

## Tumour site Specific Workshop LUNG CANCER

- Epidemiology
- Classification and biology
- Presentation
- Investigation
- Therapy

## Risk factors for lung cancer

- **Tobacco smoking**
  - 85 to 90% of all lung ca linked to smoking
  - Dose response - number and time a smoker
  - Young age when started
  - Airflow obstruction
  - Increasing age
  - family history of lung cancer
  - previous history of other cancers involving the lung, head and neck
  - Exposure to other carcinogens - asbestos, radon

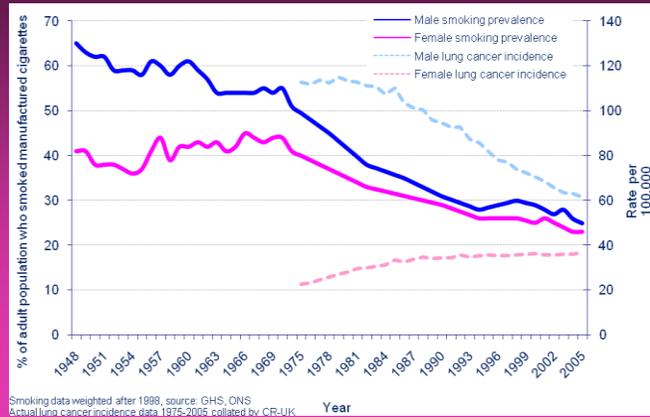
## Risk factors for lung cancer

- Tobacco smoking
- Age
- Radon (in the home)
- Genetics
- Occupation
  - Especially asbestos

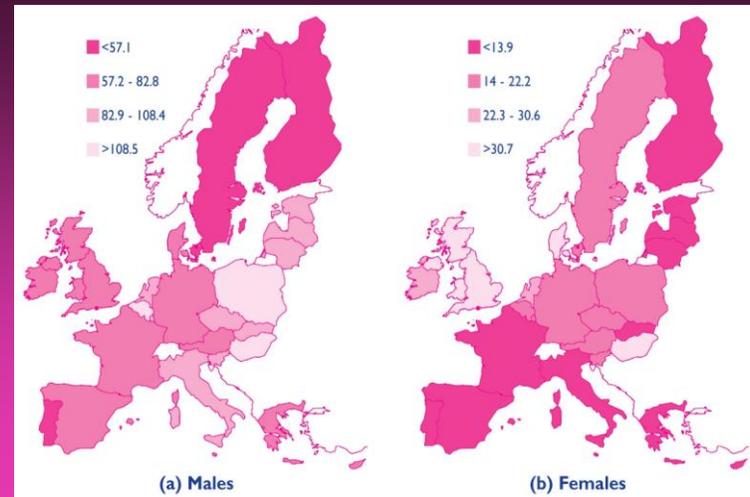
## Risk factors for lung cancer

- Occupation
  - Asbestos
  - Aluminium industry
  - Arsenic
  - Soot tars oils
  - Chromate
  - Nickel
  - Radon

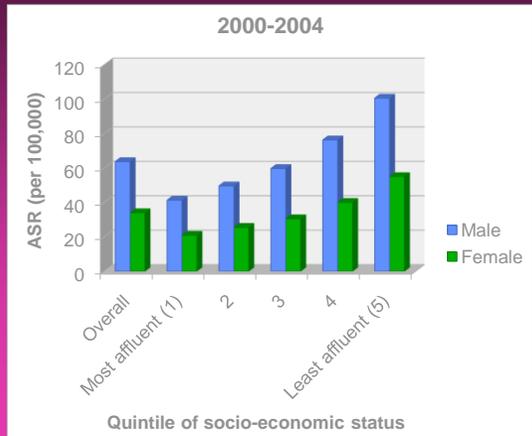
## Lung Cancer - Prevalence



## Age-standardised incidence rates (per 100,000 people)



## SES and Lung Cancer



## 5 year Survival



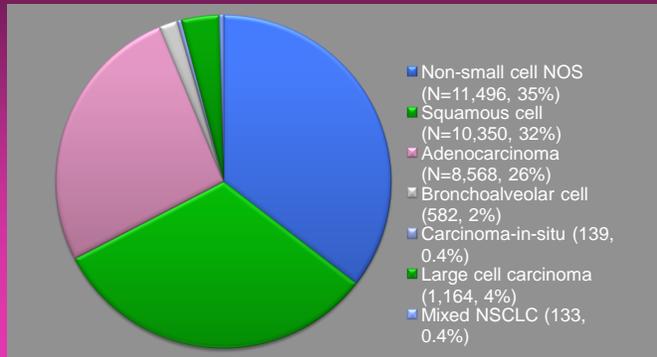
## WHO Classification of Lung Epithelial Tumours

- Benign
- Dysplasia /carcinoma in situ

## WHO Classification of Lung Epithelial Tumours

- Malignant
  - Major Group
    - Squamous
    - Small
    - Adeno
    - Large (giant / clear)
    - Adenosquamous
    - Carcinoid
    - Bronchial gland
    - Others

## Histological Subtype



## Growth Rates

Cell type	Volume doubling time (days)	Years from malignant change to:		
		earliest diagnosis (1cm)	usual diagnosis (3cm)	death (10cm)
Squamous	88	7.2	8.4	9.6
Adeno	161	13.2	15.4	17.6
Undifferentiated	86	7.1	8.2	9.4
Small cell	29	2.4	2.8	3.2

## Symptoms

- Cough
- Dyspnoea
- Chest pain
- Haemoptysis
- Weight loss
- Hoarseness
- Dysphagia
- Bone pain

## Signs (%)

	Squamous	Small	Adeno
• Clubbing	20	0	14
• Pleural effusion	12	13	33
• Hepatomegaly	10	20	9
• Neuro	4	18	21

### Non-metastatic paramalignant manifestations

- **5% produce a clinical syndrome**
  - SIADH
  - Ectopic ACTH
  - Hypercalcaemia
  - Gynaecomastia
  - Hyperthyroidism

### Non-metastatic Manifestations

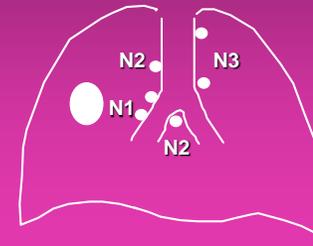
- **Neuromyopathies**
  - Lambert-Eaton syndrome
  - Polymyositis
  - Dermatomyositis
  - Mixed motor and sensory neuropathies
  - Encephalopathy
  - Myelopathy
- **Clubbing**
- **HPOA (hypertrophic pulmonary osteoarthropathy)**
- **Anaemia**

## Radiology



## TNM classification

- **N0** No nodal metastases
- **N1** Peribronchial or ipsilateral hilar
- **N2** Ipsilateral mediastinal, subcarinal
- **N3** Contralateral nodes or supraclavicular



## Changes to the TNM descriptors

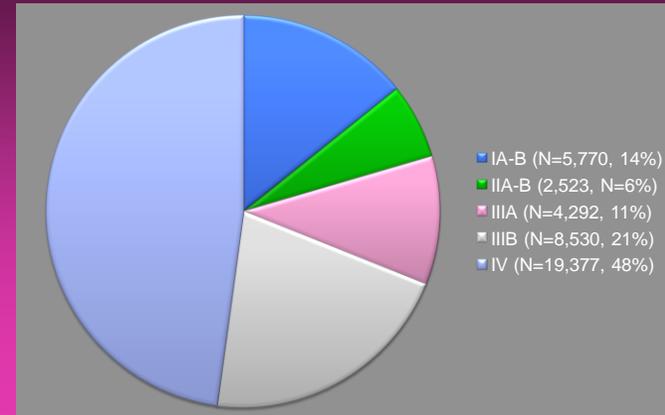
- T1 <3 cm; T1a <2 cm, T1b >2 – 3 cm
- T2 Main bronchus >2 cm from carina, invades visceral pleura, partial atelectasis
  - T2a >3- 5 cm
  - T2b >5 cm -7 cm
- T3 >7 cm; chest wall, diaphragm, pericardium, mediastinal pleura, main bronchus <2 cm from carina, total atelectasis, **separate nodule(s) in same lobe (was T4)**
- T4 Mediastinum, heart, great vessels, carina, trachea, oesophagus, vertebra; **separate tumour nodule(s) in a different ipsilateral lobe (was M1)**
- N1 Ipsilateral peribronchial, ipsilateral hilar
- N2 Ipsilateral mediastinal, subcarinal
- N3 Contralateral mediastinal or hilar, scalene or supraclavicular
- **M1a Separate tumour nodule(s) in a contralateral lobe; pleural nodules or malignant pleural or pericardial effusion (was T4)**
- **M1b Distant metastasis**

## Changes to the Stage Groupings

Occult carcinoma TX		N0	Stage IIIA	T1a,b, T2a,b	N2
Stage 0	Tis	N0		T3	N1, N2
				<b>T4</b>	N0, N1
Stage IA	T1a, b	N0	Stage IIIB	<b>T4</b>	N2
				Any T	N3
<b>Stage IB</b>	T2a	N0			
<b>Stage IIA</b>	T2b	N0	Stage IV	Any T	Any N M1
	T1a, b	N1			
	T2a	N1			
<b>Stage IIB</b>	T2b	N1			
	T3	N0			

	T1a,b	T2a	T2b	T3	T4	
N0	IA	IB	IIA	IIB	IIIA	Patients should be offered surgery if fitness is adequate
N1	IIA	IIB	IIB	IIIA	IIIA	Surgery may be suitable for some patients, based on clinical judgment
N2	IIIA	IIIA	IIIA	IIIA	IIIB	
N3	IIIB	IIIB	IIIB	IIIB	IIIB	Not suitable for surgery

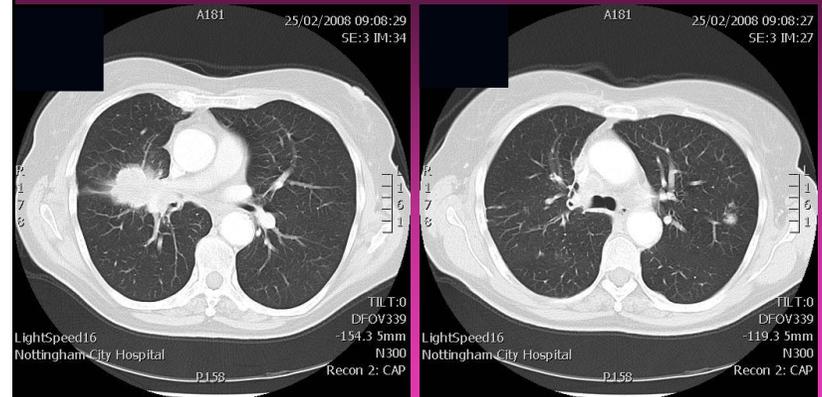
Stage in England and Wales



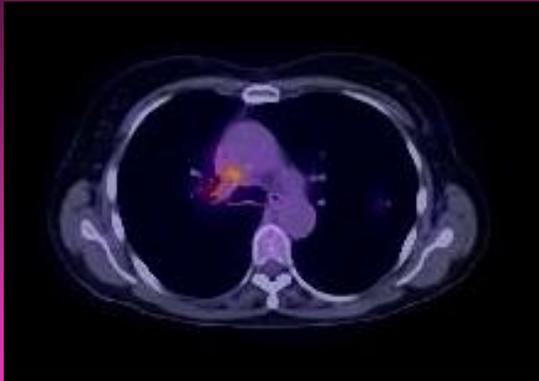
## Case 1

- Female, 61 years, never smoker
- PS 0, FEV1 2.1
- CXR: opacity at R apex

## Case 1 - CT



## Case 1 – PET-CT



## Elimination of MX

- The use of MX may result in exclusion from staging
- cMX is inappropriate as the clinical assessment of metastasis can be based on physical examination alone.
- If the pathologist does not have knowledge of the clinical M, MX should NOT be recorded. It has been deleted from TNM.
- pMX: does not exist; pM0: does not exist (except at autopsy)

## Elimination of MX

### What remains:

- cM0 = clinically no distant metastasis
- cM1= distant metastasis clinically, including based on CT findings
- pM1= distant metastasis proven microscopically,
- If a cM1 (e.g., liver met) is biopsied and is negative, it becomes cM0, not pM0

## Management

## Assessment for Therapy

- Patient's wishes
- Histological Type
- Staging
- Fitness
  - exercise tolerance
  - lung function
- Discussion with surgeons

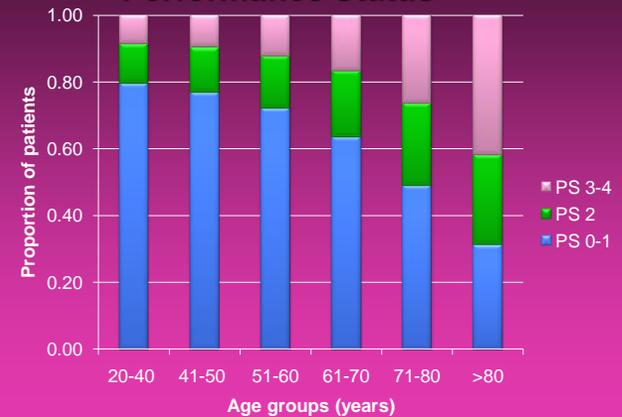
## Measures of Fitness

- Spirometry
- TLCO
- Exercise tests
  - Shuttle walk test > 400m suggests fit
  - CPET > 15ml/kg/min suggests fit

## Measures of Fitness

MRC Breathlessness Scale		ECOG / WHO Performance Status	
Not troubled by SOB	0	Fully active, able to carry out all pre-disease activity without restriction	0
SOB when hurrying on flat or walking up slight hill	1	Restricted in strenuous physical activity but ambulatory & able to carry out work of a light or sedentary nature, eg light housework, office work	1
SOB when walking with others of same age on flat	2	Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours	2
Stops for breath at own pace on flat or one flight of stairs	3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours	3
SOB on any activity	4	Completely disabled. Cannot carry out any self-care. Totally confined to bed or chair	4
SOB at rest	5		

## Performance Status



## Investigations

- CXR
- Sputum cytology
- Bronchoscopy
- FBC, Liver, Bone
- FEV<sub>1</sub> and FVC
- Pleural aspiration and biopsy
- C T scan and other imaging
- Mediastinoscopy and mediastinotomy

## Therapy of Small Cell Carcinoma

- **First Line - limited**
  - Combination chemotherapy including cisplatin (carboplatin if cannot tolerate cisplatin)
  - Concurrent radiotherapy with first or second cycle
  - If not fit, chemotherapy followed by radiotherapy
- **First line - extensive**
  - Combination chemotherapy (platinum)
- **Surgery**
  - Option in early stage

## Small Cell Cancer Therapy

- **Prophylactic cranial irradiation (PCI)**
  - If response to chemotherapy
- **Second Line**
  - Cyclophosphamide, doxorubicin and vincristine (CAV)
  - Topotecan if cannot tolerate above

## Prognosis

- **Small cell**
  - With no treatment, median survival 8 weeks
  - Dependent on extent of disease:

	Response to therapy (%)	Complete response (%)	Median survival (months)	2 year disease free survival (%)
Limited disease	81	52	12 - 14	Up to 25
Extensive disease	70	15-25	8	2

## Adverse Prognostic factors in SCLC

- **Performance status**
- **Serum sodium <132 mmol/L**
- **Wt loss >10%**
- **Serum bicarbonate <24mmol/L**
- **Extensive disease** (outside one hemithorax; ipsilateral supraclavicular fossa nodes)
- **ALP > 1.5 upper limit**
- **LDH >1.5 upper limit**

> 2 of these = poor prognosis

## Therapy of non small cell carcinoma

- **Surgery**
  - 50% 5 year survival (depends on stage)
- **Radical radiotherapy**
  - 15% 5 year survival (up to 25%)
- **Palliative radiotherapy**
- **Chemotherapy**
  - Average 2 month survival advantage
  - New targeted agents

## Chemotherapy for NSCLC

- Survival improved in 25-70%
- Response rate 20-70%
- Depends hugely on performance status at start
  - 0            11 months
  - 1            7
  - 2            4 median survival
  - overall 8 months

## Chemotherapy for NSCLC

- Cisplatin and Pemetrexed
- Targeted Treatment
  - Squamous vs adenocarcinoma
  - Adenocarcinoma with EGFR mutation respond to EGFR tyrosine kinase inhibitors gefitinib and erlotinib
  - Squamous respond better to radiotherapy
    - Radical or high dose palliative

### **Chemotherapy and surgery**

- **For NSCLC given after surgery (adjuvant)**
- **Tumours >4cm or >N0 disease**
- **5% overall improvement in survival**
- **To be given within 8 weeks of surgery**

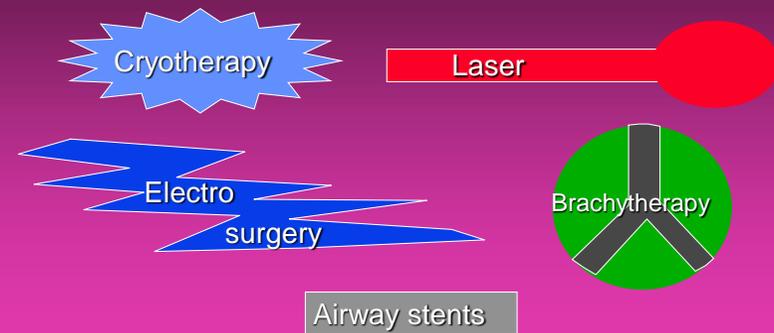
### **Endobronchial Palliation**

- **Malignant airway obstruction is a major cause of morbidity and mortality**
  - **dyspnoea, haemoptysis, cough**

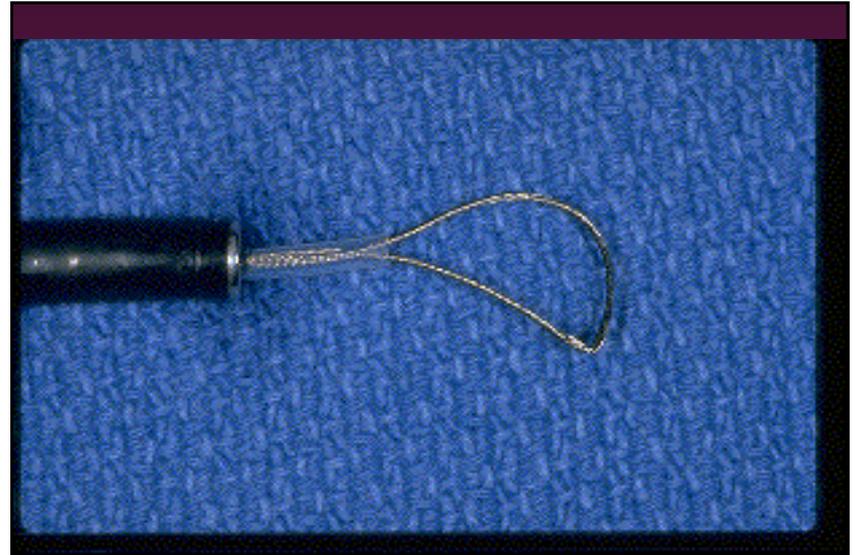
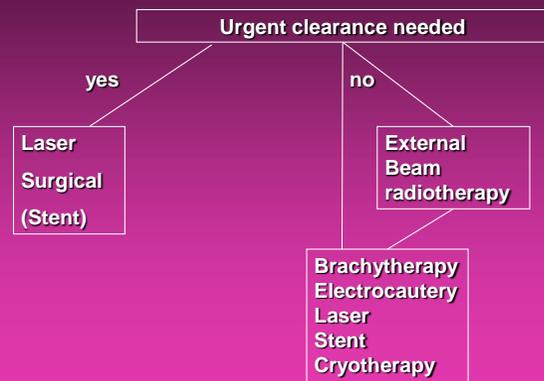
## Large Airway Obstruction

- Suspect this at any stage of disease
- Especially where CT or bronchoscopy has shown endobronchial tumour

## Endobronchial Palliation Options

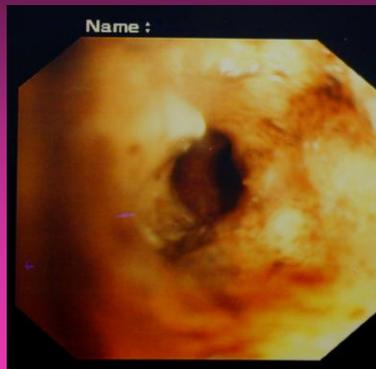


## Endobronchial Palliation



## Electrocautery

- Inexpensive
- Day case
- LA
- Safe



## Brachytherapy

