disease-Related Factors

Morphology

Morphology refers to the histological classification of the cancer tissue and a description of the course of development that a tumor is likely to take: benign or malignant behavior. The designation is based on a microscopic diagnosis of morphology by a pathologist. Not otherwise specified (NOS), is a categorization which is used in accordance with College of American Pathologists current protocols.

Table 7

Histology	Head and Neck Cancers by Histology		
	SPH %	NY %	US %
Squamous Cell Carcinoma	80.1	75.7	77.0
Keratinizing Squamous Cell Carcinoma, NOS	8.8	13.9	12.6
Large Cell Nonkeratinizing Squamous Cell Carcinoma	2.9	5.4	6.0
Basaloid Squamous Cell Carcinoma	0.6	4.4	3.2
Other Specified Types	7.6	10.4	10.3

According to the NCDB, greater than 75 percent of head and neck cancers present as squamous cell carcinoma in all three cohorts. The second largest category is keratinizing squamous cell carcinoma, NOS, which contributes to less than 15 percent of head and neck cancers (Table 7).

Stage at Diagnosis

Cancer stage at diagnosis is a strong predictor of disease outcomes. Proper clinical staging of cancer allows the physicians to determine appropriate treatment options. The cancer registry monitors the use of stage in treatment planning and records physician-assigned clinical and pathologic staging in the registry database.

As of 2010, with the changes to FORDS, certified tumor registrars are able to assign clinical stage based on the available information in the medical record if a clinical stage is not assigned by a physician. In cases where clinical information related to stage is absent or unavailable, a stage designation of “unknown” is assigned.

Incidence by Stage

The NCDB data below demonstrates relative frequency of head and neck cancers by stage at time of diagnosis for reporting years 2000 to 2010.

Table 8

Stage at Diagnosis	Head and Neck Cancers by Stage		
	SPH %	NY %	US %
0	1.8	2.3	1.9
I	18.1	14.2	14.1
II	11.1	9.8	11.2
III	12.9	17.5	17.7
IV	32.7	48.4	48.1
NA	0.6	0.2	0.2
UNK	22.8	7.5	7.0

A review of stage data, represented in Table 8, reveals that a larger percent of unknown stage at diagnosis is reported at SPH than in the comparable state and national cohorts. The largest percentage of patients present with Stage IV disease across all three geographic groups. Stage III is the second largest group for NY state and the nation. However, at SPH Stage I is the second largest group. There is a similar pattern of presenting stage between NY state and the United States. However, the SPH pattern of presentation goes from the highest to lowest percentage, Stage IV, I, III, II; whereas NY state and the United States rank, from highest to lowest percentage, Stage IV, III, I, II.

Treatment

Incidence by First Course of Treatment

Relative frequency of initial treatment modalities is shown below:

Table 9

First Course Treatment	Head and Neck Cancers by First Course Therapy		
	SPH %	NY %	US %
Surgery Only	33.3	23.4	22.1
Radiation Only	4.7	8.3	9.3
Surgery & Radiation	12.8	11.2	12.3
Radiation & Chemotherapy	25.1	35.0	32.2
Surgery, Radiation & Chemotherapy	8.2	10.6	13.0
Other Specified Therapy	5.3	5.4	5.1
No 1st Course Treatment	10.5	6.1	6.0

The highest percentage of first course treatment for patients at SPH was "Surgery Only" followed by "Radiation & Chemotherapy." For NY state and the United States, the most predominant first course treatment was "Radiation & Chemotherapy" followed by "Surgery Only." Fewer than 10 percent of patients have "Radiation Only" as a first course treatment and less than 11 percent of patients do not have a first course treatment, across all three cohorts.

Incidence of Treatment with Radiation Therapy

The data in Table 10 looks at the range of Radiation Therapy modalities delivered in treating head and neck cancers.

The largest proportion of patients was treated with beam radiation across all three cohorts. At SPH, it is nearly equal between the groups of patients who received "Beam Radiation" versus "No Beam Radiation." For NY state and the nation, a greater percentage of patients received "Beam Radiation" over "No Beam Radiation."

Table 10

Radiation Treatment	Head and Neck Cancers by Radiation Treatment		
	SPH %	NY %	US %
No Beam Radiation Treatment	49.1	34.4	32.5
Beam Radiation	49.7	60.0	64.4
Brachytherapy	0.0	0.7	0.4
Radiation Therapy, NOS	1.2	4.6	2.3
Unknown if RT Recommended or Administered	0.0	0.4	0.3

SPH does not treat head and neck cancers with brachytherapy. However, a small percentage of patients were treated with brachytherapy in NY state and nationwide (Table 10).

Incidence of Treatment with Systemic Therapy

Various combinations of chemotherapy, hormone therapy, and immunotherapy comprise the systemic therapies available for treating head and neck cancers. The data below illustrates relative frequencies of head and neck cancer treatment with systemic therapy across the geographic cohorts.

Table 11

Systemic Therapy	Head and Neck Cancers by Systemic Therapy		
	SPH %	NY %	US %
No Systemic Therapy	60.8	48.9	49.8
Chemotherapy Alone	34.5	48.4	48.3
Hormone Therapy	0.0	0.0	0.0
Immunotherapy Alone	0.0	0.1	0.1
Endocrine Surgery or Radiation	0.0	0.0	0.0
Chemotherapy and Hormone Therapy	0.0	0.2	0.3
Chemotherapy and Immunotherapy	0.0	0.3	0.2
Hormone Therapy and Immunotherapy	0.0	0.0	0.0
Systemic Therapy, NOS	4.1	1.5	1.0
Unknown if Systemic Therapy Administered	0.6	0.6	0.3

The majority of patients do not undergo systemic therapy for head and neck cancers. However, it is a close majority second only to patients receiving "Chemotherapy Alone." A larger portion of SPH patients do not receive systemic therapy than patients in NY state and the United States. No patients receive hormone therapy alone for head and neck cancers, and less than 1 percent of patients receive immunotherapy in NY state and nationwide (Table 11).

Summary

To summarize the observations and conclusions of this data analysis:

- St. Peter's Hospital reported 91 cases of tongue, tonsil, and oropharynx cancers between 2003 and 2011.
- Since the year 2003, new analytic cases of head and neck cancers have shown an erratic trend with an average change of 3.2 percent.
- Over 30 percent of patients diagnosed with head and neck cancer are between the ages of 50 and 59, in all three cohorts. Few patients are diagnosed at a younger age.

- A review of stage data reveals that a much larger percent of unknown stage is reported at SPH than in the comparable state or national cohorts. The largest percentage of patients present with Stage IV disease across all three geographic groups.
- Oropharynx has the lowest survival rate compared to tongue and tonsil, while tonsil has the best survival, followed by tongue. The average overall 5-year survival rate is 25.5 percent for all three groups.
- The largest proportion of patients was treated with "Beam Radiation" across all three cohorts. At SPH, it is nearly equal between the groups of patients who received "Beam Radiation" versus "No Beam Radiation." For NY state and the United States, a greater percentage of patients received "Beam Radiation" over "No Beam Radiation."
- Systemic therapy follows the opposite pattern of radiation therapy. At SPH there is a 2:1 ratio of "No Systemic Therapy" to "Chemotherapy Alone;" whereas for NY state and nationally, there is a 1:1 ratio of patients receiving "No Systemic Therapy" to those receiving "Chemotherapy Alone." ■





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