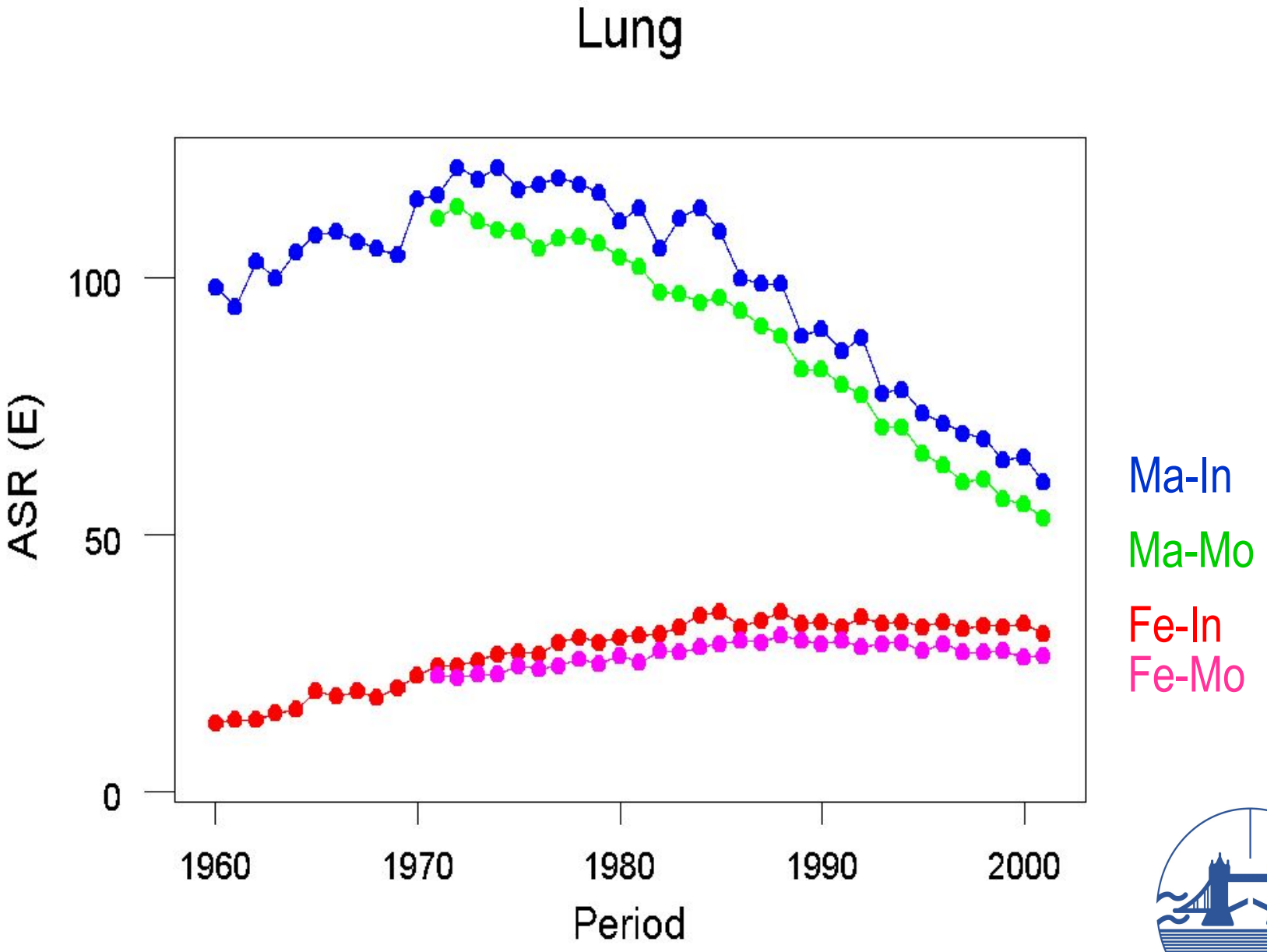
Lung Cancer

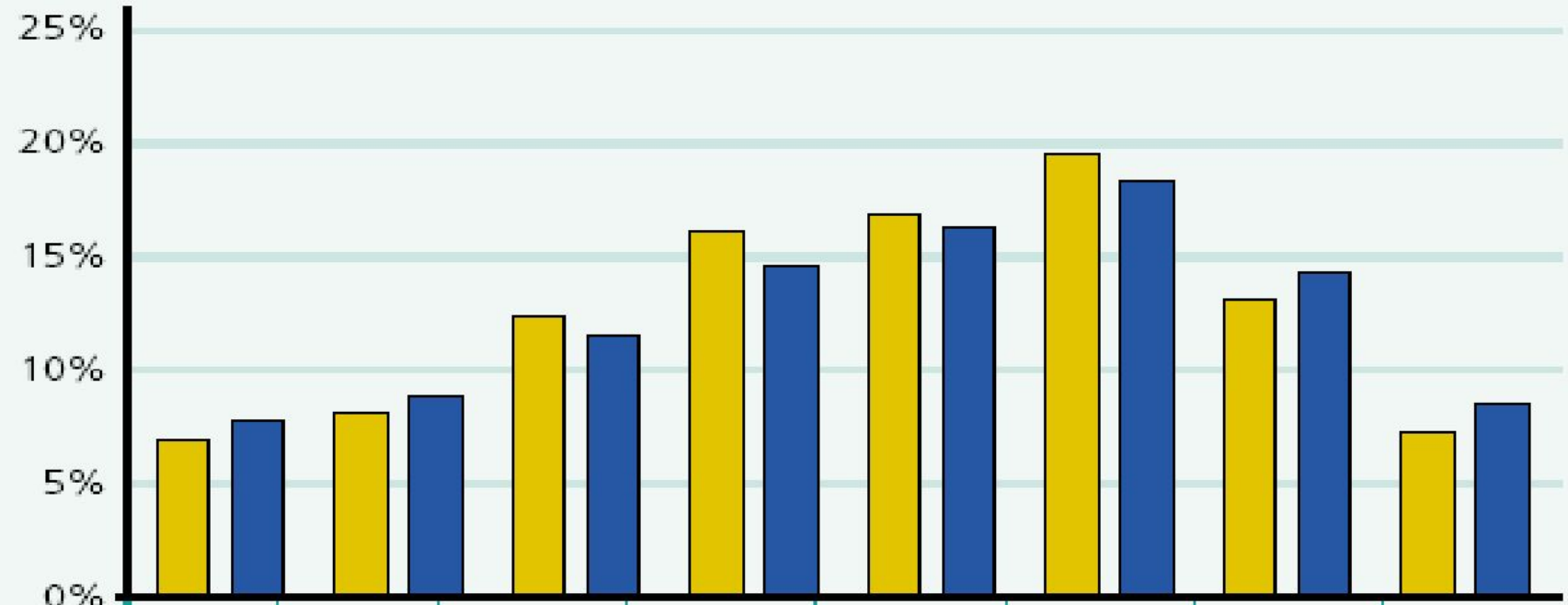
Epidemiology, Aetiology, Clinical Presentation, Diagnosis and Treatment

Lung Cancer: Basic statistics

- Over 37,500 new cases per year in UK
- Over 33,000 deaths per year in UK
- Commonest cause of death from cancer in UK (more than deaths from Breast and Colo-rectal cancers combined)
- A quarter of all cancer deaths
- Incidence falling (slowly) in Men ; Increasing in Women (more common than breast cancer as a cause of death)


Lung
ASR (E)
100
50
0
1960
1970
1980
1990
2000
Period
Ma-In
Ma-Mo
Fe-In
Fe-Mo

Lung Cancer: Age distribution 2006 England and Wales



	-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
M	7%	8%	12%	16%	17%	19%	13%	7%
F	8%	9%	11%	15%	16%	18%	14%	9%

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SMOKING AND CARCINOMA OF THE LUNG

PRELIMINARY REPORT

BY

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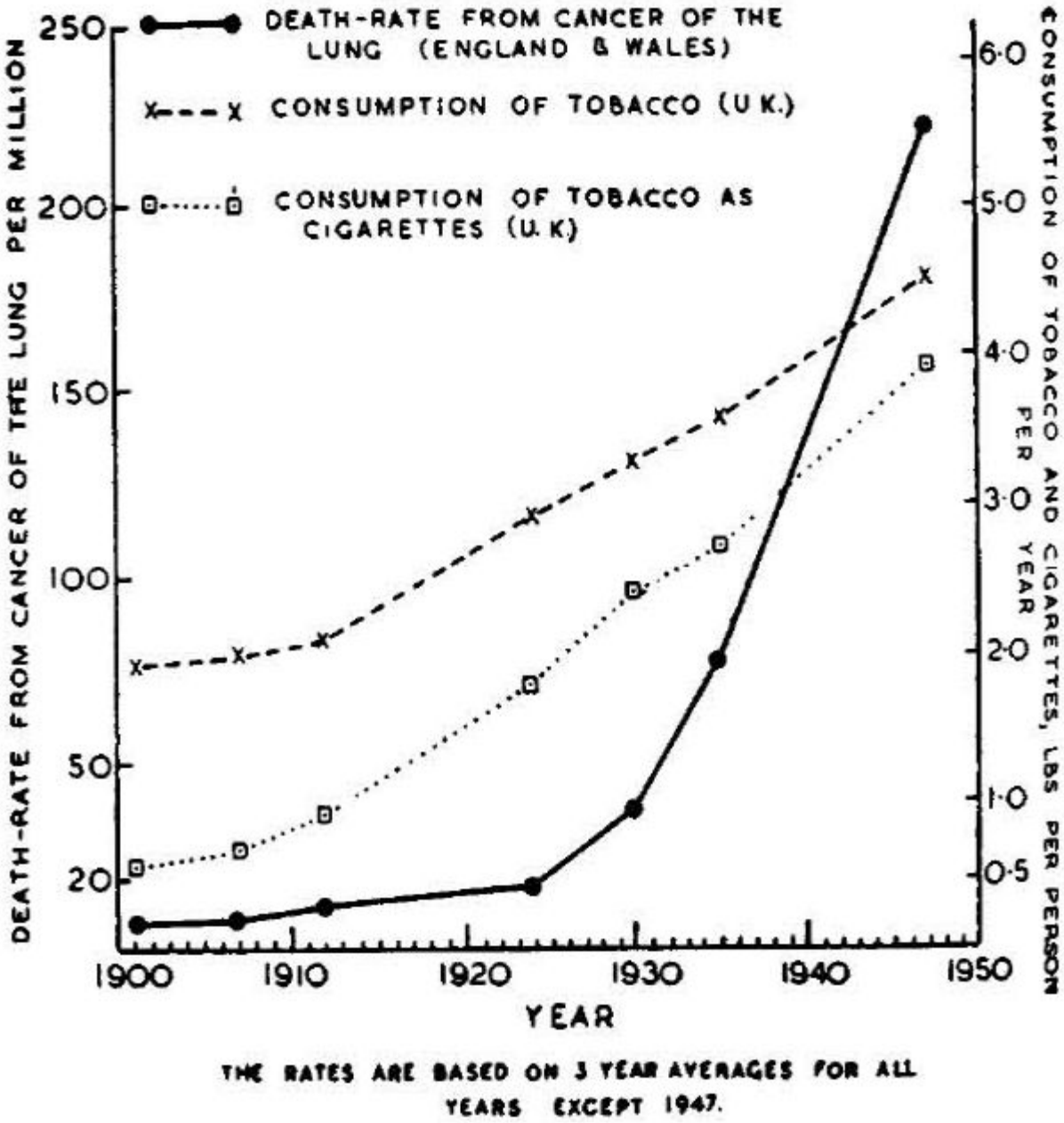


FIG. 2.—Death rate from cancer of the lung and rate of consumption of tobacco and cigarettes.

LUNG CANCER: Smoking

Smoking causes:

- ~90% of lung cancer deaths in men
- ~80% of lung cancer deaths in women
- ~20% of lung cancer cases in nonsmokers
- *One Third* of all cancer deaths
- (but over 4000 deaths per year in in never smokers)

35-year old male who smokes ≥25 cigarettes per day:

- 13% risk of dying from lung cancer before age 75 (i.e. 1 in 7)
- 10% risk of dying from coronary disease
- 28% risk of dying from smoking-related disease

Constituents of Tobacco Smoke

- Gases
  - Carbon Monoxide
  - Hydrogen Cyanide
  - Nitrogen Oxide, etc. etc.
- Nicotine
- Irritant substances
- Carcinogens
  - Poly-Aromatic Hydrocarbons
  - N-Nitroso Compounds
  - Phenols
  - Arsenic
  - Fatty Acid Esters

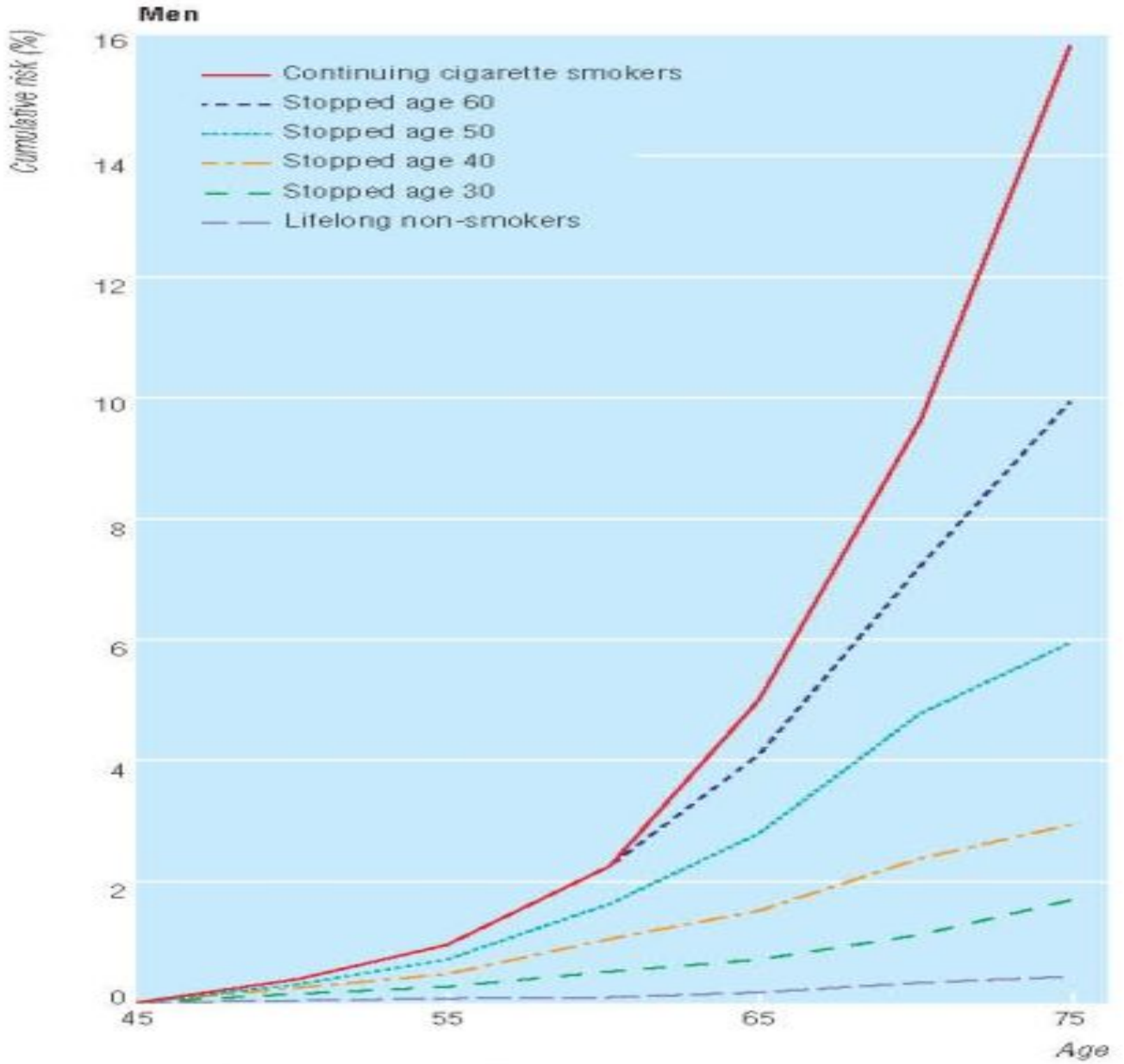
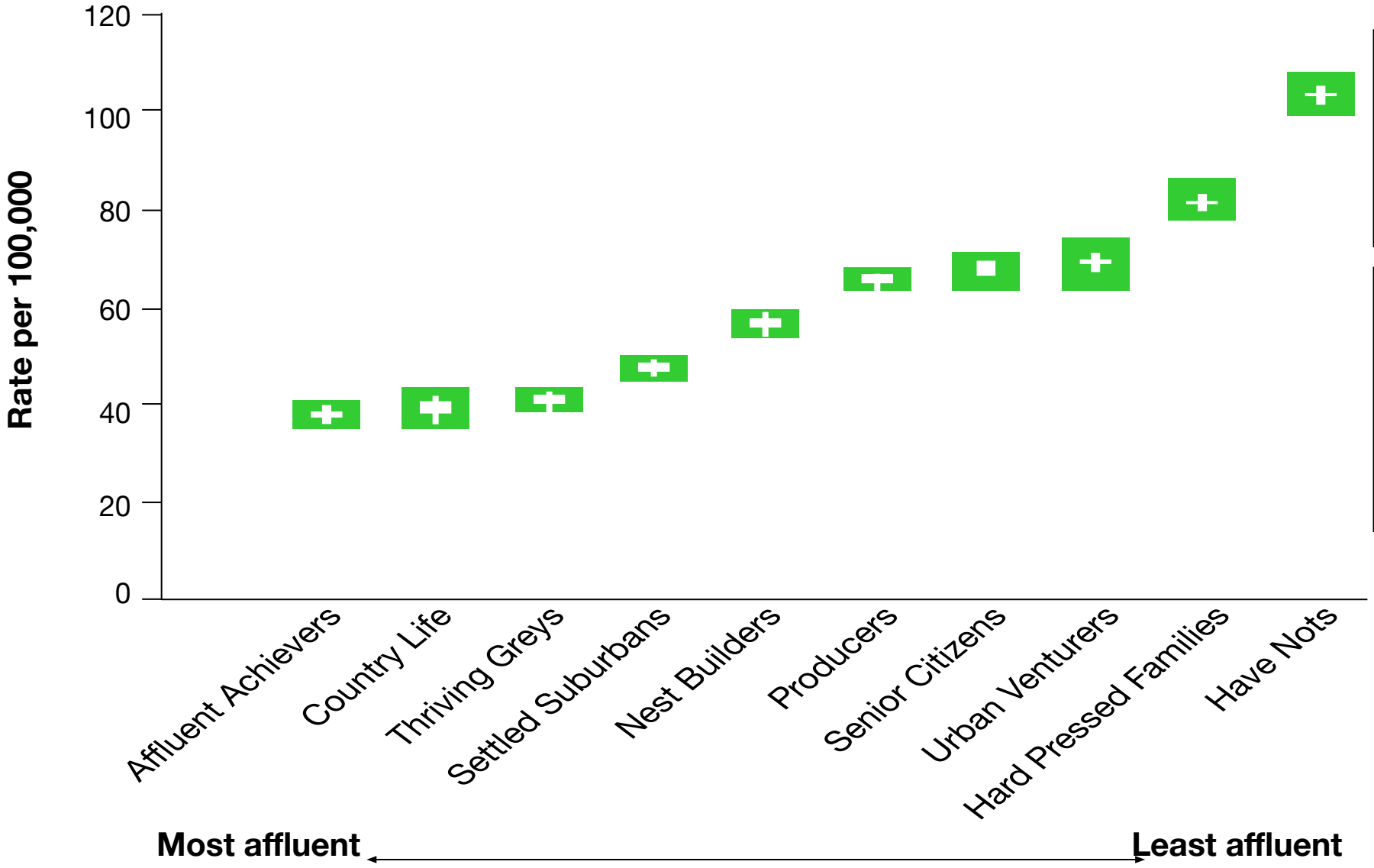


Fig 3 Effects of stopping smoking at various ages on the cumulative risk (%) of death from lung cancer up to age 75, at death rates for men in United Kingdom in 1990. (Non-smoker risks are taken from a US prospective study of mortality[14])

LUNG CANCER
Risk factors other than smoking

- COPD (relative risk 3 – 6 fold)
- Asbestos
- Radon (from mining or indoor exposure) ~ 1500 deaths / year
- Other "occupational carcinogens"
  - Chloromethyl ether, chromium, nickel, arsenic
- Diet (vitamins A, C, E, β-carotene deficiencies)
- Genetic/familial factors (relative risk ~ 1.6)

Age Standardised Incidence by Socio-economic Group



LUNG CANCER: Symptoms

Primary tumor

- Cough
- Dyspnoea; bronchial obstruction, p.effusion, pneumonia, phrenic N paralysis
- Wheezing
- Hemoptysis
- Chest pain
- Postobstructive pneumonia
- Weight Loss
- Lethargy/Malaise

Regional metastases

- Superior vena caval obstruction
- Hoarseness (Left recurrent laryngeal nerve palsy)
- Dyspnoea (Phrenic nerve palsy)
- Dysphagia

Distant metastases

- Bone pain/fractures
- CNS symptoms (headache, double vision, confusion etc.)

Superior Vena Cava Obstruction

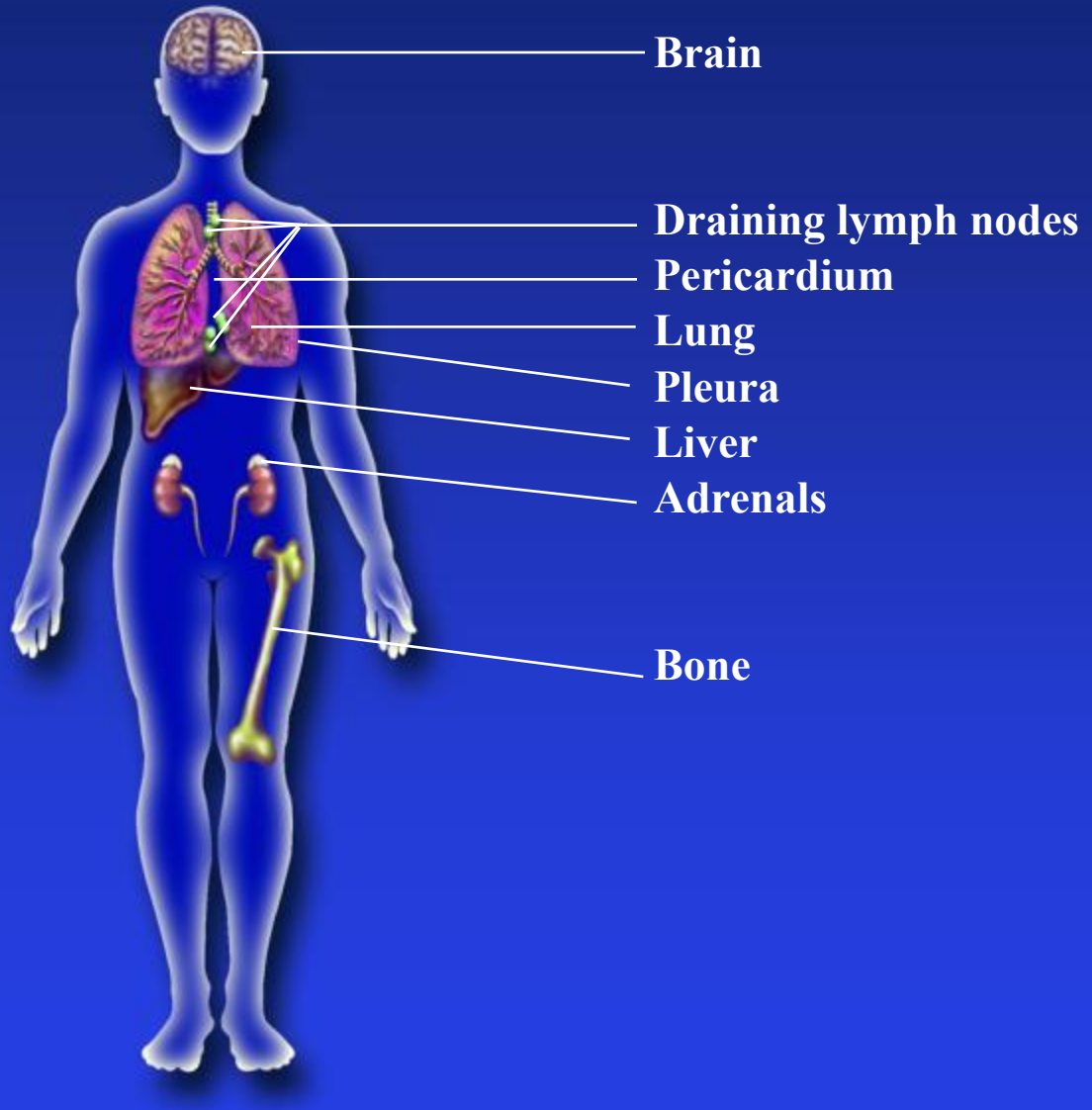
TAFEL 53

LUNG CANCER: Paraneoplastic syndromes

- **Endocrine**
  - Hypercalcaemia
  - ectopic ACTH secretion; Cushing's syndrome
  - Syndrome of Inappropriate Antidiuretic Hormone (SIADH)
  - Carcinoid syndrome
  - Gynaecomastia
- **Neurologic**
  - Encephalopathy, myelopathy
  - Peripheral neuropathy, cerebellar degeneration
  - Eaton-Lambert syndrome
- **Skeletal**
  - Finger Clubbing
  - Hypertrophic Pulmonary Osteoarthropathy
- **Haematological**
  - Anaemia
  - Thrombocytosis
  - Thrombocytopaenia
  - Disseminated intravascular coagulation (DIC)
- **Cutaneous**
  - Hyperkeratosis
  - Dermatomyositis
- **Other**
  - Nephrotic syndrome
  - Secretion of vasoactive intestinal peptide with diarrhoea
  - Anorexia or cachexia

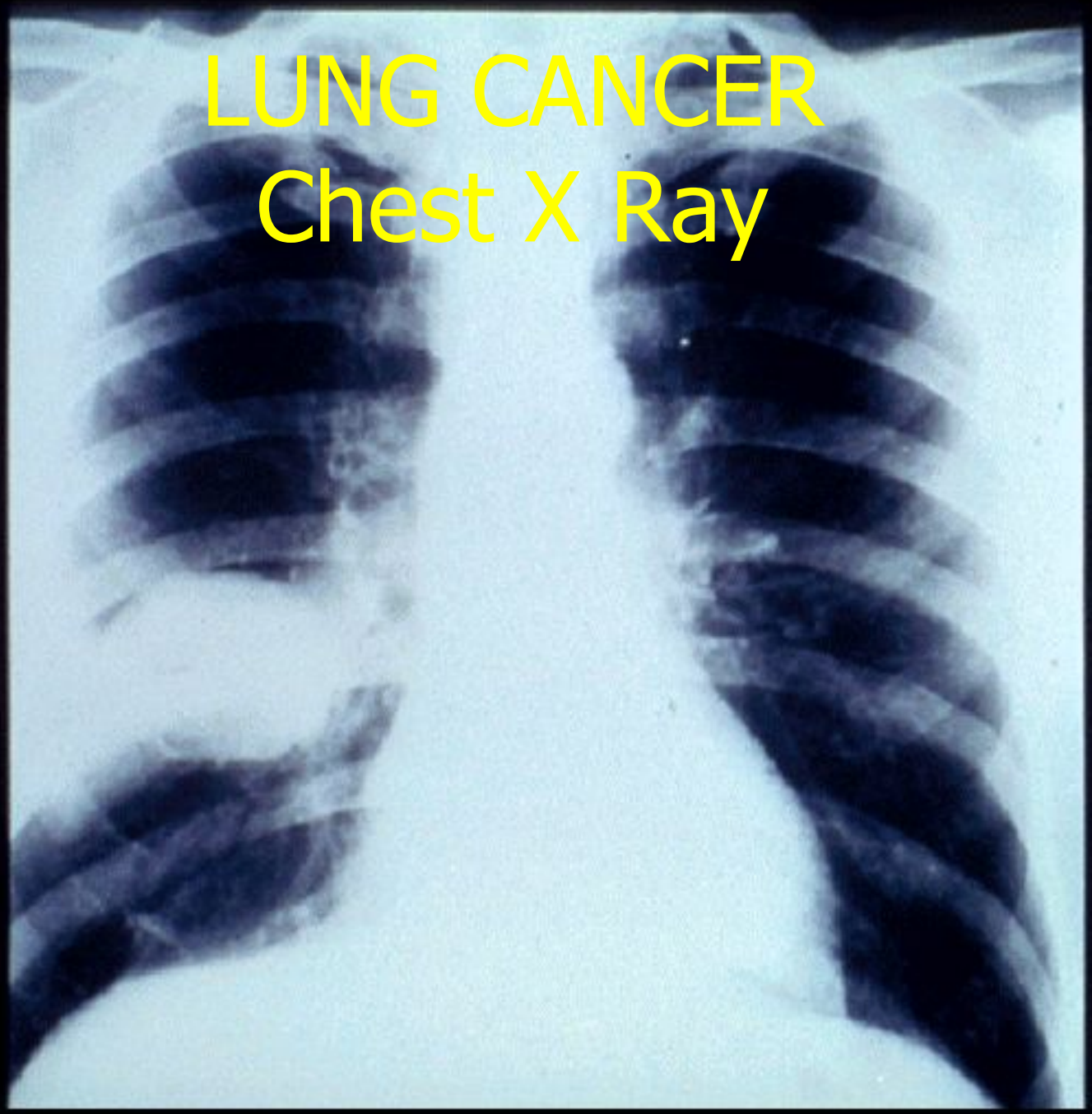
Lung Cancer : Finger Clubbing

LUNG CANCER:
Local and distant spread



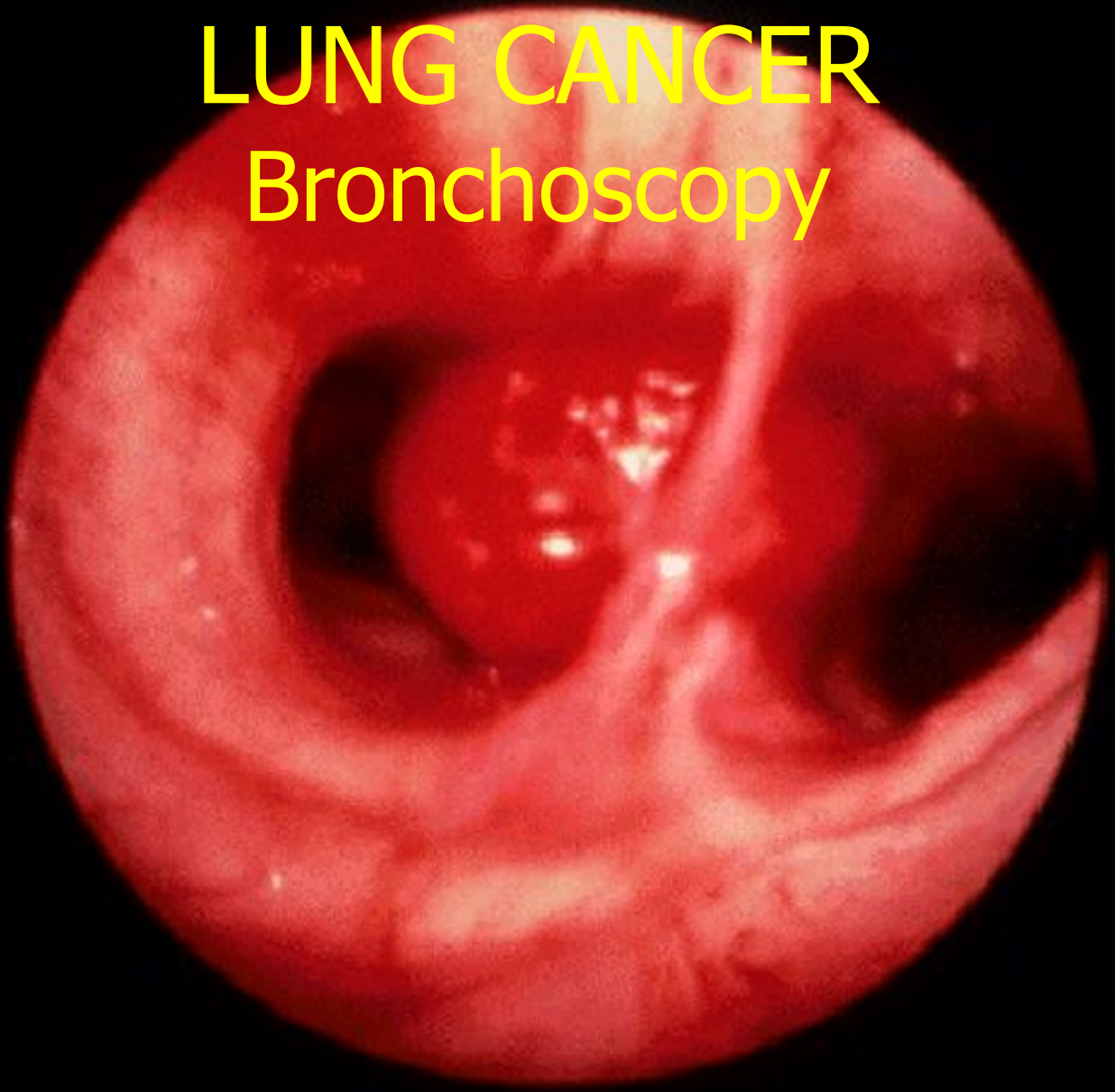
Lung Cancer: Investigation

- On first clinical suspicion:
  - Plain Chest X-Ray
- Diagnosis and staging:
  - Serum Biochemistry (Sodium, Liver Function Tests, Calcium)
  - Imaging: Cross-sectional imaging: CT and PET scans. Isotope bone scan etc.
  - Tissue: Bronchoscopy (± Lymph node biopsy), CT guided needle biopsy, bronchial wash for cytology, Lymph Node Biopsy (neck), Mediastinoscopy, (Sputum Cytology), Pleural Biopsy/Cytology


LUNG CANCER
Chest X Ray

Fibreoptic Bronchoscopy

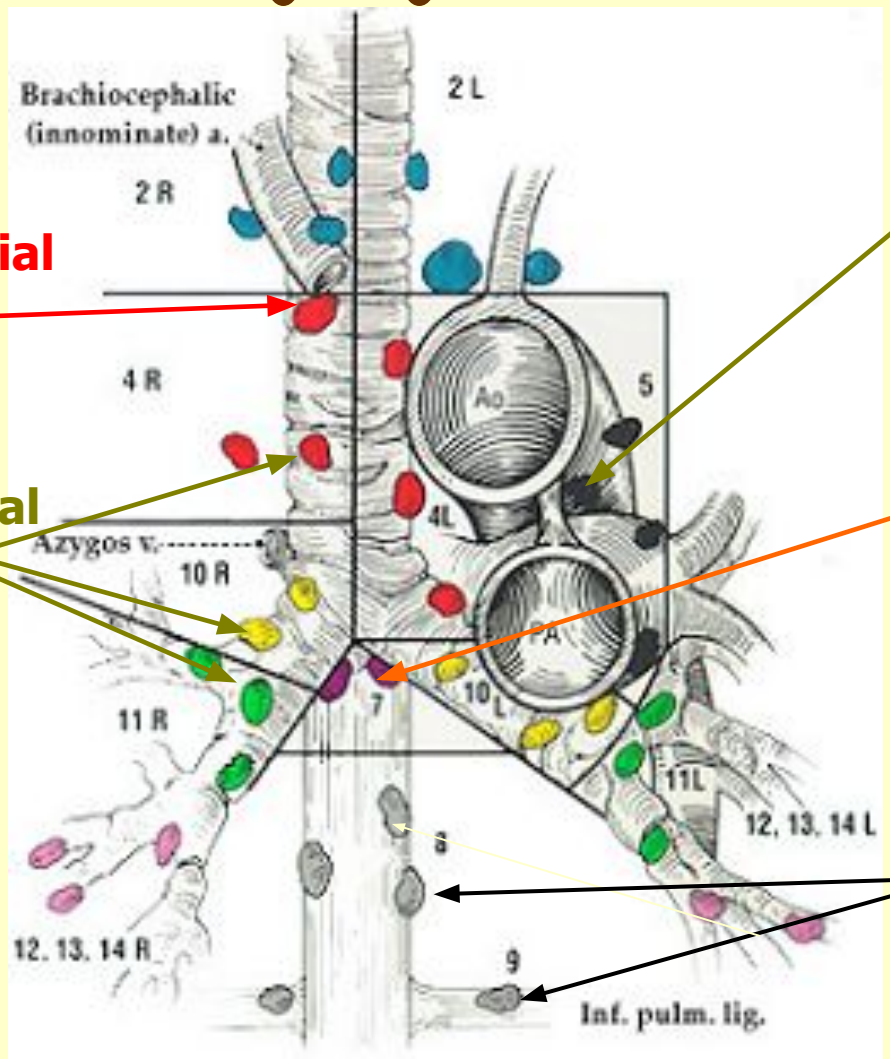
LUNG CANCER
Bronchoscopy



Lung cancer staging

- TNM
- T- tumor size.
- N- lymph node involvement.
- M- distant metastasis.
- CT, PET, Biochemical tests, lymph node sampling, liver US, bone scan, BM aspiration or biopsy are needed for staging.
- Bronchoscopy with EBUS or mediastinoscopy for upper mediastinal LN sampling.
- Oesophageoscopy with endoscopic US for lower mediastinal LN sampling.

Neck Ultrasound



Endoscopic Ultrasound

Transbronchial biopsy

Transbronchial biopsy

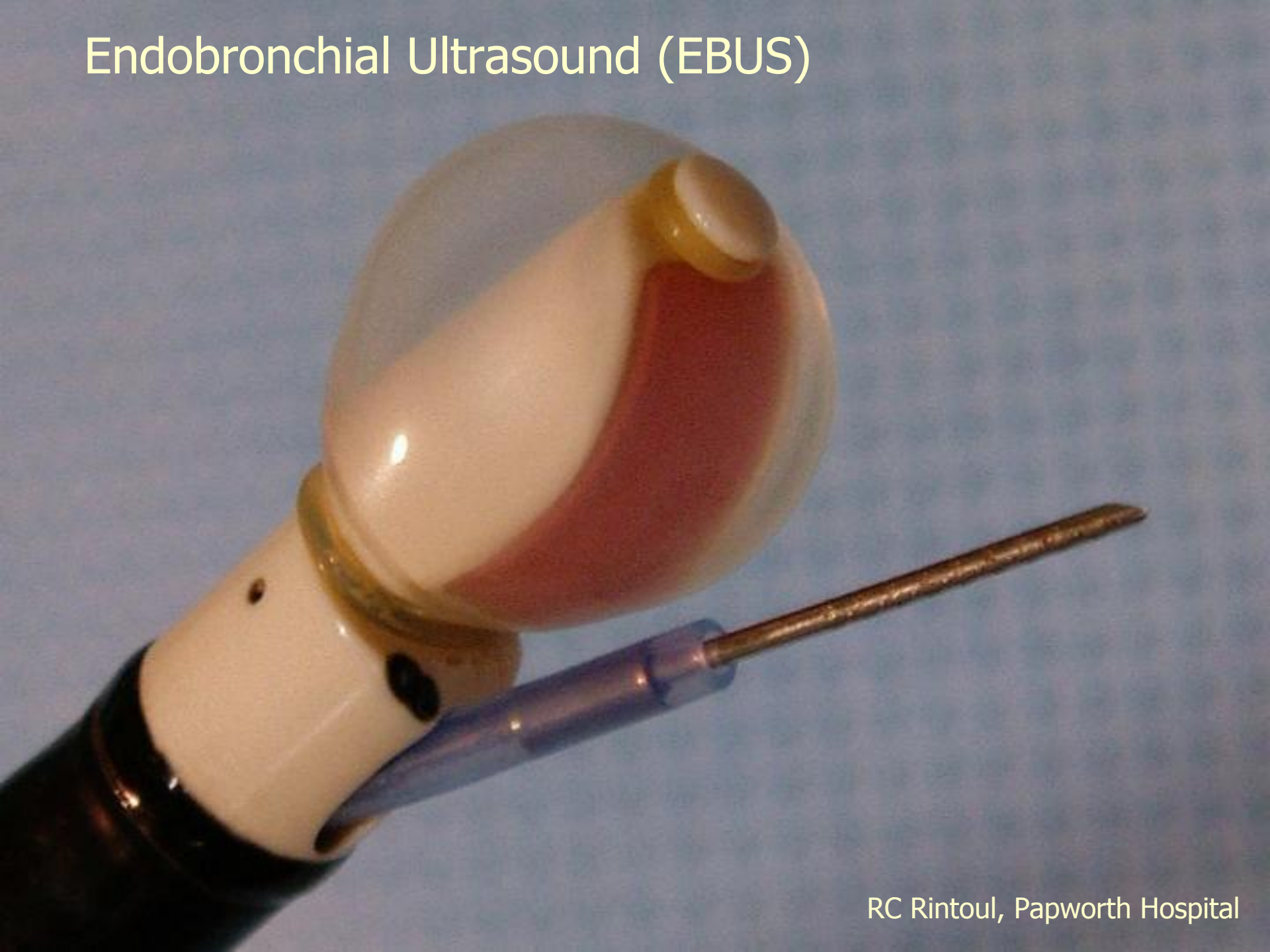
Endobronchial Ultrasound

Endoscopic Ultrasound

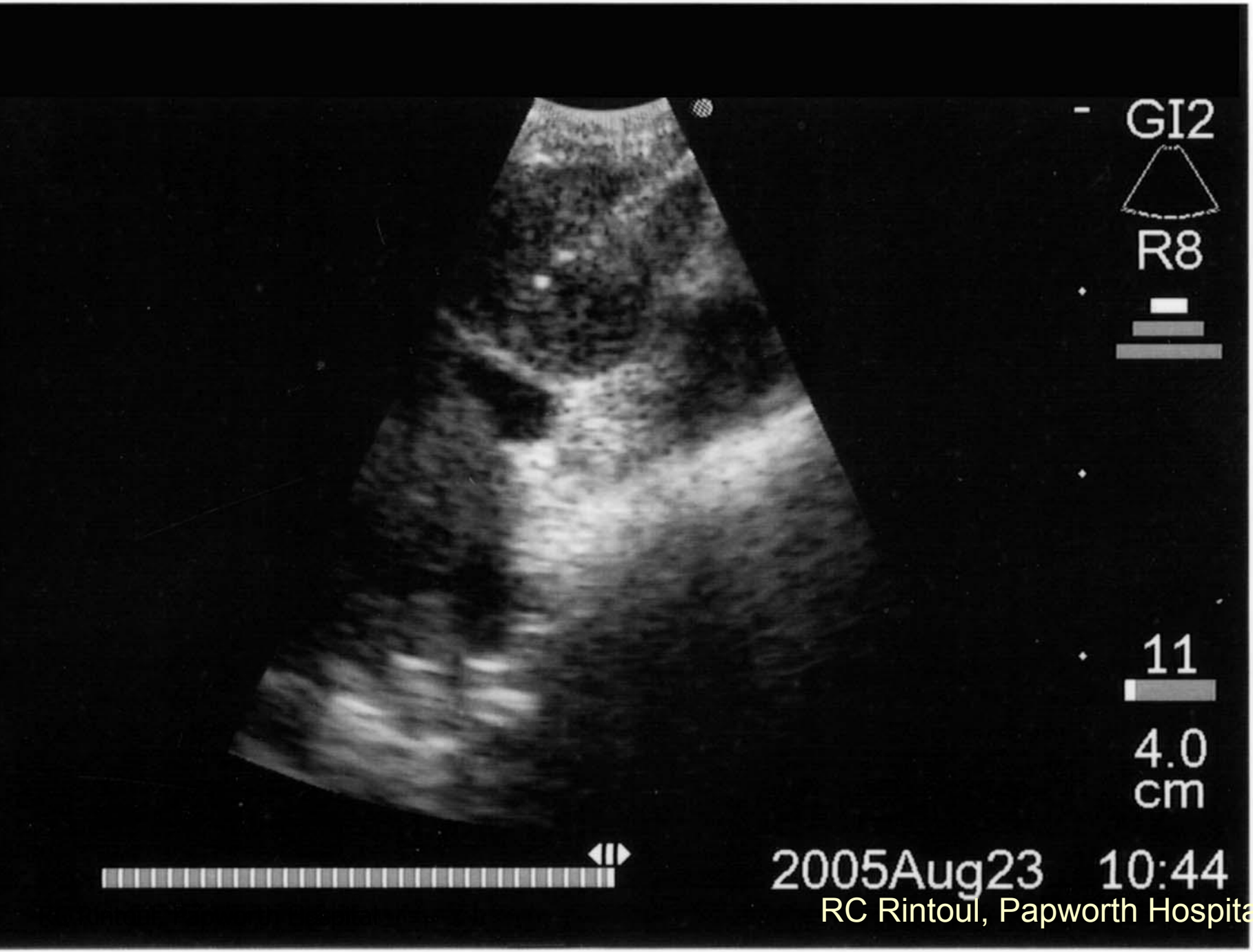
(CT biopsy)

Endoscopic Ultrasound

Endobronchial Ultrasound (EBUS)



RC Rintoul, Papworth Hospital


GI2
R8
11
4.0
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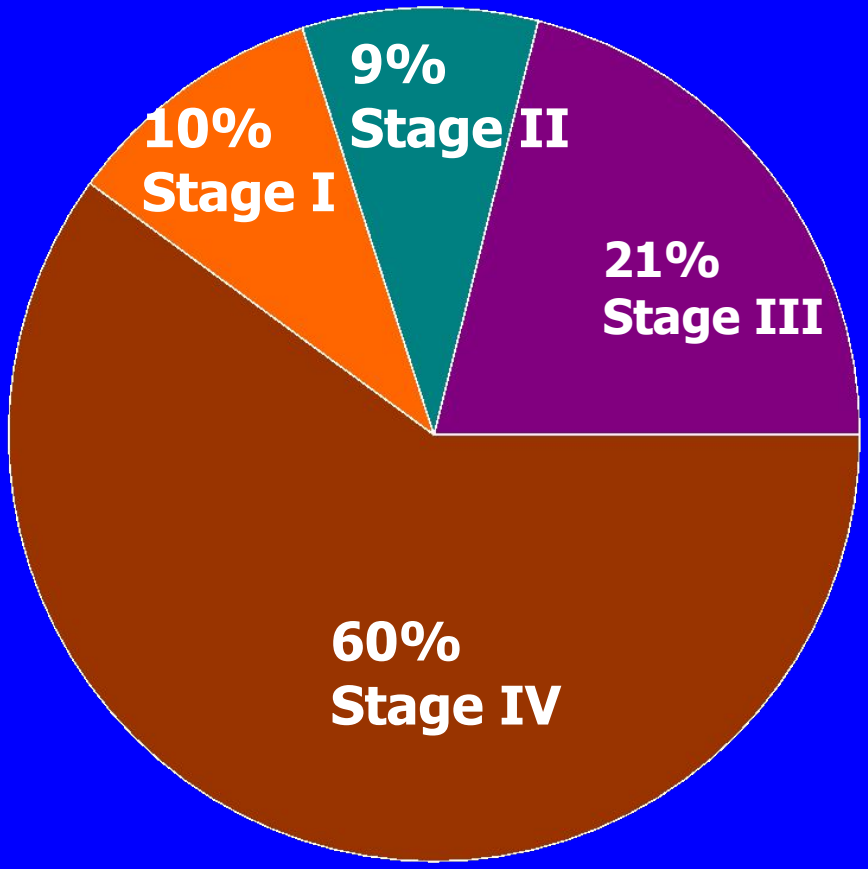
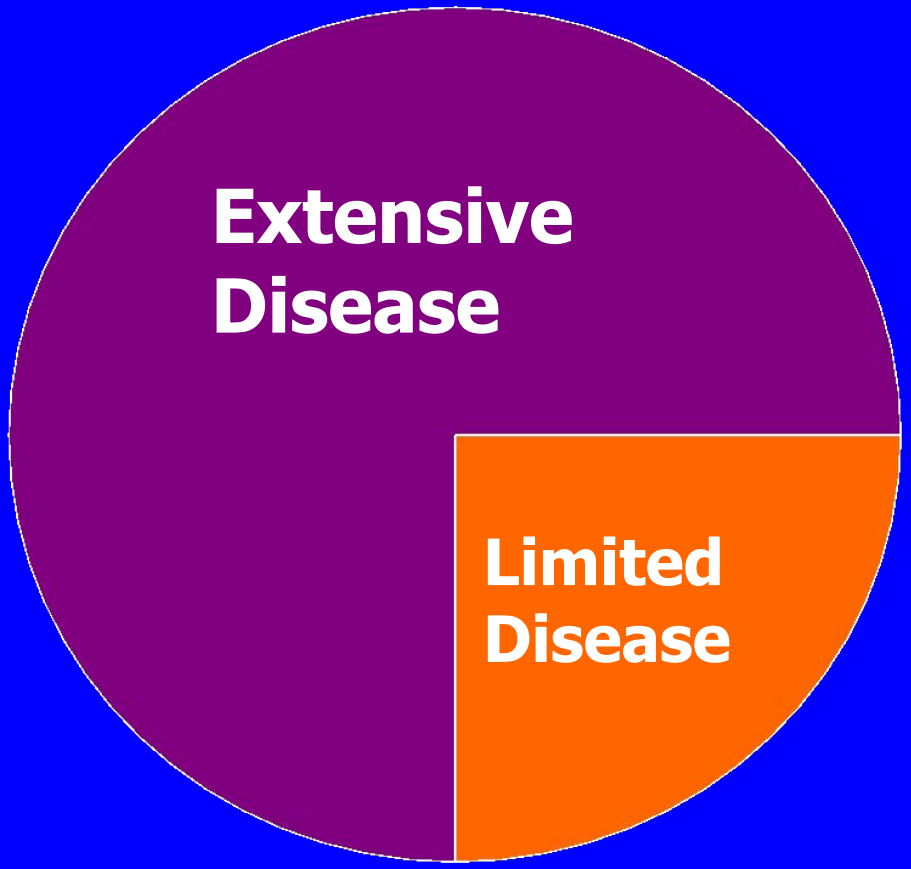
RC Rintoul, Papworth Hospital

NON-SMALL CELL LUNG CANCER
Stages at presentation



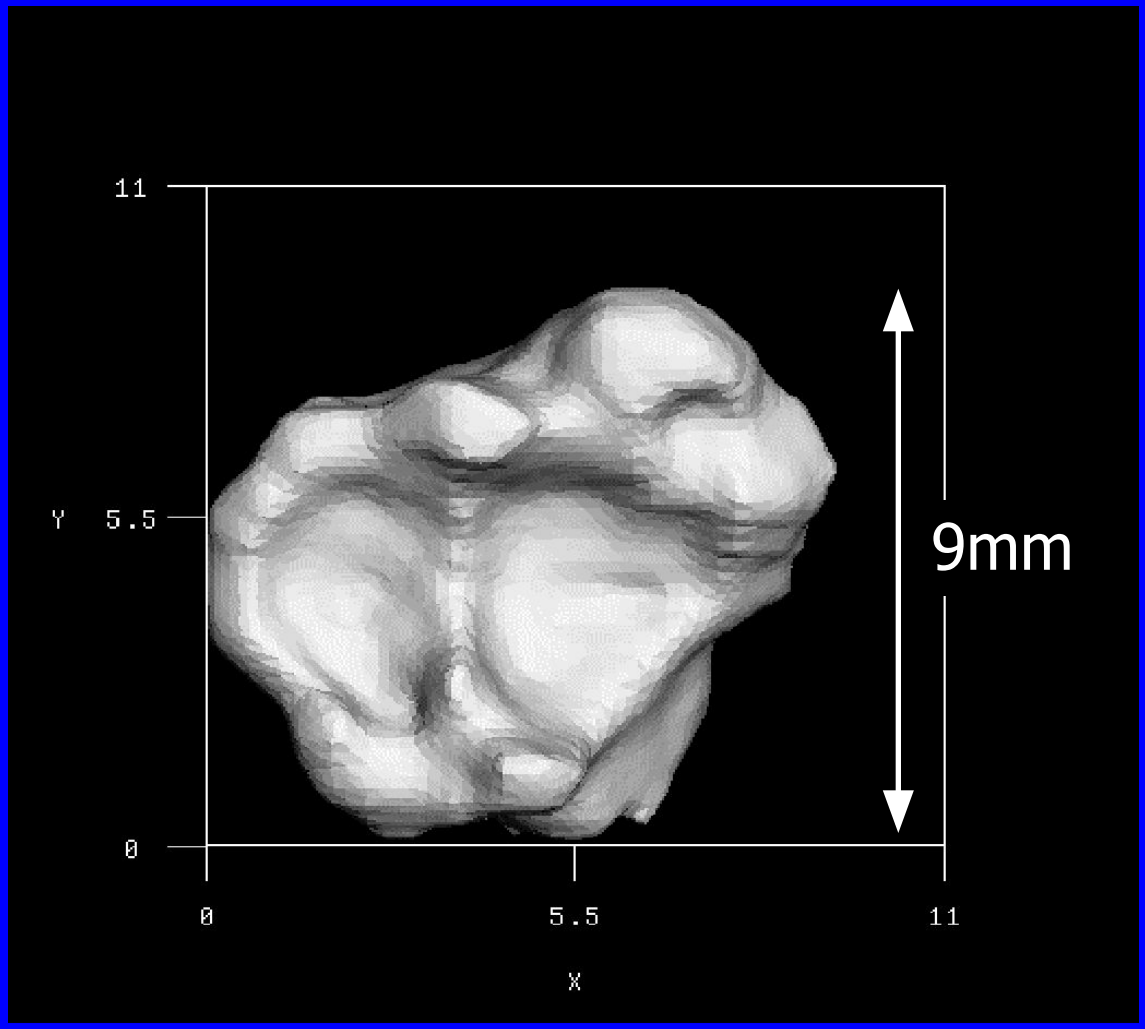
i.e. More than 2/3rds have inoperable disease at presentation

SMALL CELL LUNG CANCER
Extent at presentation

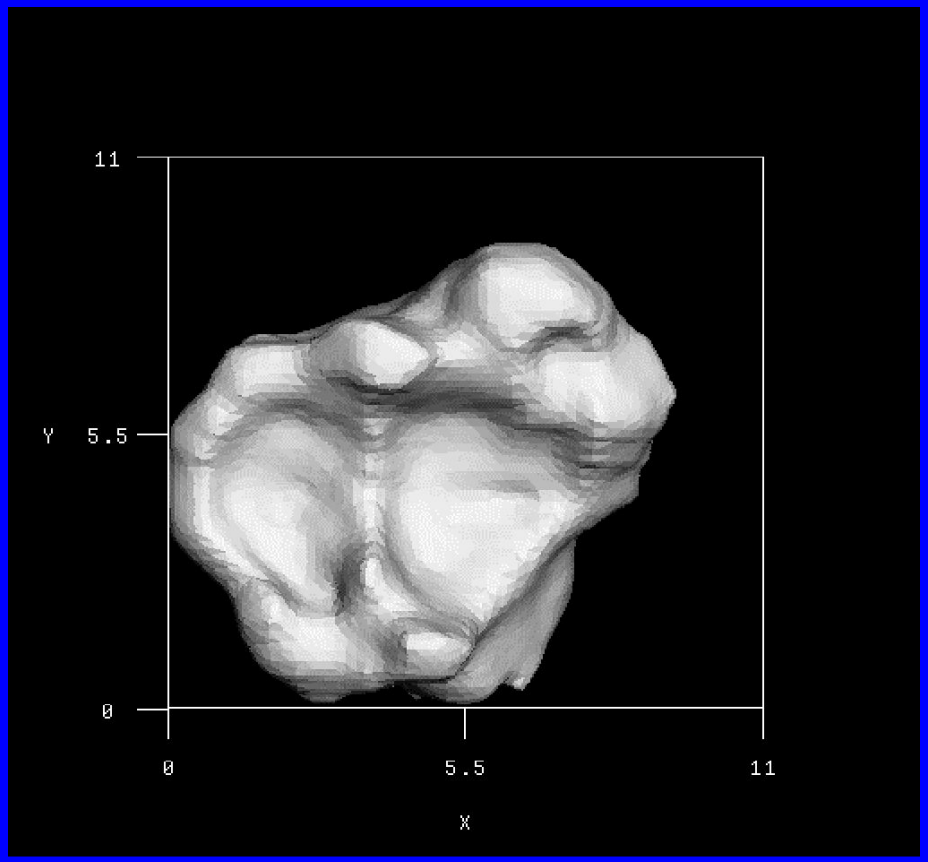


i.e. 3/4 have metastatic disease at presentation

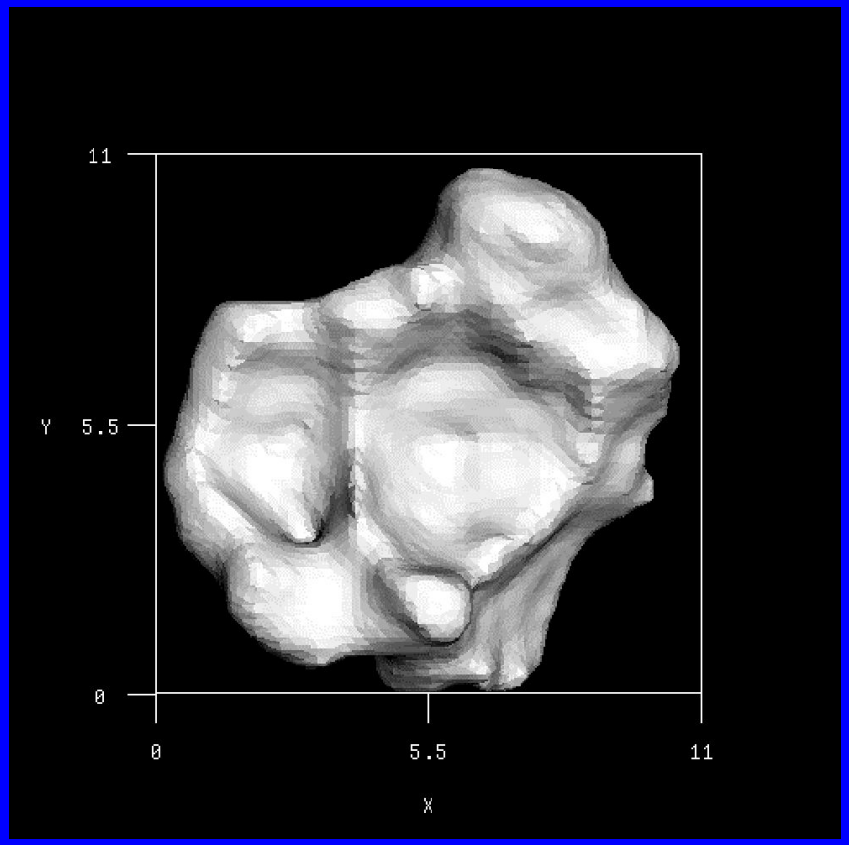
Lung Cancer: Screening with low-dose CT scanning



Day 0



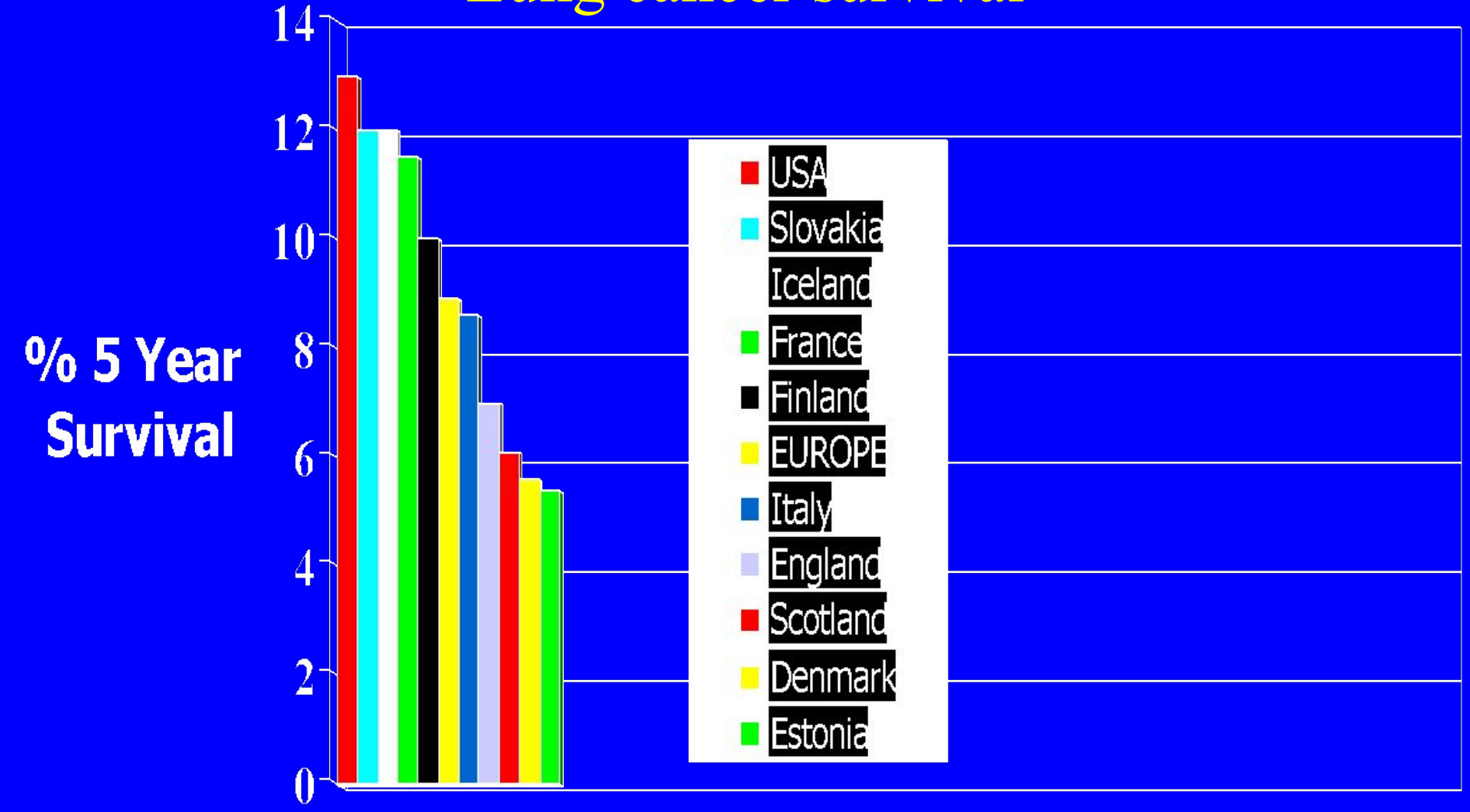
Day 36



Prognosis of lung cancer

- Overall survival is poor: less than 10% live for 5 years
- Survival (Prognosis) depends on:
  - Cell Type (Small Cell worse than Non-Small Cell)
  - Stage of Disease
  - Performance Status
  - Biochemical markers
  - Co-morbidities (e.g. Cardiac or chronic respiratory disease)
- Overall Median Survival around 6 months
- Survival worse in UK than in most other western countries

Lung cancer survival



Treatment of lung cancer

- **Surgery**
  - Mostly for Non-Small Cell (less than 20% operable)
- **Radiotherapy**
  - 'Radical' - curative
  - 'Palliative' - symptom control
- **Chemotherapy**
  - Small Cell - potentially curative in a minority
  - Non-Small Cell - modest survival increase, symptom control
- **Combination Therapy**
  - Combination chemo-radiotherpy
- **'Biological' ('Targeted') therapies**
- **Palliative Care**

Treatment of Non-small cell lung cancer

Management of non-small cell lung cancer often involves multi-modality therapy

- **Palliative radiotherapy** for local symptoms (eg cough, haemoptysis, airway obstruction, chest wall pain, bony metastases)
- **Radical radiotherapy** for operable tumour in patient not fit for surgery.
- **Chemotherapy** - ~ 50-60% response rates Modest improvement in survival; variable symptom relief
- **Combination chemo-radiotherapy** important in locally advanced disease
- **'Targeted' agents** – e.g. Epidermal Growth Factor Receptor (e.g. Erlotinib, Gefitinib) and Vascular Endothelial Growth Factor Inhibitors (e.g Bevacizumab)

Prognosis of non-small cell cancer

- Up to 20% operable
- Overall surgical survival 50% at 5 years
- 2/3 have metastatic disease at presentation

Prognosis of Non-small cell cancer

	0	1	2	3	4	5
I	100	79	54	64	48	42
II	100	65	42	32	28	22
III	100	34	15	9	7	5
IV	100	24	9	6	4	3

Treatment and prognosis of small cell cancer

- A systemic disease in >80% of cases
- Rarely operable
- ~3 months median survival untreated
- 85-90% respond to combination chemotherapy
- Approximately one year of added survival from chemotherapy
- 10-15% survive 2 years; less than 8% survive 5 years
- Good symptom palliation with chemotherapy
- Death from cerebral metastases common

Survival of small cell cancer by stage

	Median Survival Untreated Patients (weeks)	Median Survival Treated Patients (months)	5-Year Survival (%)
Limited disease	12	14-20	10%-20%
Extensive disease	5	8-12	3%-5%

Lung cancer palliative care

- A disease with multiple symptoms and often poor survival - need for prompt treatment of symptoms
- Need for early involvement of palliative care services
- Specific palliation usually best done by appropriate specialist e.g respiratory physician, medical or clinical oncologist
- Communication between, and co-ordination of, the various treatment agencies is vital. Patient held records may be useful.

What are the problems of lung cancer?

- Late Diagnosis
- Overall poor prognosis
- Very symptomatic
- Professional nihilism
- Variable standards of care
- Lack of public pressure

Grounds for optimism

- Incidence falling
- Potential for screening/surveillance
- Better diagnostics
- Treatment advances:
  - Adjuvant chemotherapy
  - Combination chemo-radiotherapy
  - Targeted agents
  - Surgical techniques
- Profile of the disease (charities, DH etc.)
- Service improvement (rapid access clinics, MDT working etc.)