

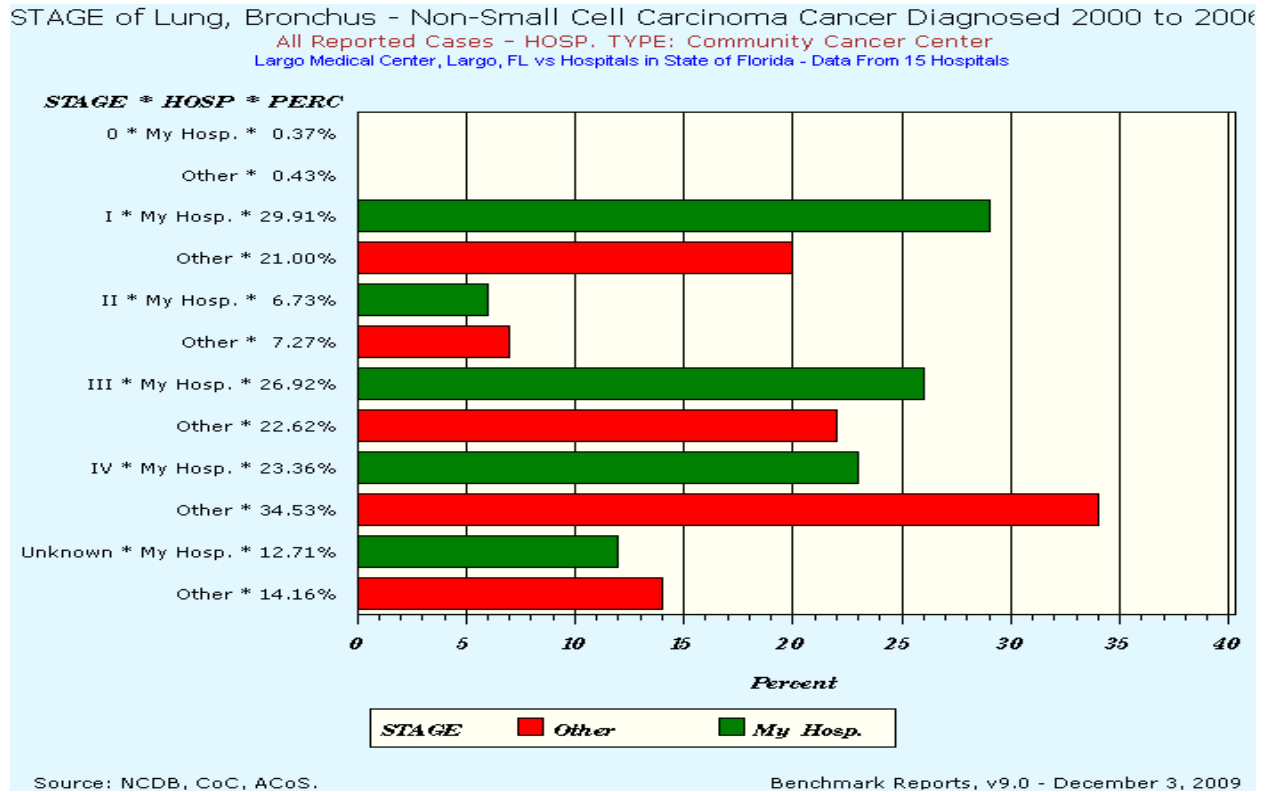
## Lung Cancer-Symptoms, Staging, and Treatment

Lung cancer continues to present a major challenge within the United States and worldwide. Lung cancer is diagnosed in over 200,000 people and approximately 160,000 will succumb to the disease in the United States annually. Perhaps with the advent of effective smoking cessation strategies and techniques, plus increasing awareness of the ravages of smoking, the incidence of lung cancer may have reached a plateau. Regardless, lung cancer will represent a major cause of morbidity and mortality for years to come.

Presenting symptoms of lung cancer can be attributed to either the primary tumor, involvement of regional lymph nodes, or the presence of distant metastases. Typical presenting symptoms of the primary tumor mass include cough, dyspnea, hemoptysis, or chest pain. Regional nodal involvement may include the same symptoms plus dysphagia or stridor. Weight loss, bone pain, or central nervous system symptoms may be related to the presence of metastatic disease.

When comparing Largo Medical Center’s non-small cell lung cancer cases from 2000-2006, we find that Largo Medical Center had a higher percentage of stage I lung cancer, and a lower percentage of stage IV lung cancer than the state averages (**Chart 1**). The five year observed survival rate for stage I lung cancer at Largo Medical Center is 42.6% compared to the national survival rate of 36%. The five year observed survival rate for stage IV lung cancer at Largo Medical Center is 1.9% which is comparable to the National survival rate of 1.8% (**Chart 2**).

**(Chart 1)**



## Lung Cancer-Symptoms, Staging, and Treatment

(Chart 2)

BESTSTG	ENTER	0.0 yr	1.0 yr	2.0 yr	3.0 yr	4.0 yr	Largo 5.0 yr	National 5.0 yr	95% Confidence Interval
0	166	100.0	52.1	34.1	25.7	22.2		17.9	11.8 - 23.9
I	9717	100.0	74.1	57.9	47.9	41.1	42.6	36.0	34.9 - 37
II	4002	100.0	59.9	39.0	28.9	23.2		19.1	17.8 - 20.4
III	13328	100.0	41.3	20.1	12.6	9.1	10.2	7.1	6.6 - 7.5
IV	17561	100.0	19.1	6.8	3.6	2.4	1.9	1.8	1.6 - 2

In order to properly treat lung cancer, it is imperative to obtain an accurate determination of the type and stage of the disease. The two main histologic subtypes include Small Cell (SCLC) and Non-Small Cell lung cancer (NSCLC). Non-Small cell lung cancer is subdivided into squamous cell, adenocarcinoma, large cell carcinoma, and bronchi alveolar carcinoma. Approximately 80% of all cancers are non-small cell, while 20% are small cell. Patients with small cell carcinoma are generally not considered candidates for surgical resection and would be offered chemotherapy or chemo radiotherapy. The different subtypes of non-small cell carcinoma may warrant different approaches from a chemotherapy standpoint. Techniques for determining the histology of a lung cancer include bronchoscopy, CT guided needle/core biopsy, thoracentesis if a pleural effusion is present, mediastinoscopy or sometimes a thoracoscopic approach.

Arriving at the exact stage of the disease is accomplished with the use of radiographic procedures such as routine chest x-rays, CT scans, and PET scans. Staging is based upon the TNM system (**Table 1**). Patients with stage I or II NSCLC based on comprehensive staging may be eligible for surgical resection provided they are medically able to handle the procedure. Many patients with clinical stage IIIA and all patients with stage IIIB are not candidates for surgery and may be offered definitive chemo radiotherapy in an effort to improve symptoms and prolong survival. All patients with stage IV are considered inoperable and incurable and would be offered either chemo radiotherapy, palliative chemotherapy, radiation alone, or supportive care.

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(Table 1)

Stage	TNM Subset	Stage	TNM Subset
<b>0</b>	<b>Carcinoma in situ</b>	<b>IIB</b>	<b>T2N1M0, T3N0M0</b>
<b>IA</b>	<b>T1N0M0</b>	<b>IIIB</b>	<b>T4N0M0, T4N1M0, T4N2M0, T4N3M0, T1N3M0, T2N3M0, T3N3M0</b>
<b>1B</b>	<b>T2N0M0</b>	<b>IV</b>	<b>Any T, any N, M1</b>
<b>IIA</b>	<b>T1N1M0</b>		

TX Primary tumor cannot be assessed, or tumor proven by the presence of malignant cells in sputum or bronchial washings but not visualized by imaging or bronchoscopy

T0 No evidence of primary tumor

Tis Carcinoma in situ

T1 Tumor 3 cm or less in greatest dimension, surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus† (ie, not in the main bronchus)

T2 Tumor with any of the following features of size or extent:  
 More than 3 cm in greatest dimension  
 Involves main bronchus, 2 cm or more distal to the carina  
 Invades the visceral pleura  
 Associated with atelectasis or obstructive pneumonitis that extends to the hilar region but does not involve the entire lung

T3 Tumor of any size that directly invades any of the following: chest wall (including superior sulcus tumors), diaphragm, mediastinal pleura, parietal pericardium; or tumor in the main bronchus less than 2 cm distal to the carina, but without involvement of the carina; or associated atelectasis or obstructive pneumonitis of the entire lung.

T4 Tumor of any size that invades any of the following: mediastinum, heart, great vessels, trachea, esophagus, vertebral body, carina; or separate tumor nodules in the same lobe; or tumor with a malignant pleural effusion

NX Regional lymph nodes cannot be assessed

N0 No regional lymph node metastasis

N1 Metastasis to ipsilateral peribronchial and/or ipsilateral hilar lymph nodes, and intrapulmonary nodes including involvement by direct extension of the primary tumor

N2 Metastasis to ipsilateral mediastinal and/or subcarinal lymph node(s)

N3 Metastasis to contra lateral mediastinal, contra lateral hilar, ipsilateral or contra lateral scalene, or supraclavicular lymph node(s)

MX Distant metastasis cannot be assessed

M0 No distant metastasis

M1 Distant metastasis present

Systemic chemotherapy for lung cancer, in particular NSCLC, has evolved over the past few years and is now increasingly guided by the histologic subtype. While platinum based doublets

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form the backbone for most patients with non small cell cancer, the particular histology offers insight into effective use of some of the newer and more novel agents. Patients with adenocarcinomas may derive substantial benefit from bevacizumab (Avastin) or pemetrexed (Alimta), whereas these agents are either dangerous (Avastin causing hemoptysis) or ineffective (Alimta) in patients with squamous cell carcinoma. Cetuximab (Erbix) however may be helpful in patients with squamous cell cancers and erlotinib (Tarceva), both of which target the EGFR (epidermal growth receptor) may be useful in squamous cell or adenocarcinomas. While patients with advanced lung cancer will still succumb to their disease, modern chemotherapy can prolong their survival and enhance their quality of life.

For those patients with stage I, II and selected IIA non small cell carcinomas, surgical resection in appropriately selected patients offers curative potential. The classic open thoracotomy has long been considered the Gold Standard of surgical management. The implicit goals of surgery are to remove the primary tumor with clear margins and to adequately stage the lymph nodes within the hilum and mediastinum. The preferred procedure is to perform a lobectomy, although at times a pneumonectomy is required. A wedge resection or segmentectomy are options in physiologically compromised patients, but are not ideal as the risk of local recurrence is higher with these procedures. (Table 2).

### Practice Guidelines in Oncology – v.2.2009

## Non-Small Cell Lung Cancer

(Table 2)

- The overall plan of treatment as well as needed imaging studies should be determined before any non-emergency treatment is initiated.
- We recommend that the determination of resectability be performed by thoracic surgical oncologists who perform lung cancer surgery as a prominent part of their practice.
- Lobectomy or pneumonectomy, if physiologically feasible.
- Limited resection - either segmentectomy (preferred) or wedge resection - if physiologically compromised.
- Video-assisted thoracic surgery (VATS) may be considered as a feasible option for patients that are surgically resectable as long as there is no compromise of standard oncologic and dissection principles of thoracic surgery.
- N1 and N2 node resection and mapping (minimum of three N2 stations sampled or complete lymph node dissection)
- If determined medically inoperable by thoracic surgeon, clinical stage I and II patients should receive potentially curative RT as their local approach.

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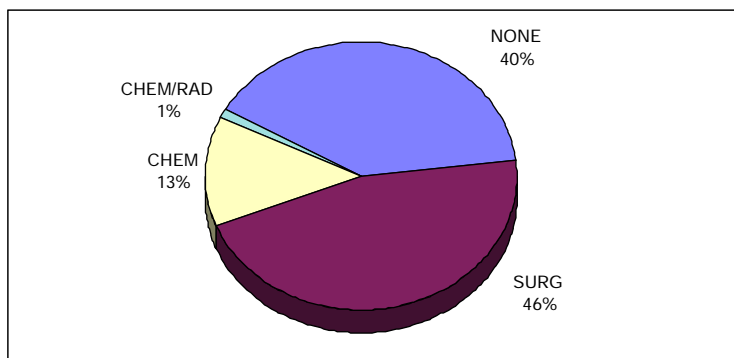
- Lung-sparing anatomic resection (sleeve lobectomy) preferred over pneumonectomy, if anatomically appropriate and margin-negative resection achieved.

Over the past few years, video-assisted thoracoscopic surgery (VATS) has become a viable option to the more invasive open thoracotomy and indeed a large shift in the thoracic oncology community is taking place. In 2007 the International Society of Minimally Invasive Cardiothoracic Surgeons issued a consensus statement declaring that VATS can be recommended for the definitive resection of lung cancer. Their studies have concluded that VATS reduces post-op complications such as pain, air leaks, decreases hospital length of stays, improves return to normal functionality allowing patients to return to their daily activities sooner and can enhance compliance in those patients who receive adjuvant chemotherapy. Furthermore it has been shown that 5 year stage-specific survival rates are identical to open thoracotomy for stages I and II NSCLC.

During 2008, 84 cases of lung cancer were identified at Largo Medical Center with sufficient data to allow analysis (**Figure 1**).

**(Figure 1)**

Rx TYPE	NBR_CASES	PERCENT
NONE	33	39.29%
SURG	38	45.24%
CHEM	11	13.10%
CHEM/RAD	1	1.19%
SURG/CHEM	1	1.19%
<b>TOTAL CASES</b>	<b>84</b>	<b>100.00%</b>



## **Lung Cancer-Symptoms, Staging, and Treatment**

Of those 84 patients, 39 underwent a surgical procedure. 36 patients underwent a VATS procedure and 3 underwent an open thoracotomy. Of 19 patients with stage IA, 18 underwent VATS with 1 open thorocotomy. All eight patients with stage IB underwent VATS and both patients with stage IIB underwent VATS. Of the 3 patients with stage IIIA disease, 2 underwent VATS and of 2 patients with stage IIIB determined at the time of surgery, one underwent VATS and the other an open procedure. The remainder of the patients evaluated had radiographic stage IIIB or IV disease and were offered chemo radiotherapy, palliative chemotherapy, or best supportive care and Hospice. The diagnosis in these patients was established by bronchoscopy, FNA, or thoracentesis.

Thus 93% of patients undergoing resection for NSCLC at Largo Medical Center were approached via VATS. This is in keeping with national trends and patterns of care. Additional study will determine data on length of stay, complication rates, adequacy of staging and survival outcomes. We anticipate that these parameters will be consistent with published data.

Respectively Submitted,

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