Eastern Connecticut Health Network

2011 ECHN Cancer Program
Annual Site Analysis
With a Statistical Review of 2010 Data

Cancer Committee Chairs:
Stephen Hauser, MD
Robert Schwartz, MD

Site Analysis: Lung Cancer

Introduction

Lung cancer accounts for more deaths annually than any other cancer in both men and women. In 2011, an estimated 221,130 new cases of lung cancer will be diagnosed in the United States with an estimated 156,940 deaths, representing approximately 27% of all cancer deaths. Since 1987, more women die from lung cancer every year than from breast cancer.

Cigarette smoking is by far the most important risk factor for developing lung cancer. Risk increases with quantity and duration of smoking. Other risk factors include occupational or environmental exposures and genetic predispositions/family history, especially if the cancer is diagnosed at a young age.

Early detection and screening programs in the past have not proven effective in reducing mortality in early stages of lung cancer; however, research in new testing methods, such as advanced radiological scans and molecular diagnostics, are showing promising results in detecting lung cancers at earlier, more operable stages in high-risk patients. Early results from The National Lung Cancer Screening Trial, a clinical trial designed to determine the effectiveness of lung cancer screening in high-risk individuals, showed 20% fewer lung deaths among current and former heavy smokers who were screened with spiral CT compared to standard chest x-ray (National Cancer Trial 00047385) . However, these results may not be applicable to the general population because this study cohort was comprised strictly of individuals with a history of heavy smoking – the equivalent of at least a pack of cigarettes per day for 30 years.

Signs and symptoms of lung cancer can include persistent cough, sputum with/without blood, chest pain, hoarse voice and recurring lung conditions such as pneumonia or bronchitis. All of these symptoms usually prompt a full work up which include (but is not limited to) history and physical examination, radiology imaging (chest x-ray, chest computed tomography scan (CT), and bronchoscopy, which may include bronchial washings and/or biopsy of a suspected lesion. Once a cancer diagnosis is made via tissue biopsy, a treatment plan is customized for each patient based on the type of lung cancer, the extent of disease, the patient's general age and health and the patient's wishes. The two primary types of lung cancer are small cell carcinoma and non-small cell carcinoma.

Traditional treatment options for non-small cell lung carcinoma include surgery, radiation therapy and chemotherapy, with new targeted therapies (such as the drugs bevacizumab (Avastin) and erlotinib (Tarceva)) offered when appropriate. For localized cancers, surgery may be offered. As the survival for many patients with early stage, non-small cell lung cancer is improved with chemotherapy this may be an option following surgery. Combined chemotherapy and radiation are sometimes used for more advanced disease or in preparation for surgery in the neoadjuvant setting. Advanced stage non-small cell lung cancer patients may benefit from the addition of targeted drugs such as Avastin or cetuximab (Erbitux) combined with other chemotherapy. Many research trials offering new treatments for lung cancer are also available for select patients and patients should feel free to inquire about research trials as part of their lung cancer treatment if they are so inclined.

Small cell carcinomas are usually treated with chemotherapy alone or in combination with radiation. Surgery is usually discouraged for this type of lung cancer. Small cell carcinomas are chemotherapy and radiation therapy sensitive and this treatment often results in a clinical remission. However, small cell carcinomas recur frequently.

Lung cancer is often aggressive and despite recent advances in detection and treatment, the mortality rate remains high. Improvement in the 1-year survival for lung cancer increased from 35% in the 1975-1979 time period to 43% in 2003-2006, largely due to tailored surgical techniques and the use of combination therapies. Unfortunately, the 5-year survival rate for all stages combined remains approximately 16%. The 5-year survival rate for all cases detected when the disease is localized is 53%; only 15% of lung cases are diagnosed at this early stage. Due to this fact, the Eastern Connecticut Cancer Institute and ECHN are dedicated to researching and implementing new ways to detect and treat lung cancer at earlier stages for our 19-town community via initiatives such as the new pulmonary nodule algorithm and our multidisciplinary lung tumor boards (see below).

Health Consequences of Smoking

In the United States, tobacco use is responsible for nearly 1 in 5 deaths and nearly half of those who smoke will die from smoking related diseases. In addition, an estimated 8.6 million people suffer from chronic conditions related to smoking, such as chronic bronchitis, emphysema and cardiovascular diseases.

- Smoking accounts for at least 30% of all cancer deaths and 87% of lung cancer deaths in the United States

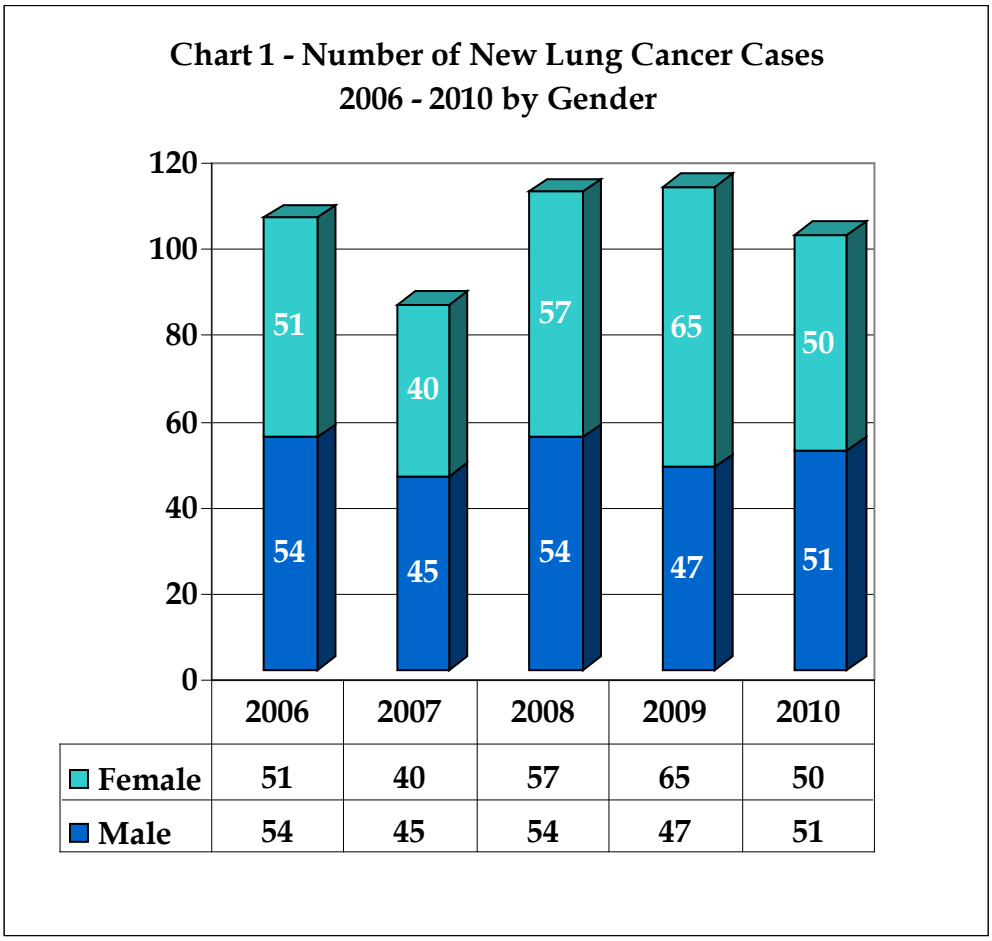
- Risk of developing lung cancer is 23 x higher in male smokers and 13 x higher in female smokers compared to lifelong non-smokers

- Smoking increases the risk of the following types of cancer: nasopharynx, nasal cavity and para-nasal sinuses, lip, oral cavity, pharynx, lung, esophagus, pancreas, uterine cervix, ovary (mucinous), kidney, bladder, stomach, colorectal and acute myeloid leukemia

- Smoking is a major cause of heart disease, cerebrovascular disease, chronic bronchitis and emphysema and is associated with gastric ulcers

- The risk of lung cancer is just as high in smokers of “light” or “low-tar” cigarettes as in those who smoke “regular” or “full-flavored” products

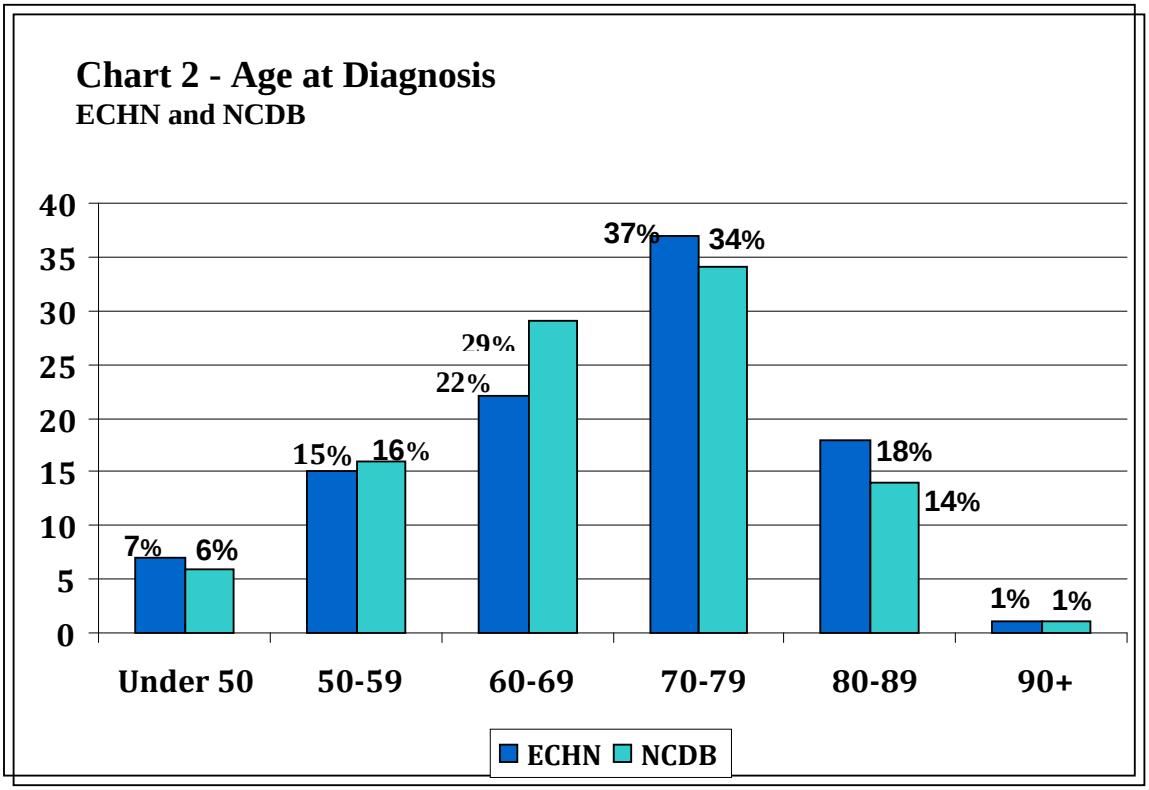
ECHN's Experience



	2006	2007	2008	2009	2010
Female	51	40	57	65	50
Male	54	45	54	47	51

Lung Cancer was the third most common type (12.7%) of cancer diagnosed at ECHN in 2010, following breast cancer (17.1%) and prostate cancer (13.8%). As you can see above, the average number of new lung cancer cases treated at our institute in the last 5 years was 102. Interestingly, in 2006 and 2007, men outnumbered the women in the number of cases by gender, yet in 2008 and 2009 it was reversed.

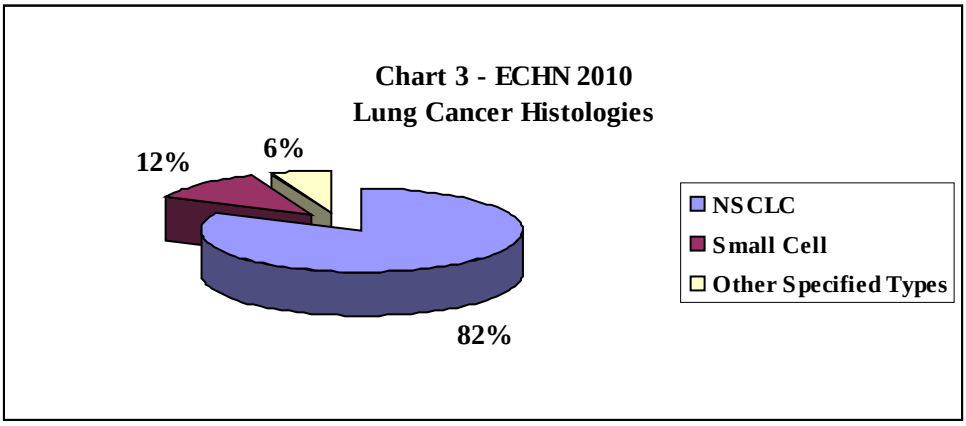
Age at Diagnosis



Age is a critical factor in determining what type of treatment is possible for lung cancer patients. Usually, the more advance age of a patient, the more likely they will have multiple co-morbidities which can impact treatment options. As shown in Chart 2, patients at ECHN are diagnosed with lung cancer at age 50 or older 93% of the time, a rate consistent with the national percentages shown above. Our peak incidence appears to be in the 70-79 age range.

Histology

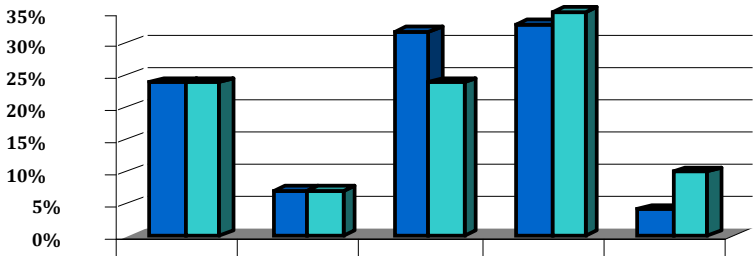
There are two main types of lung cancers: Small Cell Lung Cancer (SCLC) and Non-Small Cell Lung Cancer (NSCLC). Each type is treated differently - thus knowing the histology is critical for cancer treatment. In 2010, the majority (82%) of lung cancer diagnoses were Non-Small Cell Lung Cancer (NSCLC) (Chart 3).



AJCC Stage at Diagnosis

Chart 4 – AJCC Stage at Diagnosis – Non-Small Lung Cancer

ECHN and NCDB

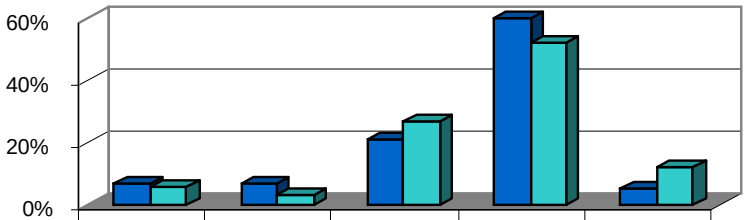


	I	II	III	IV	Unknown.
ECHN	24%	7%	32%	33%	4%
NCDB	24%	7%	24%	35%	10%

ECHN NCDB

Chart 5 – AJCC Stage at Diagnosis – Small Cell Lung Cancer

ECHN and NCDB



	I	II	III	IV	Unknown
ECHN	7%	7%	21%	60%	5%
NCDB	6%	3%	27%	52%	12%

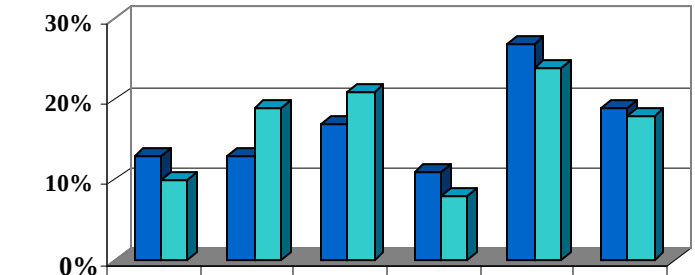
ECHN NCDB

Staging of lung cancer is based on a number of clinical findings, diagnostic studies and laboratory tests. When clinicians discuss treatment options and prognosis for lung cancer patients, stage of disease is a vital part of the decision making process. The stage (or extent) of disease is determined by the size of the main tumor and the spread of disease to both lymph nodes and other organs. Similar to the treatment differences in NSCLC and SCLC, each stage of disease has different treatment options. As reflected in the Charts 4 & 5, most lung cancer cases in both series tend to be diagnosed in later stages (stage III or IV. This is most likely due to the fact that symptoms of lung cancer usually manifest themselves late in the disease course and that approved lung cancer screening programs are not available. At ECHN, 65% of NSCLC lung cancer patients and 81% of SCLC presented to ECHN with stage III or IV disease, in keeping with national statistics. The “unknown” category reflects patients for whom a complete diagnostic workup cannot be completed, usually due to very advanced disease at presentation. In these patients, the disease may progress rapidly, prior to finalizing the clinical staging. Thankfully, ECHN’s rate of the “unknown” category is lower than the national average (5% at ECHN vs. 10-12% nationally), possibly due to the diligence of ECHN physicians in closely evaluating their patients and streamlined staging studies at our institution.

Treatment Modalities

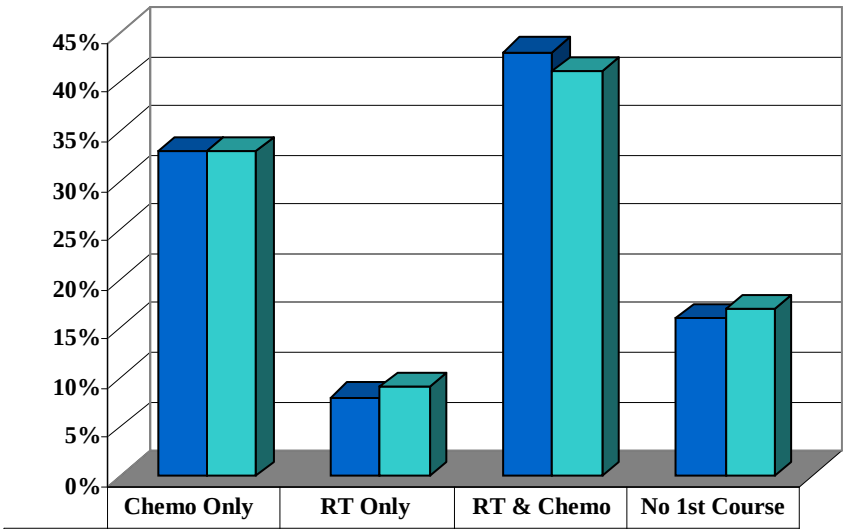
Treatment options for lung cancer are developed for the patient based on the histology or type of lung cancer, patient's age and performance status, as well as the stage of disease. Treatment modalities include surgery, radiation therapy and chemotherapy. For localized or early stage cancers, surgery is often the treatment of choice. This is usually followed by chemotherapy for non-small cell lung cancer. For some, electing not to receive treatment is the correct choice. In general, National Comprehensive Cancer Network (NCCN) guidelines recommendations were followed for treating patients at ECHN (taking into account patients' performance status and preference.) as seen in Chart 6. For small cell lung cancers, chemotherapy alone or combined with radiation is the usual treatment modality as seen below in Chart 7.

Chart 6 - 2010 Initial Treatment for ECHN & NCDB Lung Cancer Cases



	Chemo Only	RT Only	Surgery Only	Surg & Chemo	RT & Chemo	No 1st Course
ECHN	13%	13%	17%	11%	27%	19%
NCDB	10%	19%	21%	8%	24%	18%

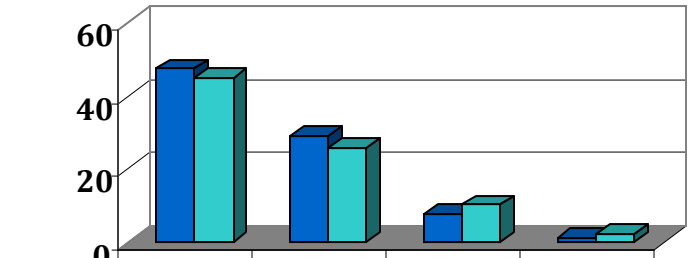
Chart 7 – 2010 Initial Treatment for ECHN & NCDB Small Cell Lung Cancer Cases



	Chemo Only	RT Only	RT & Chemo	No 1st Course
ECHN	33%	8%	43%	16%
NCDB	33%	9%	41%	17%

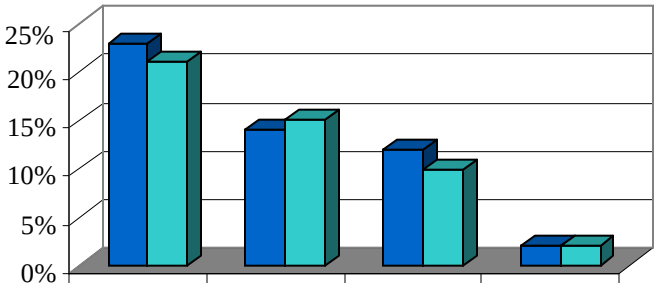
Survival Data by AJCC Stage

Chart 8 - Non-Small Cell Lung Cancer Five-Year Survival Rate
ECHN Compared to the NCDB



	I	II	III	IV
ECHN	47.5%	29.1%	7.6%	1.2%
NCDB	44.9%	26%	10.3%	2.4%

Chart 9 - Small Cell Lung Cancer Five-Year Survival Rate
ECHN Compared to the NCDB



	I	II	III	IV
ECHN	23%	14%	12%	2%
NCDB	21%	15%	10%	2%

Survival rates in lung cancer depend upon multiple factors such as stage of disease at diagnosis, age, type of lung cancer treatment and response to treatment. At ECHN, if the non-small cell lung cancer is diagnosed at an early stage, the 5-year survival rate for NSCLC (Chart 8) is at 47.5%, whereas for advanced disease (stage IV), the 5-year survival rate drops to 2.4%. For those diagnosed with small cell lung cancer (Chart 9), survival rates are low even for those diagnosed at an earlier stage. This survival data is in line with the national rates in both non-small and small cell lung cancer.

Summary and Conclusion

Lung cancer continues to be a difficult type of cancer to diagnosis and treat. Detecting lung cancer in its early stages is critical for better treatment outcomes and survival. ECHN has recently initiated a "suspicious pulmonary nodule pathway" to help diagnose our lung cancer patients earlier and at a curable stage (see below for more information). This annual site analysis demonstrates that ECHN's experience with lung cancer is generally on par with national cancer database statistics and in some cases even exceeds the benchmark data (as in survival rates for patients with Stage I and Stage II non-small cell lung cancer). With dedication and compassion, the physicians and staff at ECHN and the Eastern Connecticut Cancer institute strive to continually improve the diagnosis, management and treatment experiences of our lung cancer patients to ensure the quality of life that they deserve.

COC and Cancer Care Conferences

Reflecting ECHN's commitment to providing the highest quality services, the Commission on Cancer (CoC) of the American College of Surgeons (ACoS) has awarded **three-year re-accreditation with commendation** to our Cancer Program.

Approval by the CoC is given only to those facilities that have committed to providing the best in cancer diagnosis and treatment and that are able to comply with the CoC standards. Accreditation with commendation by the CoC is granted upon the demonstration of a commendation level of compliance with one or more standards that represent the full scope of the cancer program (including existence of cancer committee leadership, cancer data management, clinical services, research, community outreach, and quality improvement). In addition, a facility must receive a compliance rating for all other standards.

Receiving care at a Commission on Cancer accredited facility ensures that, most importantly, patients receive quality care close to home. A CoC – Approved Cancer Program also ensures patients have access to comprehensive care including a range of state-of-the-art services and equipment; a multi-specialty team approach to coordinate the best treatment options available to cancer patients; cancer-related information, education and support; lifelong patient follow-up through a cancer registry that collects data on types and stages of cancers and treatment results; and information about ongoing clinical trials and new treatment options.

CoC Approval is widely recognized by national organizations, such as the Joint Commission on the Accreditation of Health Care Organizations and the American Cancer Society.

Pulmonary Cancer Care Conferences

Cancer Care Conferences, also known as tumor boards, are essential forums to provide multidisciplinary consultative services for patients, and offer education to physicians and healthcare providers. They are integral in our efforts to offer a comprehensive approach to patient care. Cancer conferences are a requirement for an accredited program by the CoC.

In 2010, eighteen patients were presented at the four site specific Pulmonary Cancer Care Conferences, and an additional 12 patients were presented at other Cancer Care Conferences. At the request of our physicians, the frequency of the Pulmonary Conferences was increased to every other month in 2011 and will be monthly for 2012.

Development of the Clinical Pathway to Manage Suspicious Pulmonary Nodules and Lung Cancer at ECHN

Stephen H Hauser, MD

Chair, Subcommittee for the Management of Patients with Suspicious Pulmonary Nodules and Lung Cancer

Early detection and screening programs for lung cancer in the past have not proven effective in reducing mortality in early stages of lung cancer; however promising results in detecting lung cancers at earlier, more operable stages in high-risk patients have recently been reported. Early results from the National Lung Cancer Screening Trial, a clinical trial designed to determine the effectiveness of lung cancer screening in high-risk individuals, showed a 20% few lung cancer deaths among current and former heavy smokers who were screened with spiral CT compared to standard chest X-ray. It is yet to be determined if these results are applicable to the general population because this study cohort was comprised strictly of individuals with a history of heavy smoking – the equivalent of at least a pack of cigarettes per day for 30 years.

The one year survival for lung cancer increased from 35% in 1975-1979 to 43% in 2003-2006, largely due to improvements in surgical techniques and combined therapies. Unfortunately, the 5-years survival rate for all stages combined is only 16%. The 5-year survival rate for all cases detected when the disease is localized is 53% but only 15% of lung cases are diagnosed at this early stage.

To this effect the ECHN Cancer Committee recognized the need to formalize the process of identifying suspicious pulmonary nodules found on chest CT, in particular when found incidentally on chest CT imaging ordered for unrelated purposes. The committee established a subcommittee for the development of this process, which meets regularly and reports to the cancer committee. As of this date, a system was implemented whereby 1) all chest CT scans performed at ECHN identifying pulmonary nodules obtain the Fleisher recommendations on the report regarding appropriate follow up, 2) all such suspicious scans then forward to ECHN's nurse navigator who notifies the ordering physician of such findings and recommendations, and 3) all patients whose scans have nodules in which biopsy is recommended obtain such biopsy within fourteen days of CT scan as part of a fast track mechanism of care for such patients. All three components are tracked and monitored by the cancer committee as part of ECHN's quality indicators and studies.

Since the start of the notification process of abnormal findings in July 2011, 386 patients with suspicious pulmonary nodules have been identified on chest CT scans at ECHN. One hundred and eight calls have been placed to ordering physicians if not the patient's pulmonologist or oncologist. Eight such patients required biopsies according to recommendations and seven of those eight had their biopsy within 14 days of CT scan. Seven of those eight patients had a positive diagnosis of lung cancer identified on those biopsies.

The subcommittee recognizes the need to carry this model through to the completion of management for patients identified with lung cancer through timely referrals to the managing team of physicians and through the development of an interdisciplinary clinic where patients can be seen to facilitate coordination of such care. As such, the subcommittee continues to meet to develop this fast track model to ensure patients diagnosed with lung cancer receive appropriate care in a timely manner.