

Overview of Lung Cancer

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Presenter Disclosure

- **Faculty: William Hunter**
- **Relationships with commercial interests:**
 - No relationships financial or otherwise

Mitigating Potential Bias

- No potential biases to mitigate.

Learning Objectives

1. Recognize the diversity of thoracic malignancies and identify the most common ones that affect Manitobans
2. Describe the basics of lung cancer staging and how it effects prognosis and guides treatment
3. Appreciate the multidisciplinary approach for diagnoses and management of lung cancers

Most Common Cancer Diagnoses, 2015

Manitoba

Incidence

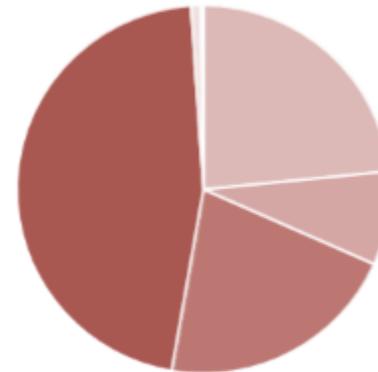
Male		Female		Total	
SITE	CASES	SITE	CASES	SITE	CASES
Prostate	710	Breast	834	Lung & bronchus	935
Colorectal	482	Lung & bronchus	497	Breast	838
Lung & Bronchus	438	Colorectal	347	Colorectal	829
Non-Hodgkin lymphoma	163	Corpus uteri	262	Prostate	710
Kidney	137	Non-Hodgkin lymphoma	130	Non-Hodgkin lymphoma	293
Melanoma of the skin	131	Melanoma of the skin	110	Corpus uteri	262
Bladder	105	Thyroid	98	Melanoma of the skin	241
Stomach	84	Kidney	94	Kidney	231
Pancreas	78	Pancreas	93	Pancreas	171
Chronic lymphocytic leukemia	59	Ovary	84	Bladder	147

http://www.cancercare.mb.ca/home/cancer_research/epidemiology_and_cancer_registry/reports/

Incidence: Manitoba 2015

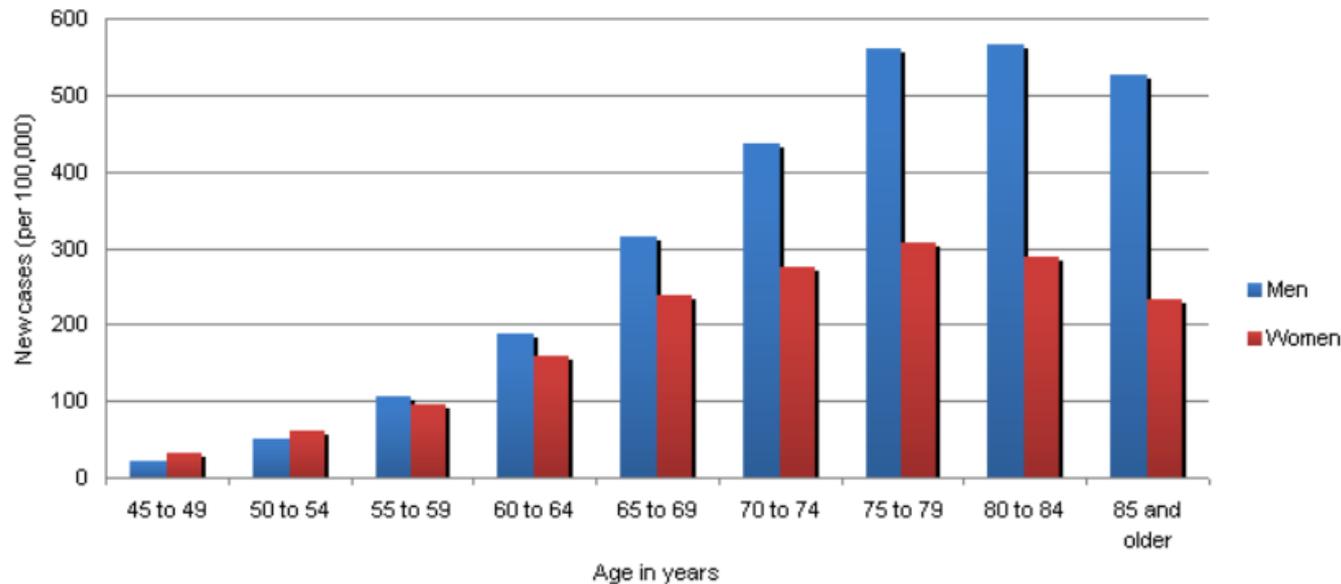
Lung & bronchus

	Frequency	Percent	
Stage I	219	23.4	
Stage II	77	8.2	
Stage III	197	21.1	
Stage IV	432	46.2	
Unknown	8	0.9	
Occult	2	0.2	
Total	935	100	



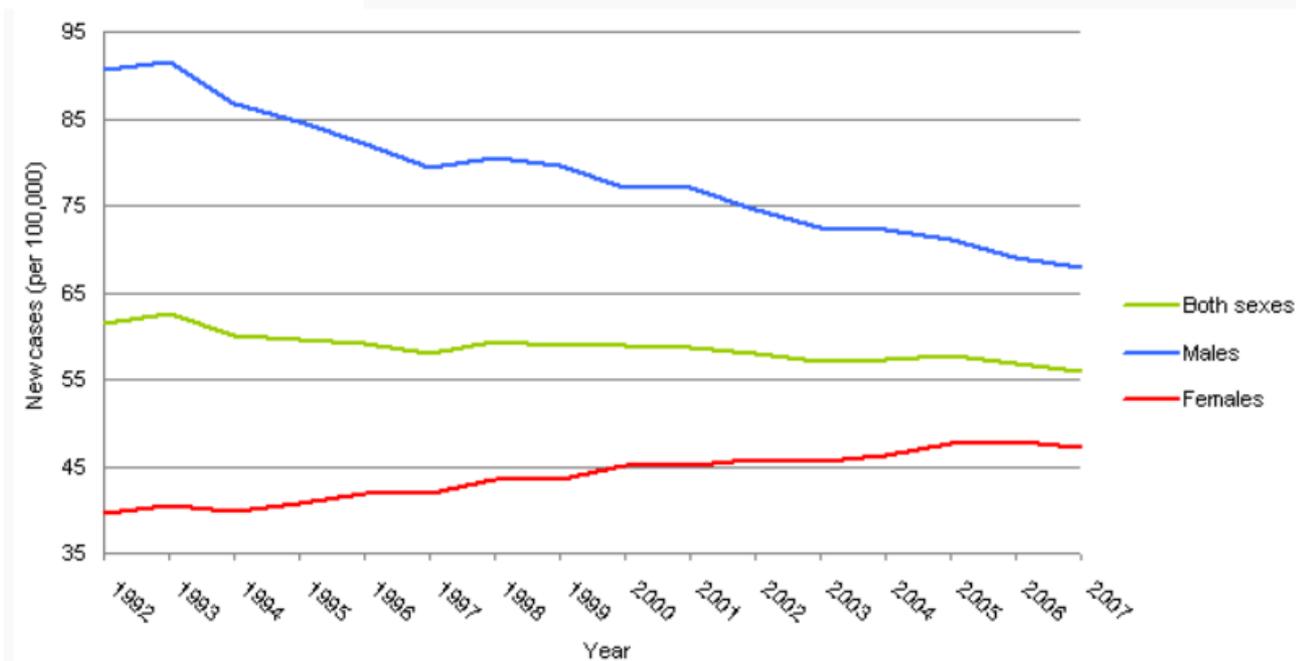
http://www.cancercare.mb.ca/home/cancer_research/epidemiology_and_cancer_registry/reports/

Lung cancer, incidence rate per 100,000, by age group and sex, Canada, 2007



<https://www.statcan.gc.ca/pub/82-624-x/2011001/article/chart/11596-03-chart3-eng.htm>

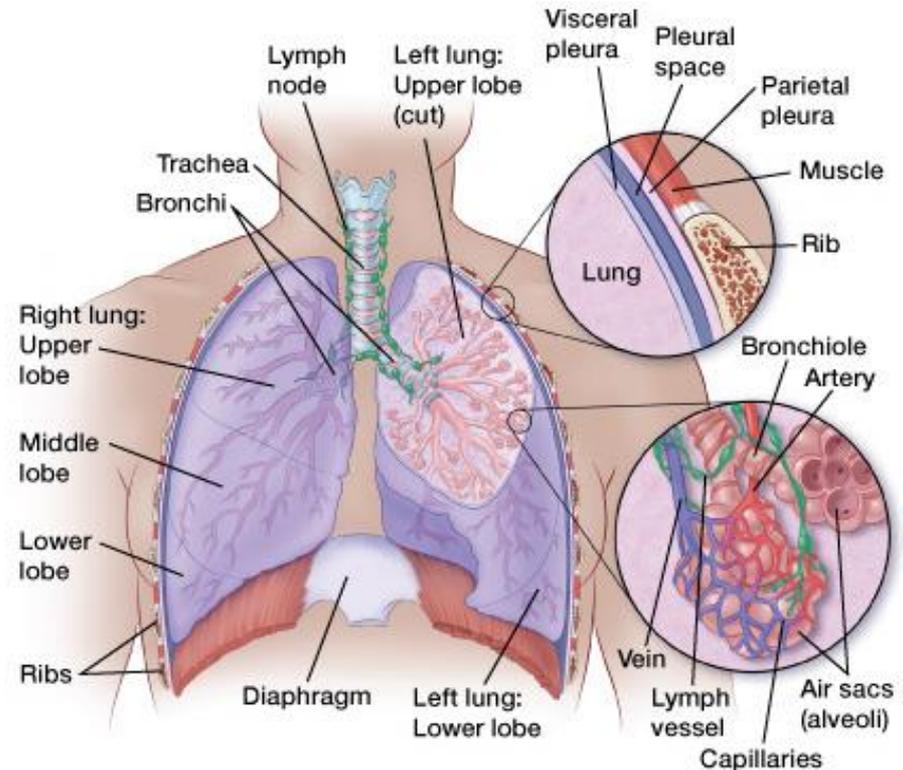
Lung cancer, age-standardized incidence rates per 100,000, by year and sex, Canada, 1992 to 2007



<https://www.statcan.gc.ca/pub/82-624-x/2011001/article/chart/11596-02-chart2-eng.htm>

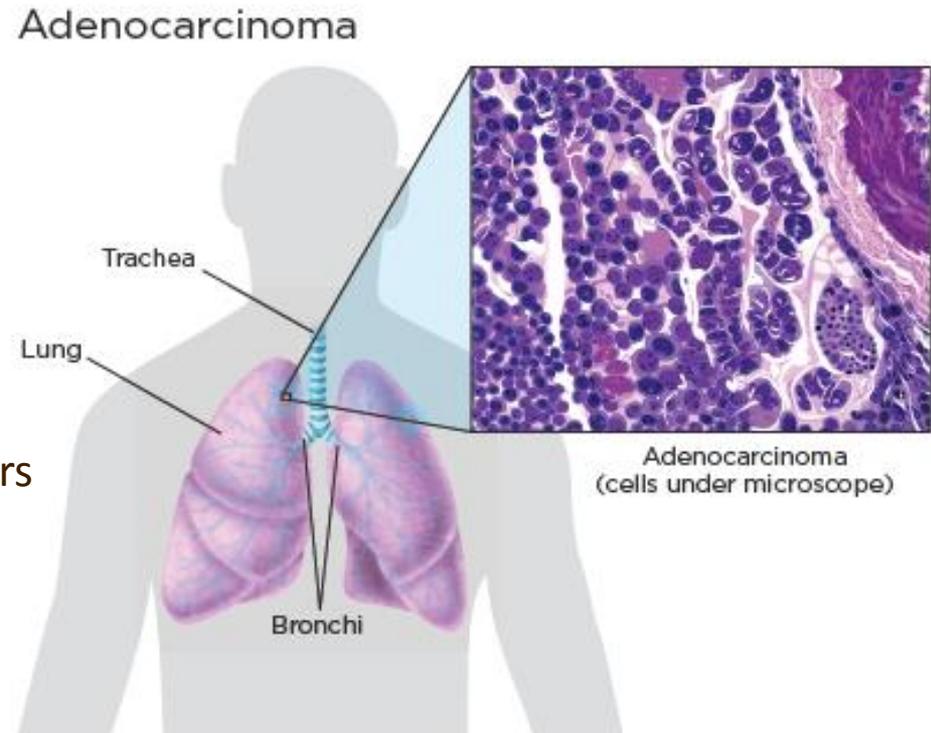
2 Main Types of Lung Cancer

- Non Small Cell Lung Cancer (NSCLC)
 - Adenocarcinoma
 - Squamous cell carcinoma
 - Large Cell Carcinoma
- Small cell lung Cancer (SCLC)
- Rare: carcinoids, granular cell, salivary gland type, large cell neuroendocrine, sarcomatoid carcinoma



NSCLC - adenocarcinoma

Begins in glandular cells
Typically located in periphery of the lung
~40% of lung cancers
Generally slower growing
Most common lung cancer in non-smokers



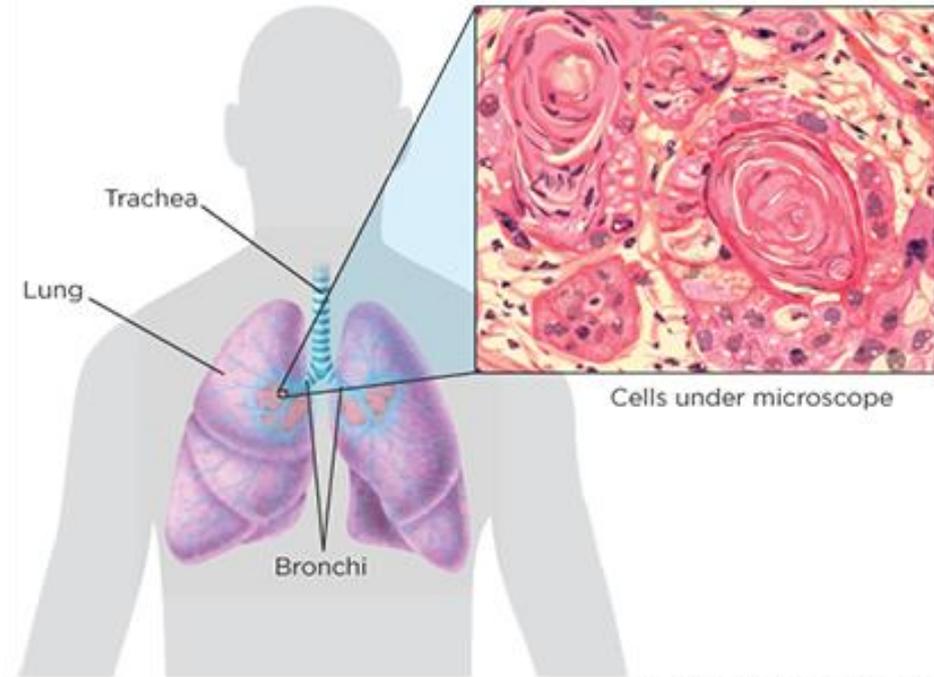
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<https://www.lungevity.org/for-patients-caregivers/lung-cancer-101/types-of-lung-cancer/lung-adenocarcinoma>

NSCLC – squamous cell carcinoma

Epidermoid origin
Arising in cells that line the airways
~30% of lung cancers
Typically more central locations

Squamous Cell Lung Cancer



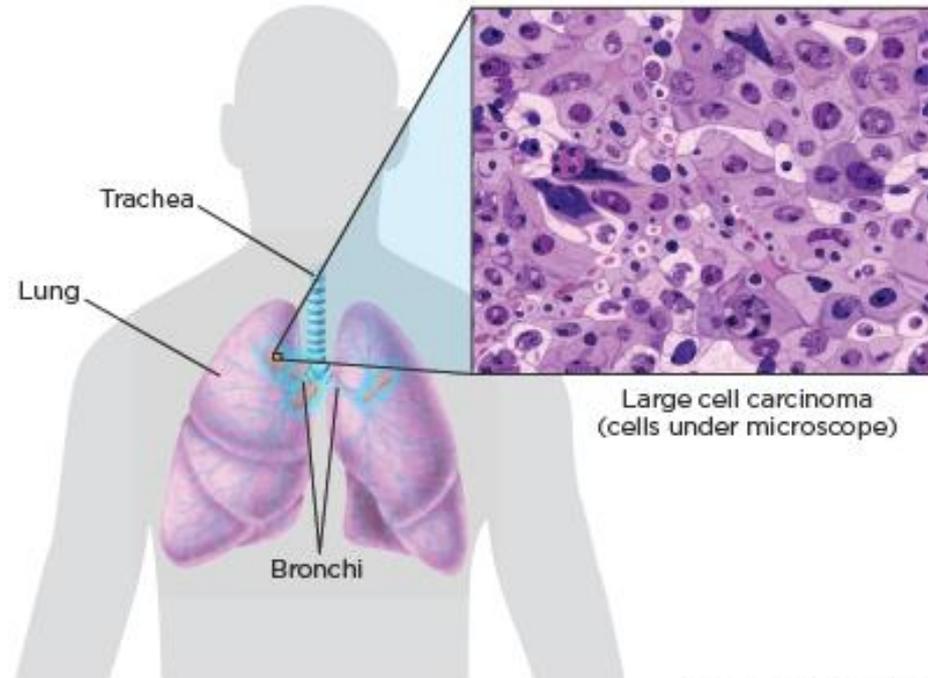
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<https://www.lungevity.org/for-patients-caregivers/lung-cancer-101/types-of-lung-cancer/squamous-cell-lung-cancer>

NSCLC- large cell carcinoma

~10% of lung cancers
Dropping incidence- better classification
Majority are found in men

Large Cell Carcinoma

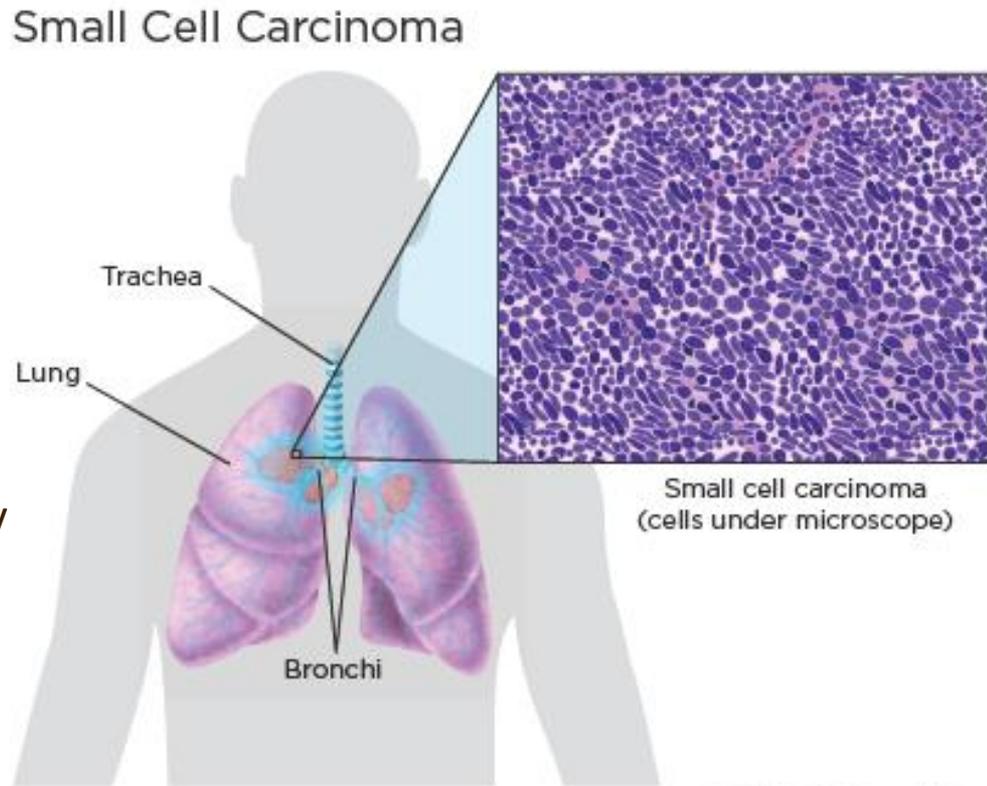


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<https://www.lungevity.org/for-patients-caregivers/lung-cancer-101/types-of-lung-cancer/large-cell-lung-cancer>

SCLC

- Neuroendocrine tumor
- Usually located more centrally
- ~15% of all lung cancers
- Strongly associated with tobacco use
- High propensity to spread
- Some consider it a systemic disease
- Chemotherapy main treatment modality
- High propensity to spread to brain



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<https://www.lungevity.org/for-patients-caregivers/lung-cancer-101/types-of-lung-cancer/small-cell-lung-cancer>

Lung Cancer Staging

WHY?

1. Helps with estimating prognosis
2. Guides management decisions
3. Aids in tracking outcomes

Lung Cancer Staging

- **AJCC** - American Joint Committee on Cancer
- **TNM**
 - **T = Tumour**
 - **N = Node**
 - **M = Metastases**

Clinical Staging- exam, biopsy, imaging investigations

Pathological Staging- examination of resected surgical specimen

<https://cancerstaging.org>

Lung Cancer Staging

TNM

– T = Tumour

- Size, location, invasion into adjacent structures, collapse of lobes, separate tumor nodules

– N = Node

– M = Metastases

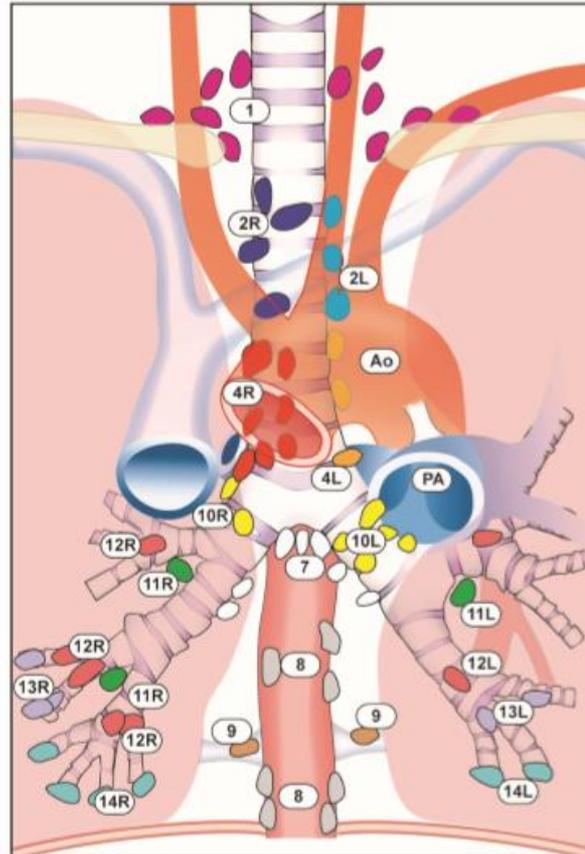
Primary Tumor (T)

- 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 (for example, not in the main bronchus)¹
- T1a** Tumor 2 cm or less in greatest dimension
- T1b** Tumor more than 2 cm but 3 cm or less in greatest dimension
- T2** Tumor more than 3 cm but 7 cm or less or tumor with any of the following features (T2 tumors with these features are classified T2a if 5 cm or less): involves main bronchus, 2 cm or more distal to the carina; invades visceral pleura (PL1 or PL2); associated with atelectasis or obstructive pneumonitis that extends to the hilar region but does not involve the entire lung
- T2a** Tumor more than 3 cm but 5 cm or less in greatest dimension
- T2b** Tumor more than 5 cm but 7 cm or less in greatest dimension
- T3** Tumor more than 7 cm or one that directly invades any of the following: parietal pleural (PL3), chest wall (including superior sulcus tumors), diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium; or tumor in the main bronchus less than 2 cm distal to the carina¹ but without involvement of the carina; or associated atelectasis or obstructive pneumonitis of the entire lung or separate tumor nodule(s) in the same lobe
- T4** Tumor of any size that invades any of the following: mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, carina, separate tumor nodule(s) in a different ipsilateral lobe

<https://cancerstaging.org>

Lung Cancer Staging

- TNM
 - T = Tumour
 - N = Node (lymph)
 - location
 - M = Metastases



Regional Lymph Nodes (N)

- NX** Regional lymph nodes cannot be assessed
- N0** No regional lymph node metastases
- N1** Metastasis in ipsilateral peribronchial and/or ipsilateral hilar lymph nodes and intrapulmonary nodes, including involvement by direct extension
- N2** Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s)
- N3** Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s)

<https://cancerstaging.org>

Lung Cancer Staging

- **TNM**
 - T = Tumour
 - N = Node
 - **M = Metastases**
 - **Distant spread**

.....

Distant Metastasis (M)

M0 No distant metastasis

M1 Distant metastasis

M1a Separate tumor nodule(s) in a contralateral lobe, tumor with pleural nodules or malignant pleural (or pericardial) effusion²

M1b Distant metastasis (in extrathoracic organs)

<https://cancerstaging.org>

Lung Cancer Staging

- **TNM**
 - T = Tumour
 - N = Node
 - M = Metastases
- **Combined for overall stage**

ANATOMIC STAGE/PROGNOSTIC GROUPS			
Occult Carcinoma	TX	N0	M0
Stage 0	Tis	N0	M0
Stage IA	T1a	N0	M0
	T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T2b	N0	M0
	T1a	N1	M0
	T1b	N1	M0
	T2a	N1	M0
Stage IIB	T2b	N1	M0
	T3	N0	M0
Stage IIIA	T1a	N2	M0
	T1b	N2	M0
	T2a	N2	M0
	T2b	N2	M0
	T3	N1	M0
	T3	N2	M0
	T4	N0	M0
	T4	N1	M0
Stage IIIB	T1a	N3	M0
	T1b	N3	M0
	T2a	N3	M0
	T2b	N3	M0
	T3	N3	M0
	T4	N2	M0
	T4	N3	M0
Stage IV	Any T	Any N	M1a
	Any T	Any N	M1b

<https://cancerstaging.org>

Lung Cancer Staging

- Don't try to memorize
- Just print out the sheet
- Updates/changes are coming

<https://cancerstaging.org>

5 year Survival Rates

NSCLC

- Stage IA: 49%
- Stage IB: 45%
- Stage IIA: 30%
- Stage IIB: 31%
- Stage IIIA: 14%
- Stage IIIB: 5%
- Stage IV: 1%

SCLC

- Stage I: 31%
- Stage II: 19%
- Stage III: 8%
- Stage IV: 2%

<https://www.cancer.org/cancer/non-small-cell-lung-cancer/detection-diagnosis-staging/survival-rates.html>

Associated Risk Factors

Smoking – linked to 80 to 90% of lung cancers

Second Hand smoke

Radon

Asbestos

Other substances: arsenic, exhaust, silica, chromium

Family History of Lung Cancer: common environment vs genetics

Radiation exposure

Weaker associations:

Human Papilloma Virus infection- may be linked to some squamous cell cases

Previous Tuberculosis infection

Marijuana smoking

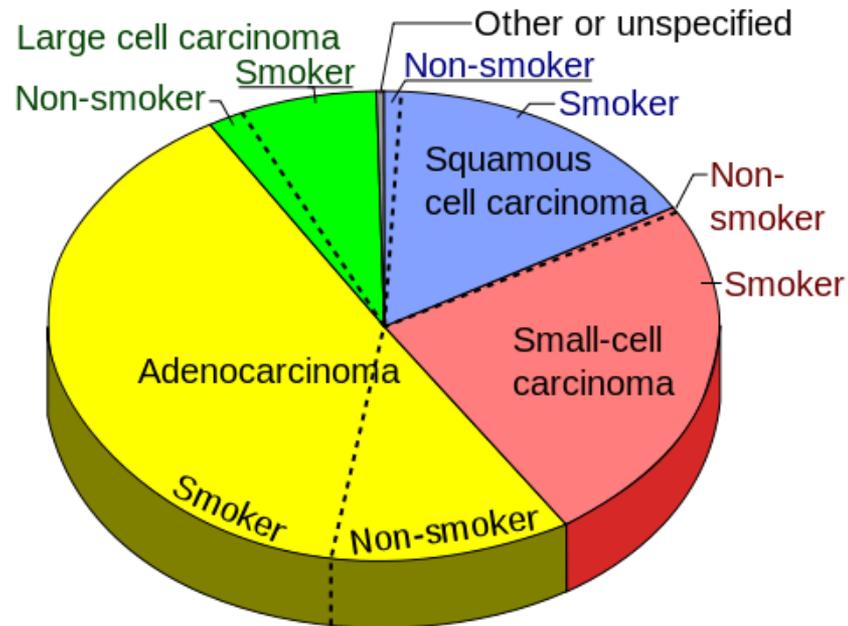


Table 2 in: Kenfield, S A; Wei, E K; Stampfer, M J; Rosner, B A; Colditz, G A (2008). "Comparison of aspects of smoking among the four histological types of lung cancer". Tobacco Control. 17 (3): 198–204. PMC 3044470 Freely accessible. PMID 18390646.

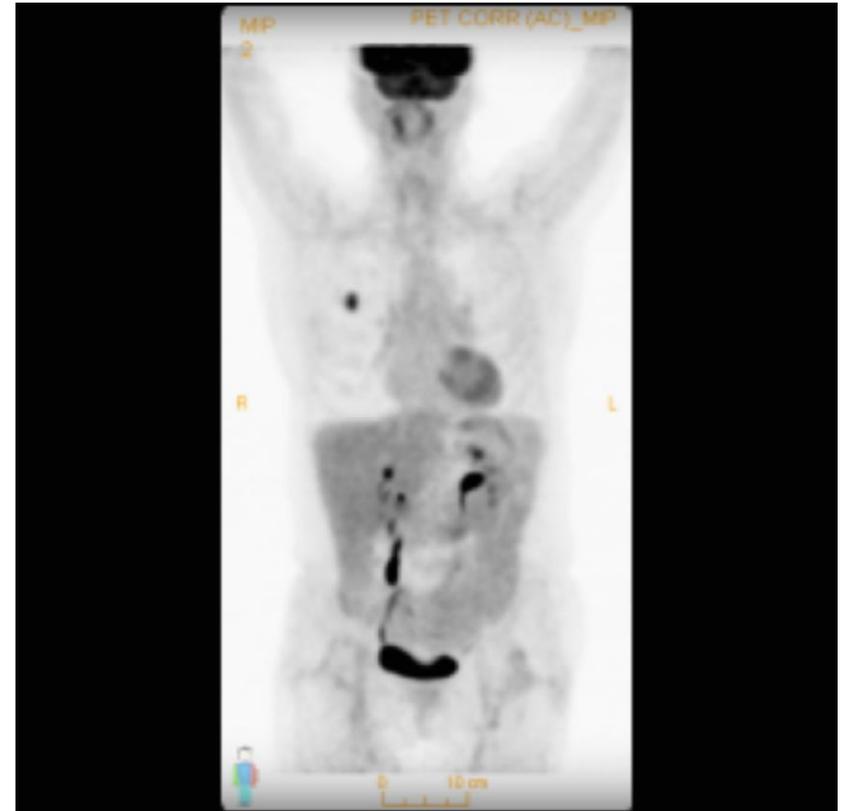
Treatment

Surgery

Radiation

Chemotherapy

Depends on stage,
resectability, patient
factors such as age and
comorbidities



Curative versus palliative

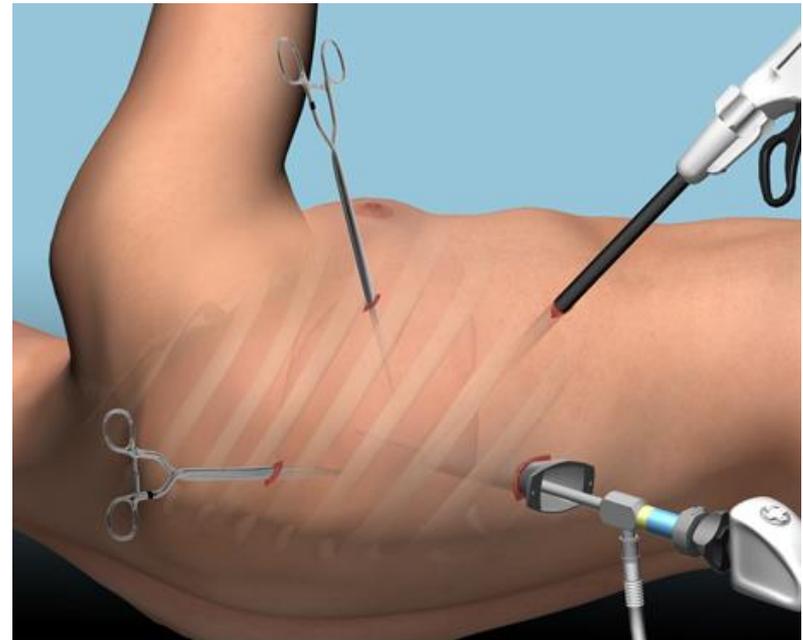
Treatment

Surgery

best chance of cure
resectability/stage
patient factors

Radiation

Chemotherapy



Video-assisted thoracic surgery (VATS) showing minimally invasive access to chest structures

Treatment

Surgery

Radiation

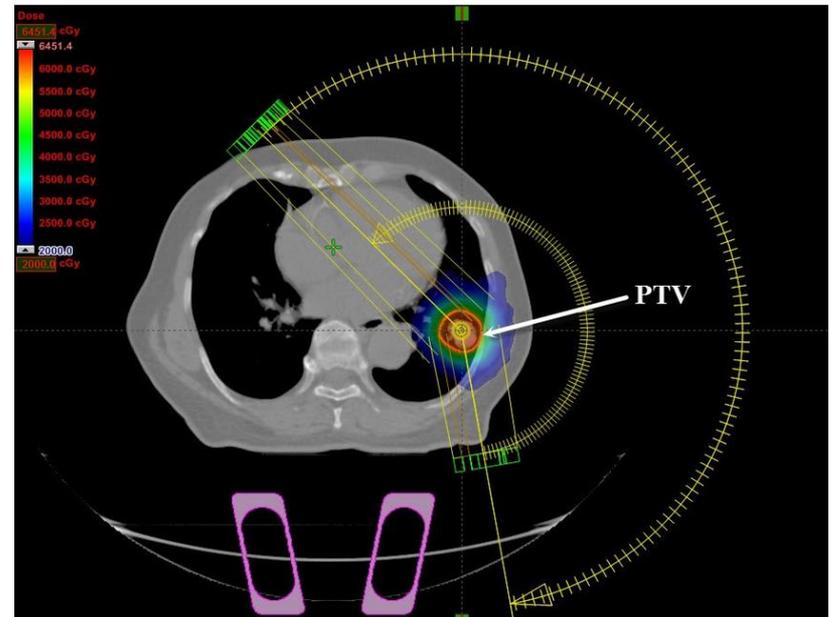
curative +/-chemo

adjuvant tx

SBRT

palliative tx

Chemotherapy



Treatment

Surgery

Radiation

Chemotherapy

primary tx for SCLC

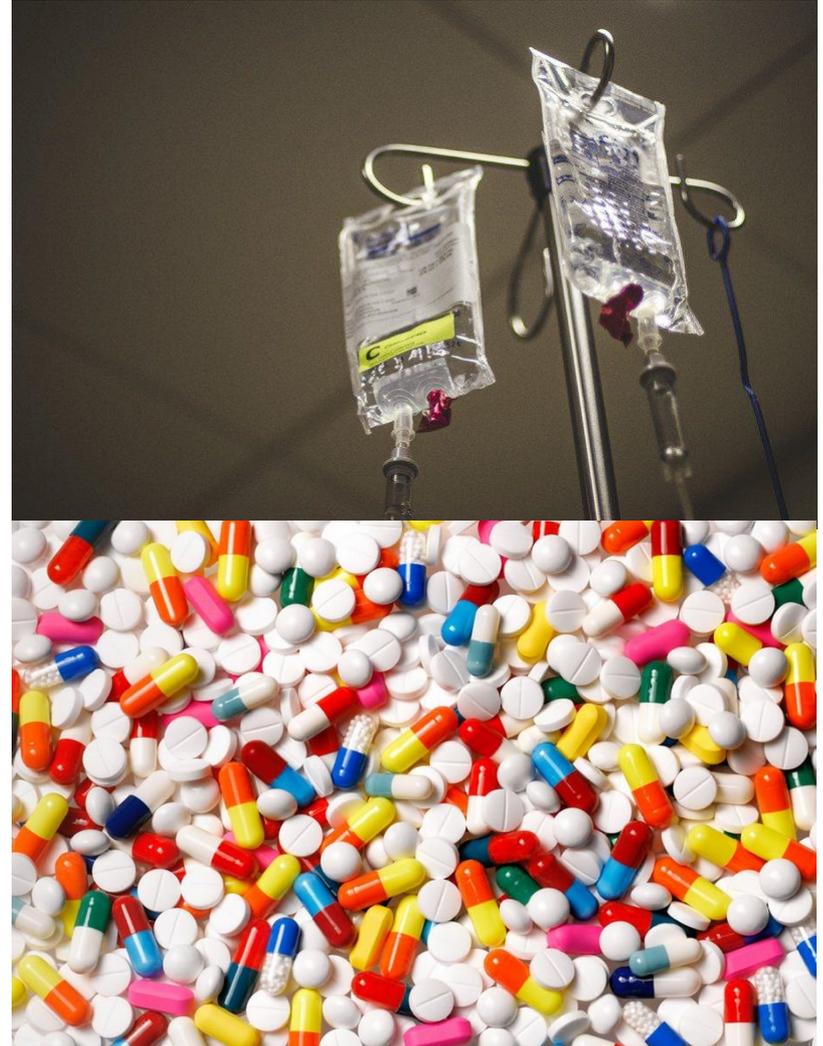
adjuvant therapy

curative chemoRT

palliative tx

new targeted agents

immunotherapy



Treatment

Surgery

Radiation

Chemotherapy

- Common to use combination of modalities**
- Evolving strategies such as increased use of neoadjuvant chemoRT prior to surgery**
- integration of new systemic therapies**

Treatment

Surgery

Radiation

Chemotherapy

-treatment decisions and coordination can get complicated quickly

“concise” NCCN guideline for managing NSCLC is 200 pages long

Weekly Thoracic Rounds

To discuss complicated cases

1



Weekly Thoracic Rounds

To discuss complicated cases

1



Cooperative Multidisciplinary Approach

Patient

Family

Family doctors

Cancer Care Navigators

Thoracic surgery

Respirology

Nursing

Pathology

Medical Oncology

Radiation Oncology

Radiology

Nuclear Medicine

Home Care

Dietician

Palliative Care

Psychosocial

Pharmacy

Smoking Cessation

Alternative and Complimentary Medicine



Thank you