

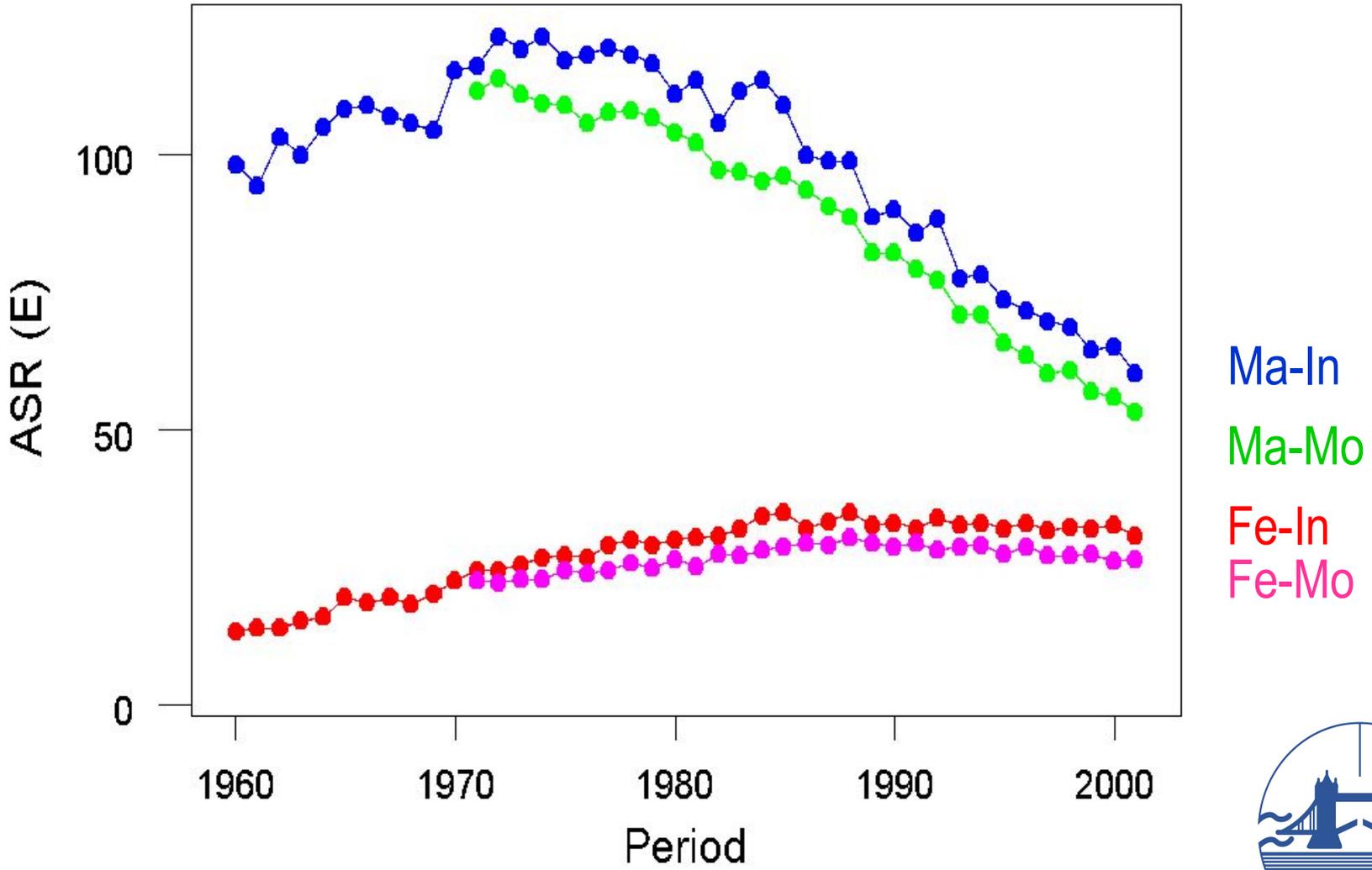
Lung Cancer

Epidemiology, Aetiology, Clinical
Presentation, Diagnosis and
Treatment

Lung Cancer: Basic statistics

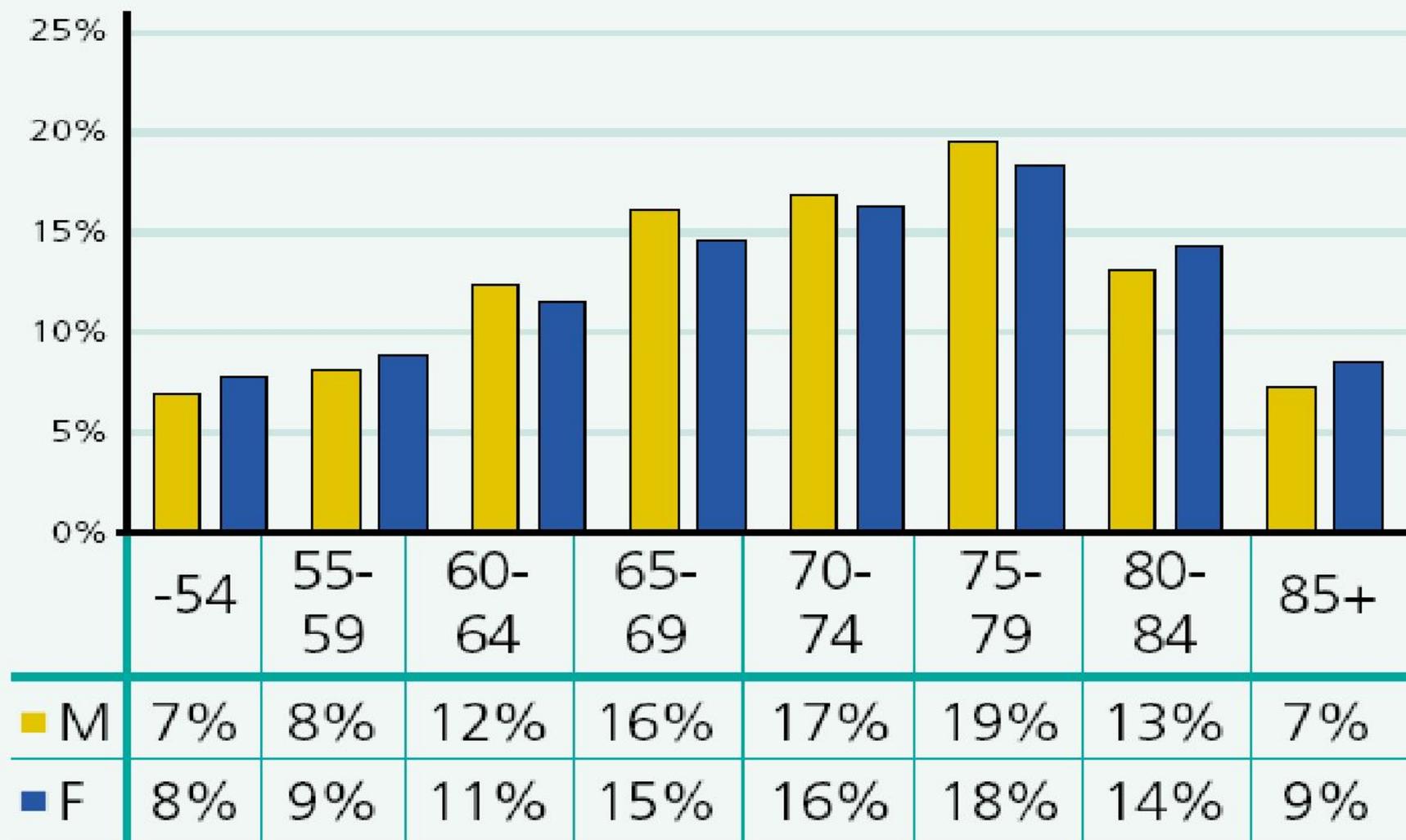
- Over 37,500 new cases per year in UK
- Over 33,000 deaths per year in UK
- Commonest cause of death from cancer in UK (more than deaths from Breast and Colo-rectal cancers combined)
- A quarter of all cancer deaths
- Incidence falling (slowly) in Men ; Increasing in Women (more common than breast cancer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

Lung



Lung Cancer: Age distribution 2006

England and Wales



BRITISH MEDICAL JOURNAL

LONDON SATURDAY SEPTEMBER 30 1950

SMOKING AND CARCINOMA OF THE LUNG PRELIMINARY REPORT

BY

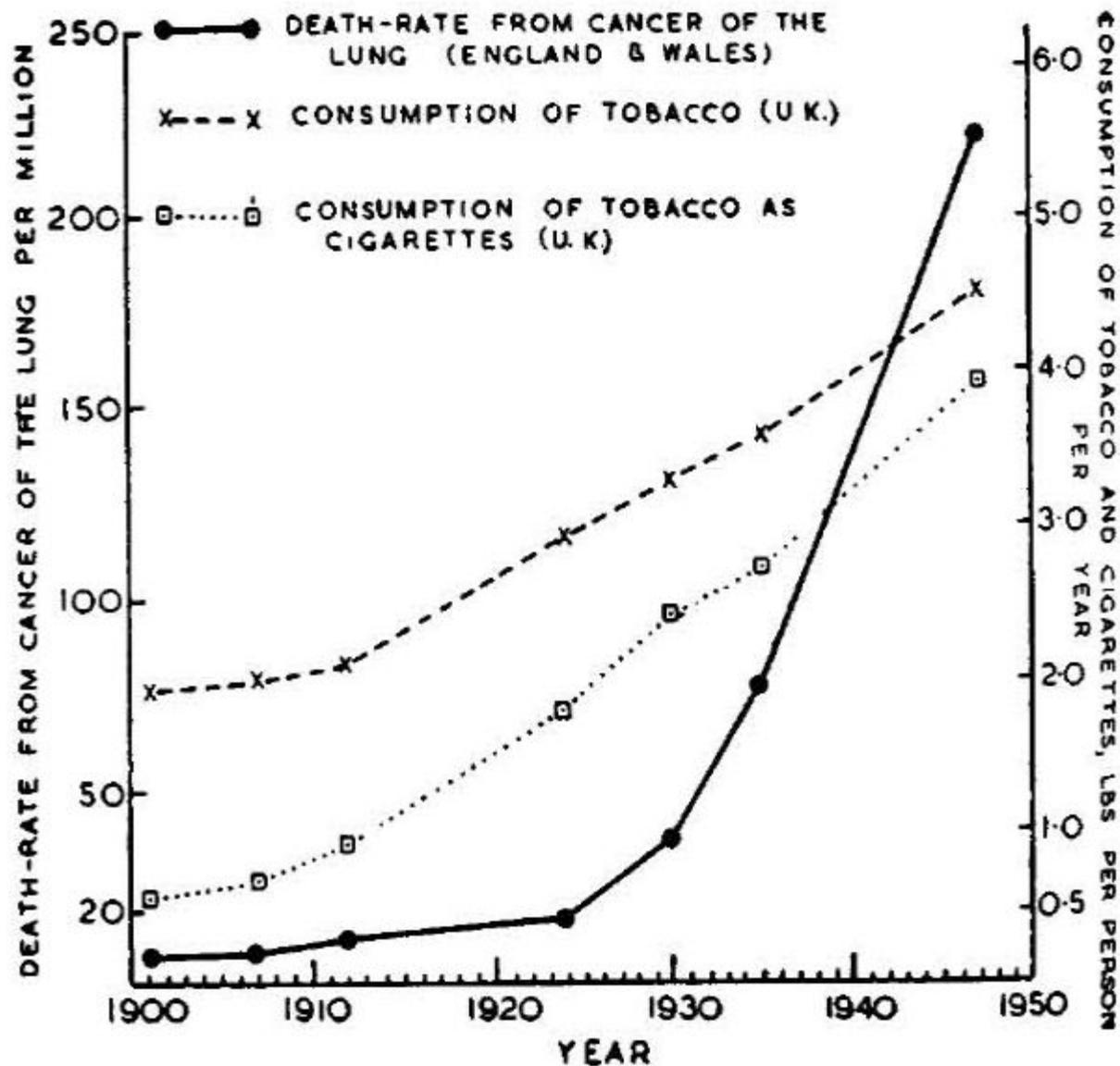
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AND

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Professor of Medical Statistics, London School of Hygiene and Tropical Medicine; Honorary Director of the Statistical Research Unit of the Medical Research Council



THE RATES ARE BASED ON 3 YEAR AVERAGES FOR ALL YEARS EXCEPT 1947.

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

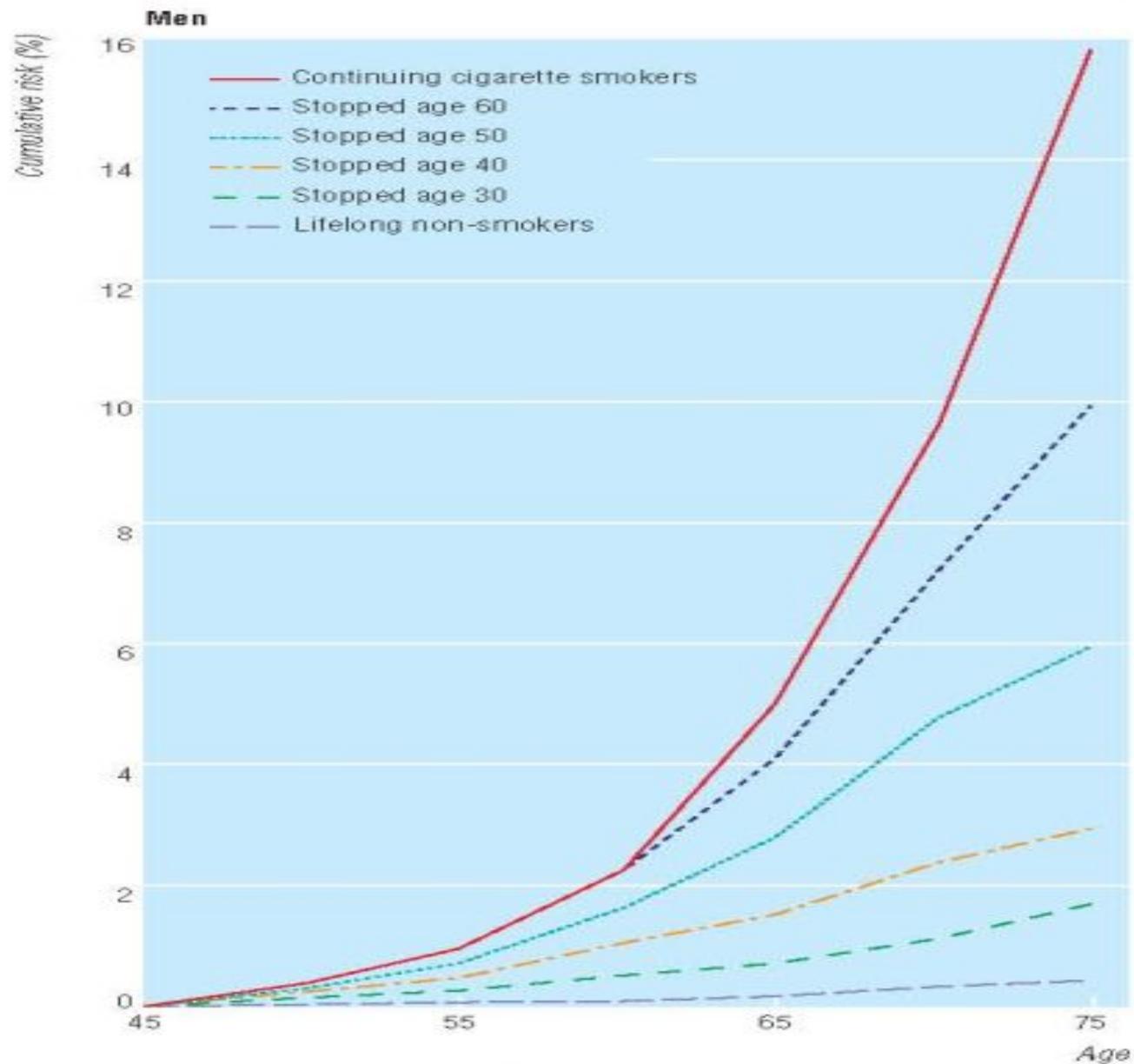


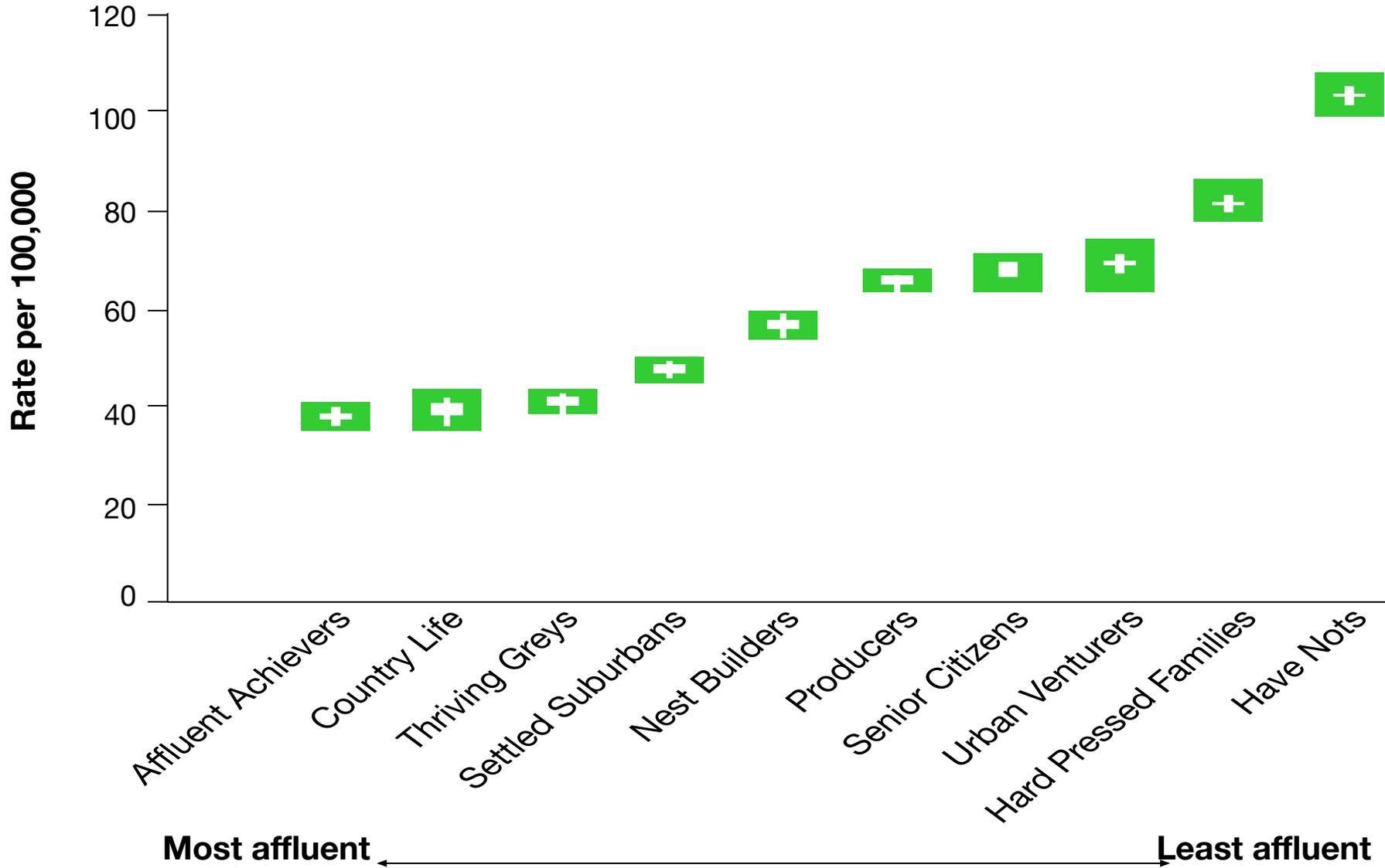
Fig 3 Effects of stopping smoking at various ages on the cumulative risk (%) of death from lung cancer up to age 75, at death rates for men in United Kingdom in 1990. (Non-smoker risks are taken from a US prospective study of mortality³⁴)

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



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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
- Thrombocytopenia
- Disseminated
intravascular
coagulation (DIC)

● Cutaneous

- Hyperkeratosis
- Dermatomyositis

● Other

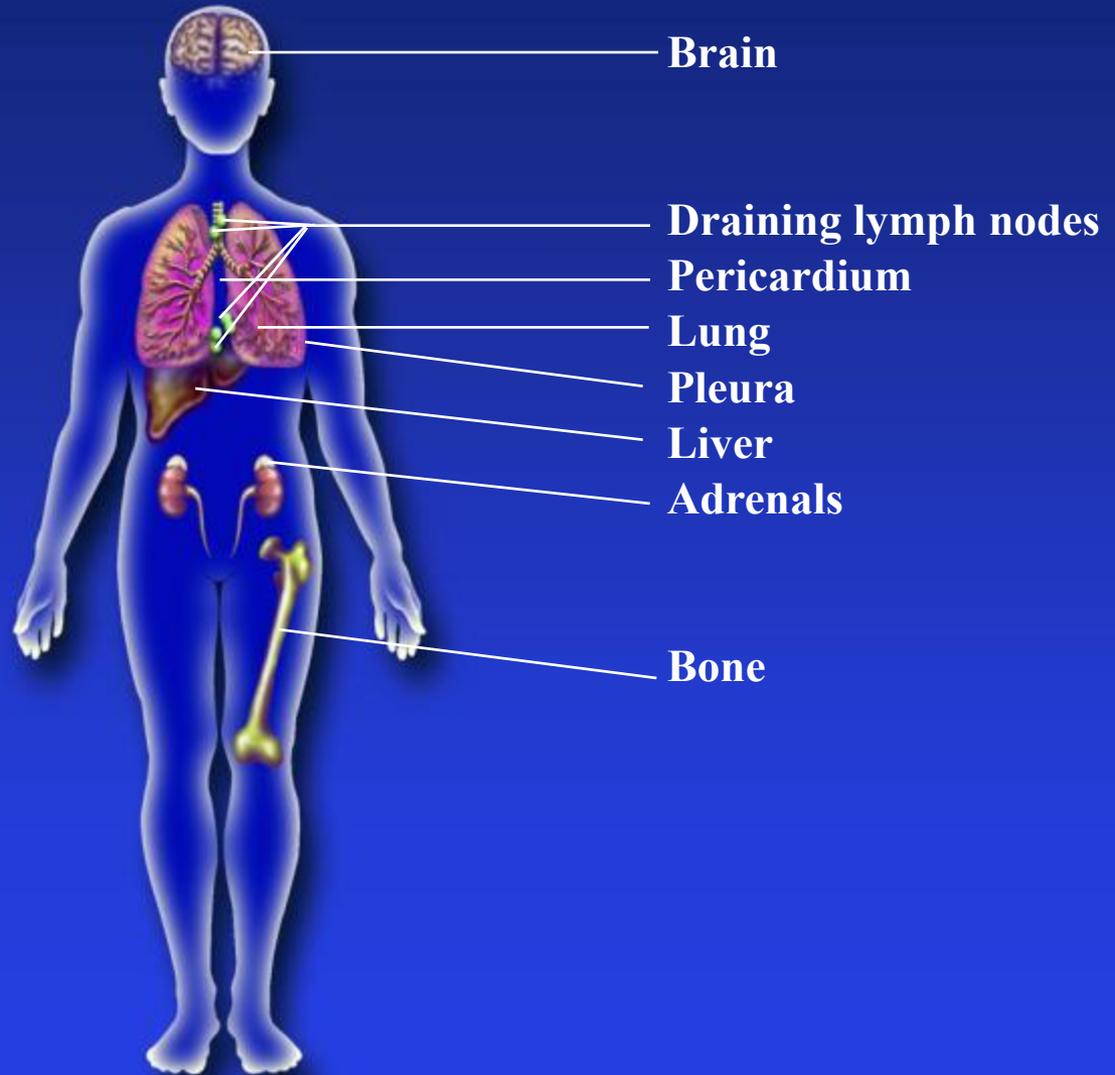
- Nephrotic syndrome
- Secretion of
vasoactive
intestinal peptide with
diarrhoea
- Anorexia or cachexia

Lung Cancer : Finger Clubbing



LUNG CANCER:

Local and distant spread

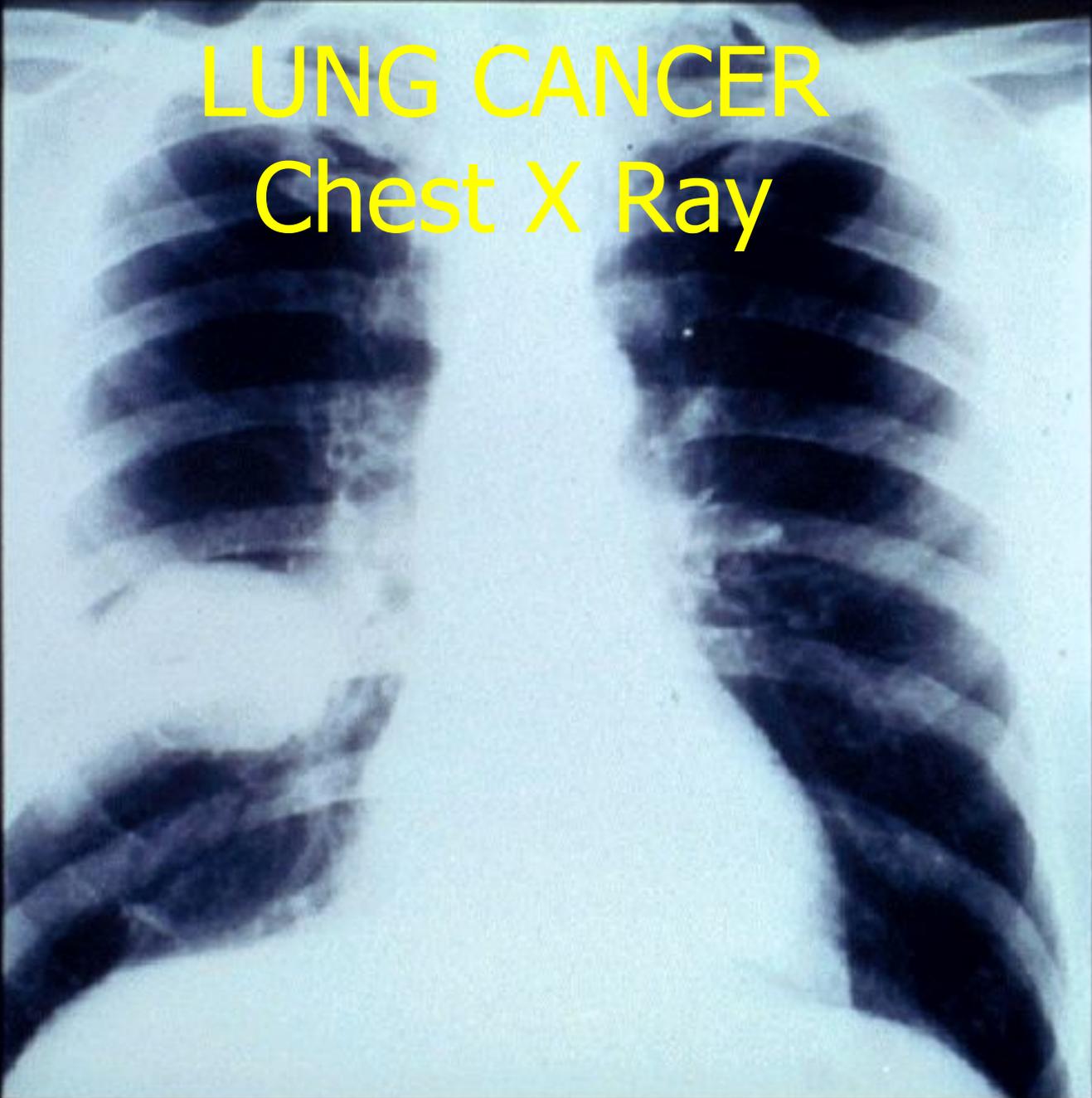


Lung Cancer: Investigation

- **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 (\pm 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

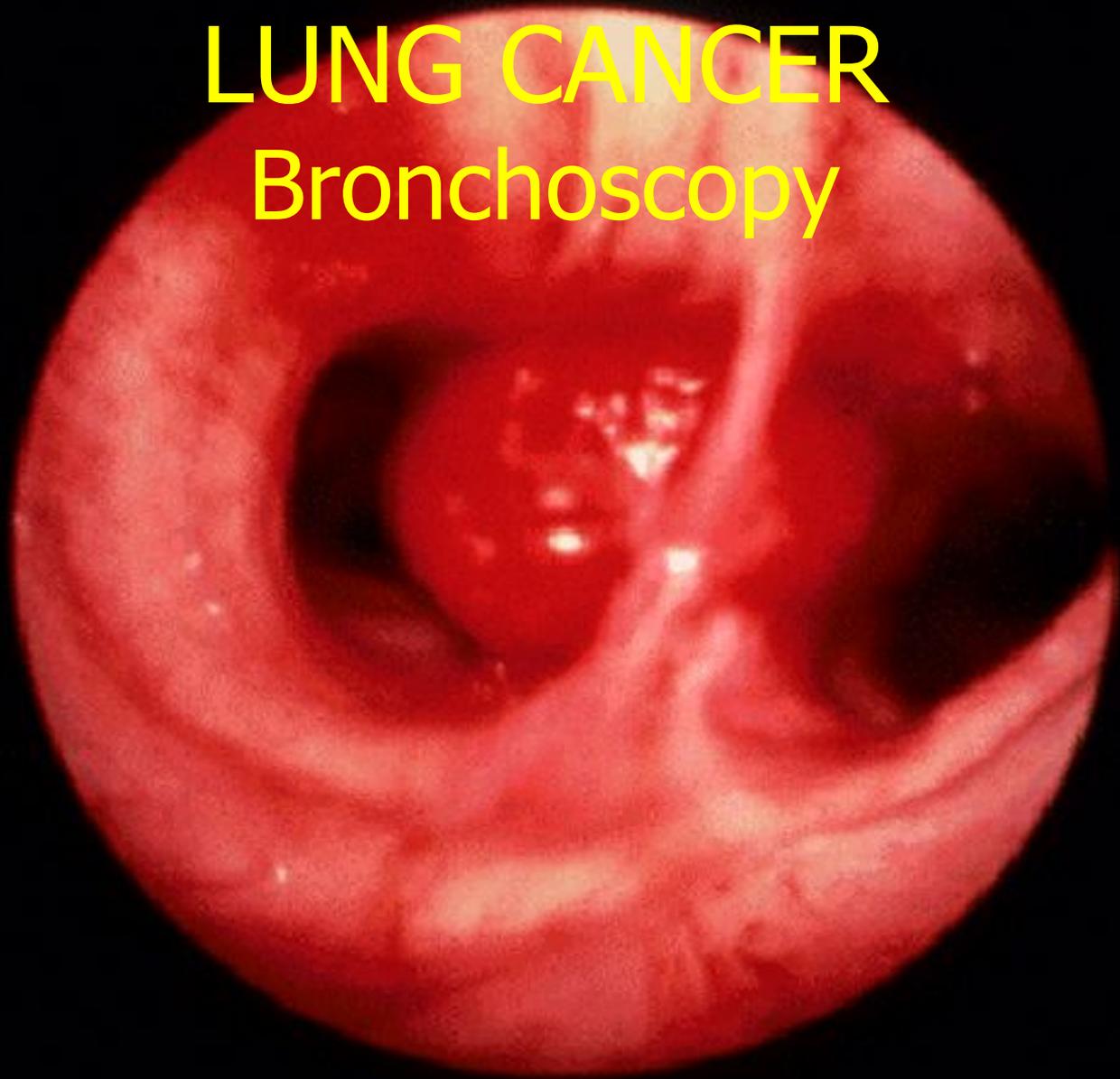


Fibreoptic Bronchoscopy



LUNG CANCER

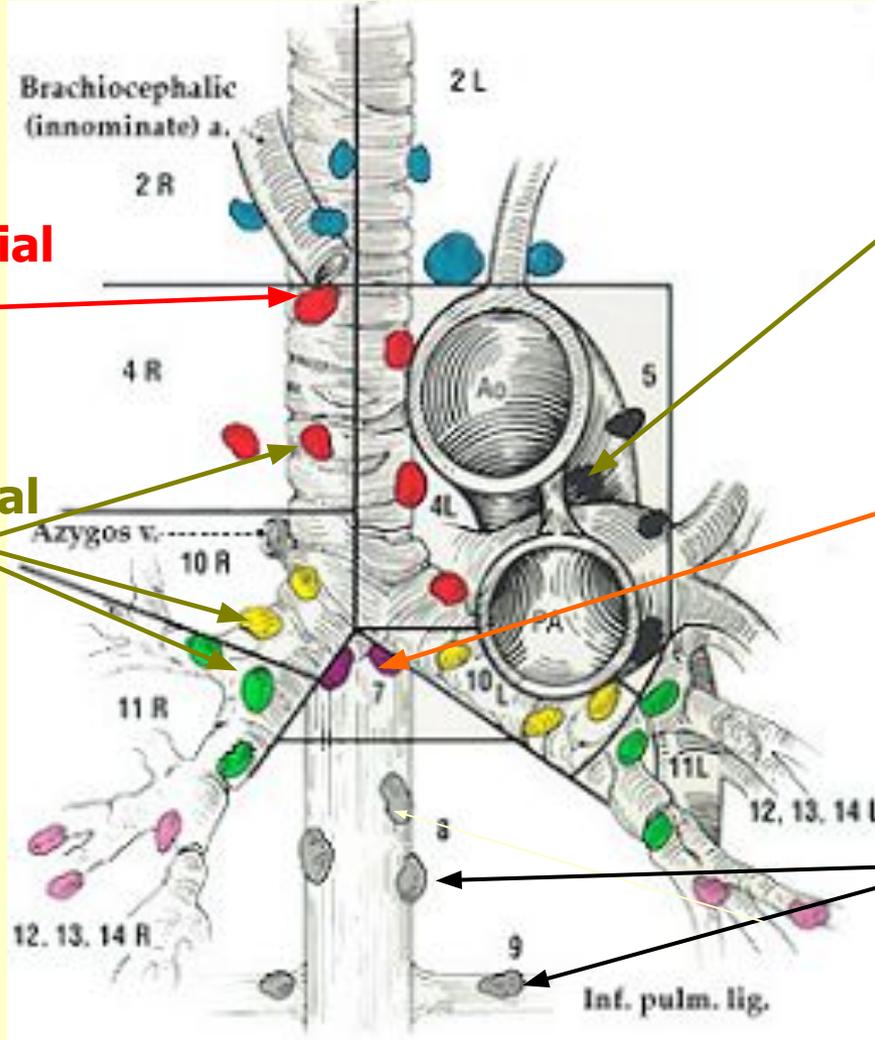
Bronchoscopy



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



Transbronchial biopsy

Endobronchial Ultrasound

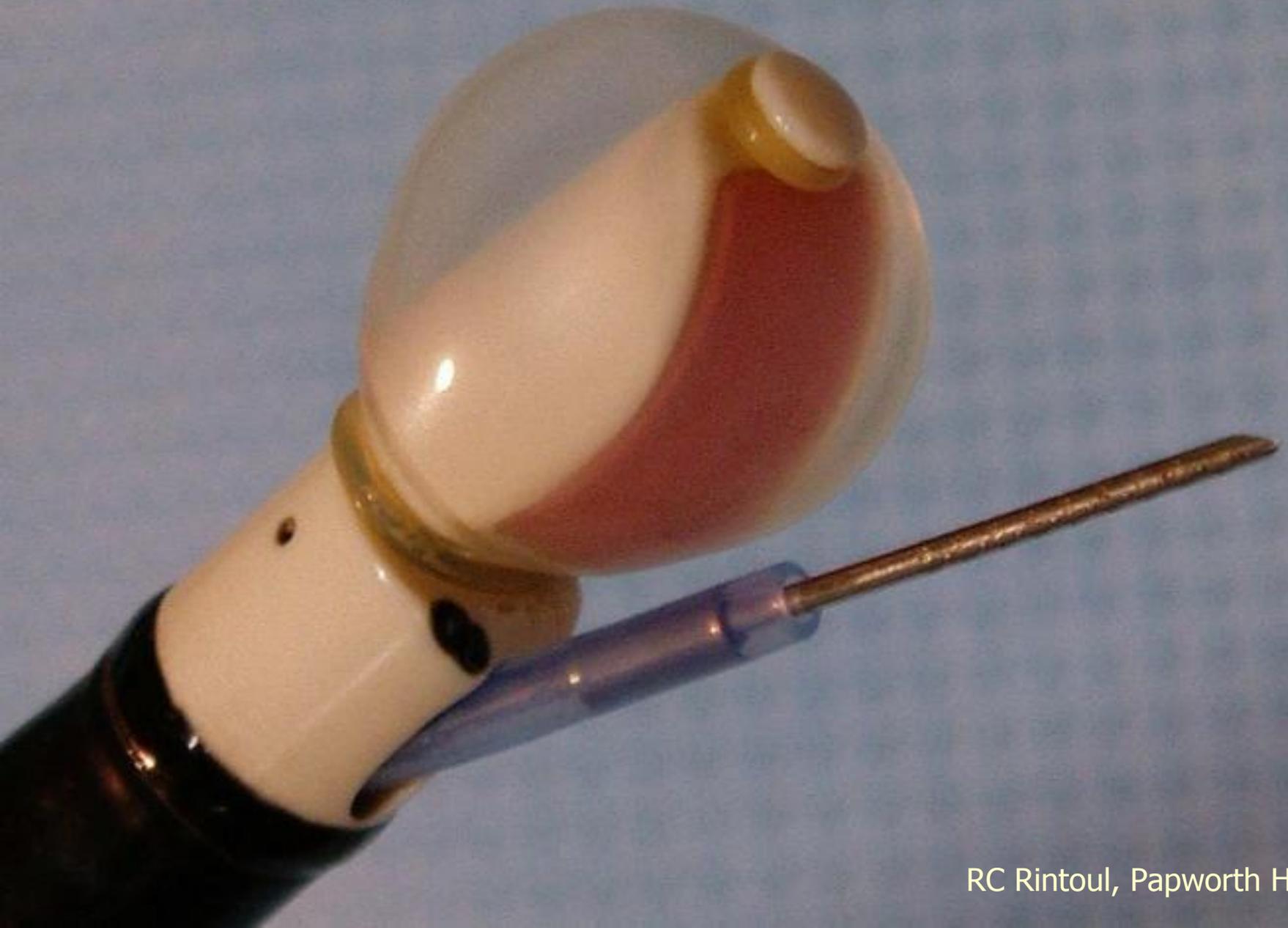
Endoscopic Ultrasound

Transbronchial biopsy

Endoscopic Ultrasound (CT biopsy)

Endoscopic Ultrasound

Endobronchial Ultrasound (EBUS)



- GI2



R8



11



4.0
cm

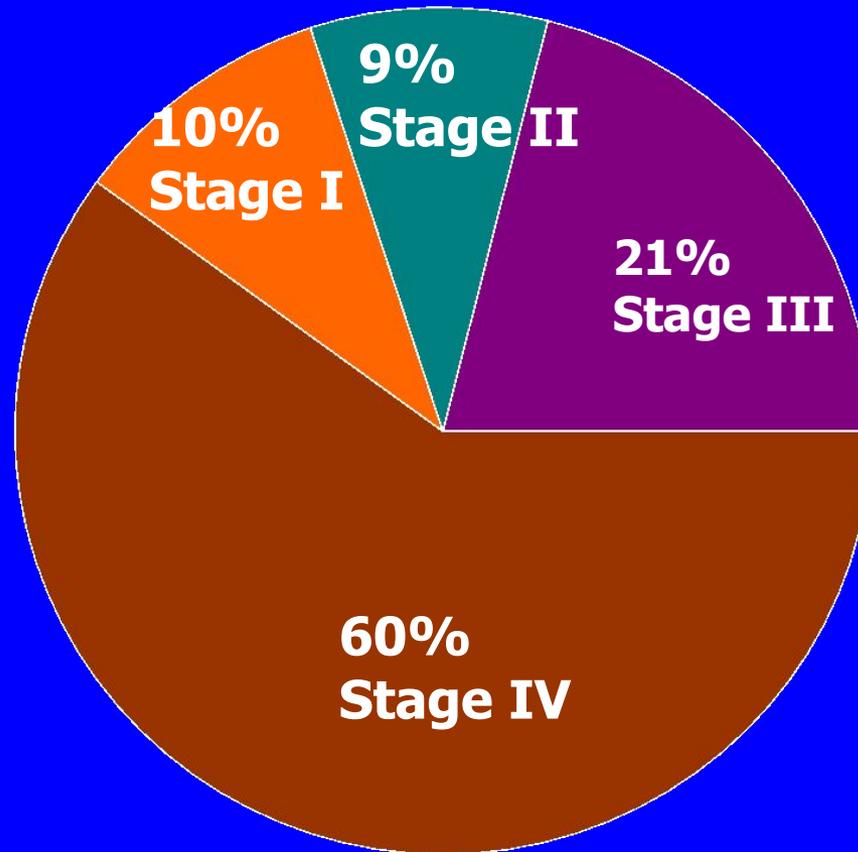


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RC Rintoul, Papworth Hospital

NON-SMALL CELL LUNG CANCER

Stages at presentation



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

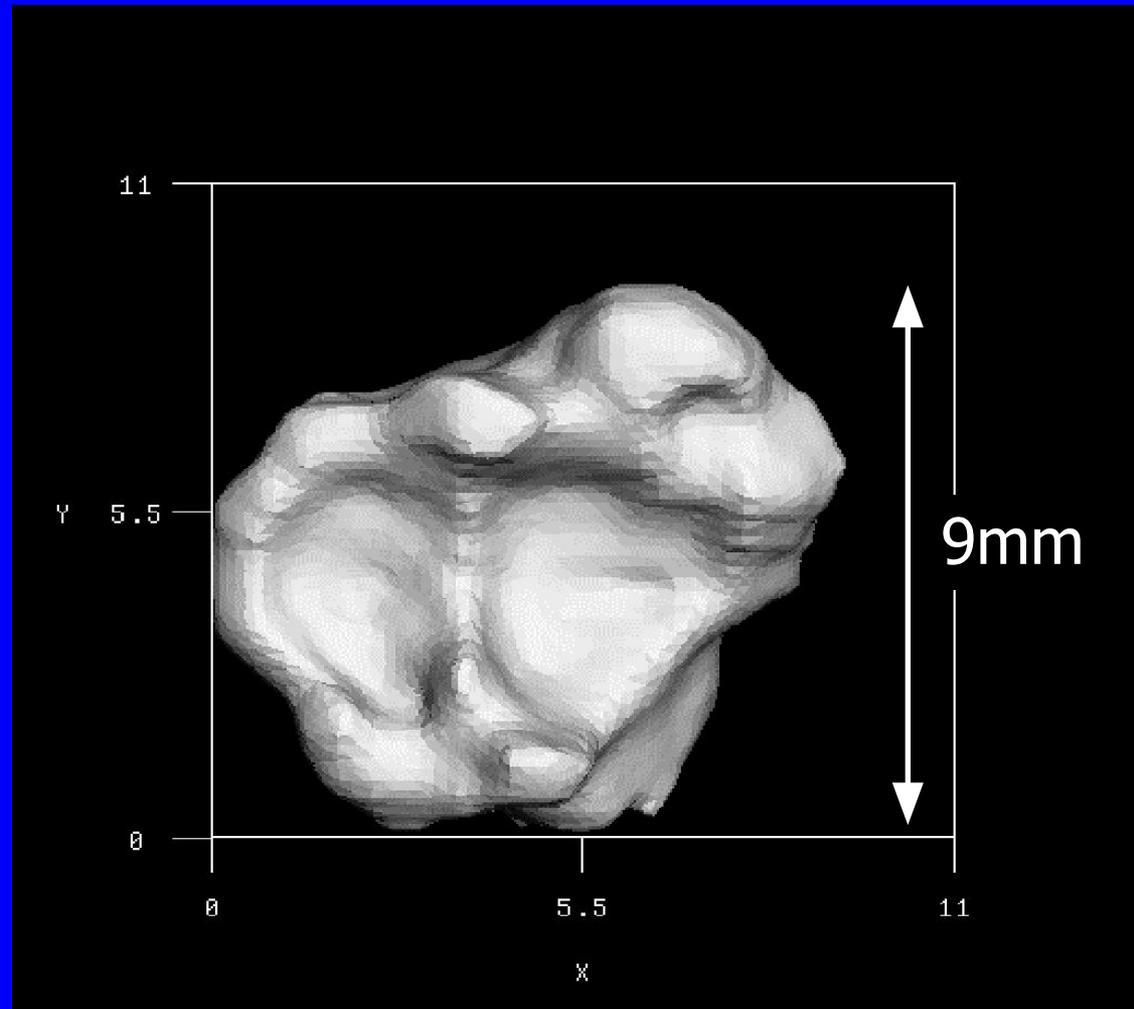
SMALL CELL LUNG CANCER

Extent at presentation

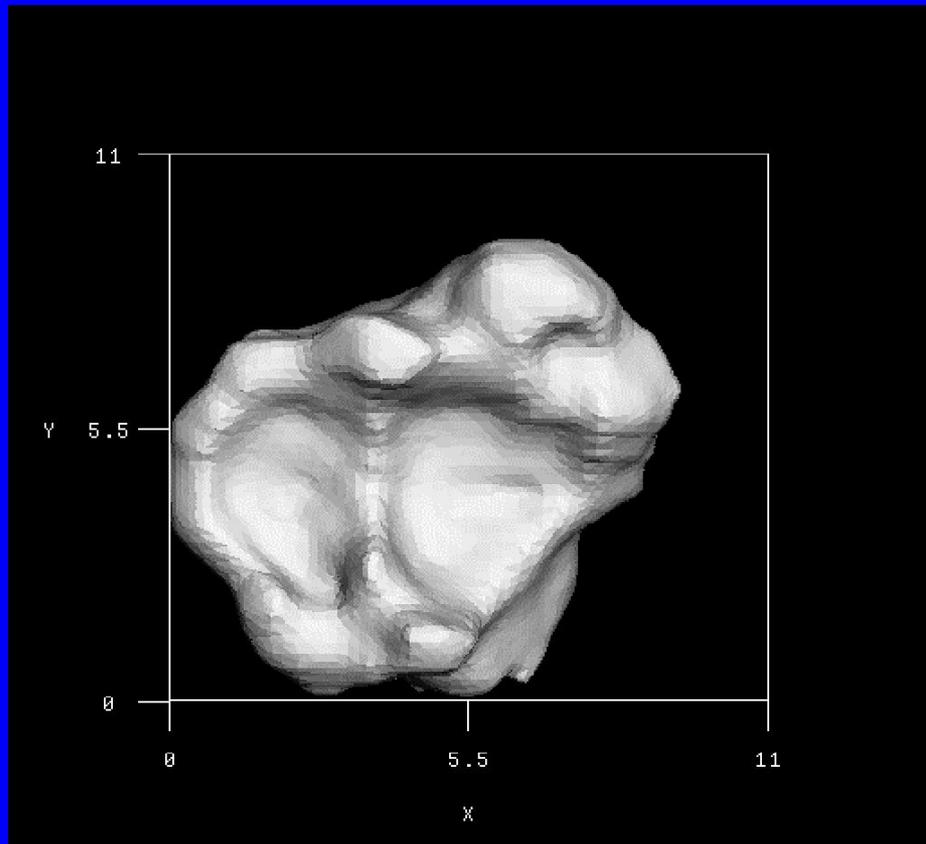


i.e. 3/4 have metastatic disease at presentation

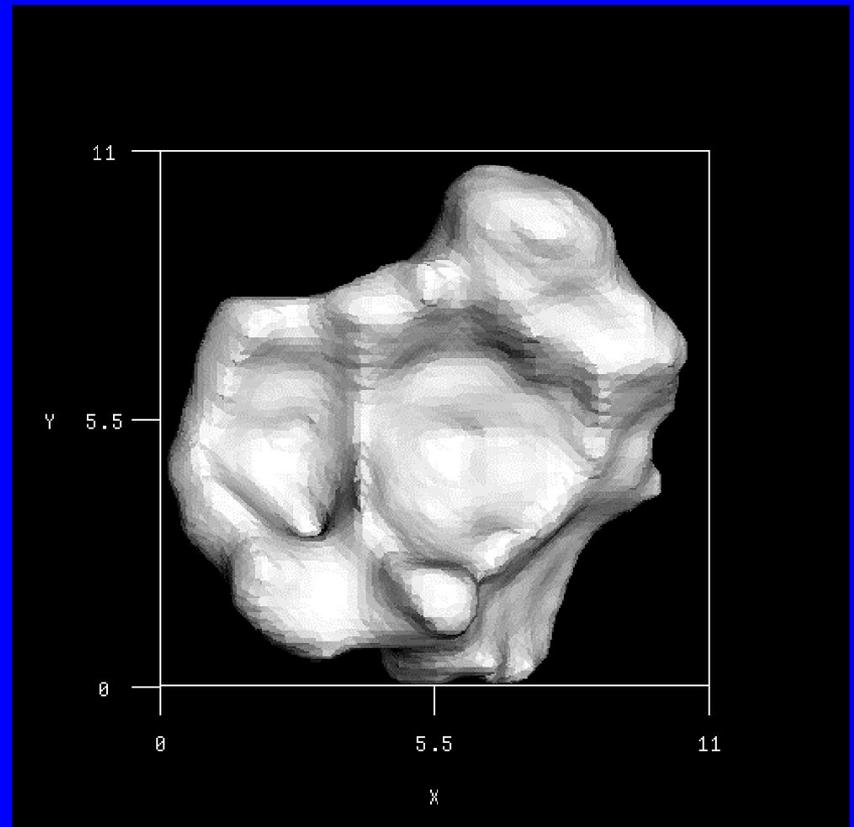
Lung Cancer: Screening with low-dose CT scanning



Day 0



Day 36

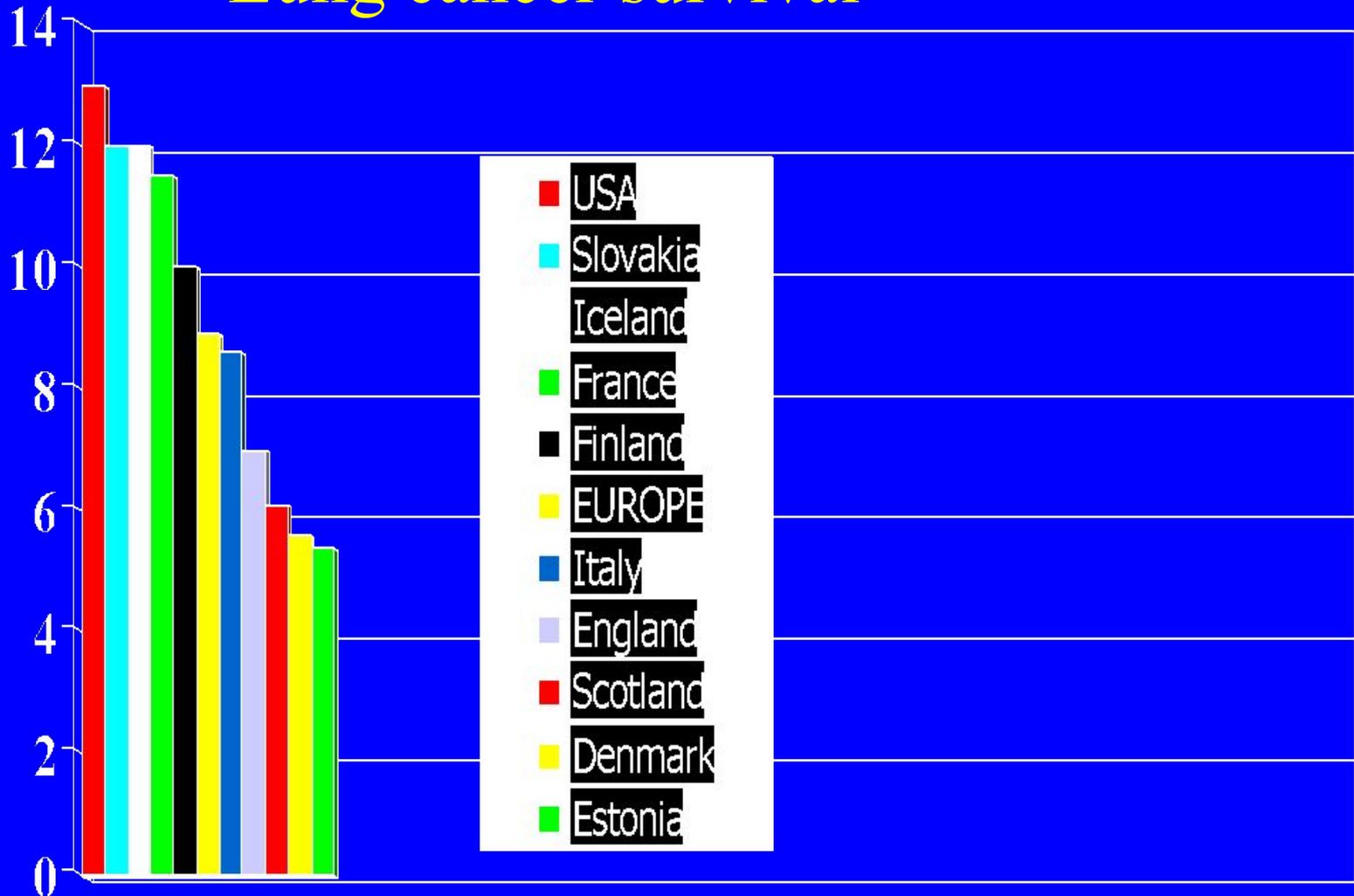


Prognosis of lung cancer

- 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

% 5 Year 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-radiotherapy
- **'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

NON-SMALL CELL LUNG CANCER Survival by stage



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 Survival	Median Survival	5-Year
	Untreated Patients	Treated Patients (%)	
	(weeks)	(months)	
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.)