

Year 6 Integrated Medicine Course:  
Respiratory Lecture 1:  
***Diagnosis and approaches to the  
breathless patient***

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Professor of Respiratory Medicine  
NHLI at Charing Cross



# Year 6 Integrated Medicine Course

## Respiratory Lectures

- ***Lecture 1:***  
Diagnosis and approaches to the breathless patient
- ***Lecture 2:***  
Management of Common Airway Diseases
- ***Lecture 3:***  
Less Common Lung Diseases and preparation for PACES

# Year 6 Integrated Medicine Course

## Respiratory Lectures

- This is revision
- Most already covered in Year 3
- E Learning Modules are available to cover this ground
- All available from the Year 6 page on the Undergraduate intranet

## Modules available:

1. A rational approach to the diagnosis of respiratory disease
2. Respiratory Emergencies (including pneumothorax, foreign bodies, Acute asthma, pulmonary embolism, pneumonia and exacerbations of COPD)
3. Asthma
4. Chronic Obstructive Pulmonary Disease
5. Lung Cancer
6. Sarcoidosis (Imminent Launch)
7. Obstructive Sleep Apnoea Syndromes (In preparation)

*PLUS VPAs on TB and severe asthma*

Imperial College  
London



Respiratory Medicine

**Diagnosis, Differential  
Diagnosis and Spirometry**

Enter

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Respiratory Medicine

# Asthma

Enter

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Respiratory Medicine

Lung Cancer

Enter

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Respiratory Medicine

COPD

Enter





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Search Outline Thumbnails Notes

## Introduction

- ▶ 1. Case I
- ▶ 2. Case II
- ▶ 3. Case III
- ▶ 4. Case IV
- ▶ 5. Case V
- ▶ 6. Cases VI
- 7. Self assessment
- 8. Further sources of information

## Introduction

### Learning objectives



*"Researching the delivery of  
respiratory healthcare"*

E-learning module in the diagnosis, assessment and management of common respiratory emergencies

On completion of this module the undergraduate should be able to:

- Describe common respiratory emergencies.
- Reflect upon respiratory emergencies they have seen previously.
- Understand the wide variety of presentations of those emergencies.

### Learning objectives



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## Investigations

### Investigations to perform

Having examined the patient and found him to be breathless with a fast respiratory rate and little in the way of breath sounds to be heard on the left hand side, which investigations would you wish to perform?



- A full blood count
- Estimation of Oxygen Saturation
- ECG
- A Chest radiograph

### Investigations to perform





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3. Case III

3.1 Introduction

3.2 Facts

3.3 Investigation

3.4 Emergency management

3.5 Management

3.6 Summary

4. Case IV

## Investigations

### Investigations to perform

Having examined the patient and found him to be breathless with a fast respiratory rate and little in the way of breath sounds to be heard on the left hand side, which investigations would you wish to perform?



**A full blood count**

This might be part of your "routine" assessment but is unlikely to be a crucial factor in determining the differential diagnosis.

**Estimation of Oxygen Saturation**

By oximetry or blood gas sampling. Yes a reasonable test to quantify an abnormality but it will not by itself help you make a diagnosis.

**ECG**

**Yes!**, this might help you exclude alternative diagnoses but it will not explain, for example, the absence of breath sounds which you detected when examining the left side of the chest.

**A Chest radiograph**

**Yes!**, this was performed and is shown next...

### Investigations to perform





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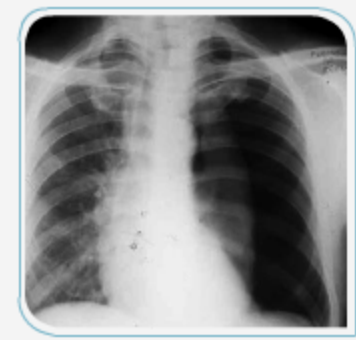
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- 45. 7. Self assessment
- 46. 8. Further sources of information

## Case Management

### Case Management

What are the key features which you need to know to determine the management of a pneumothorax?

- How breathless they are?
- Have they had one before?
- How large it is ?
- Do they have underlying lung disease?



### Case Management



Enter the password for "mrphl" on imperial.ac.uk?

Remember | New

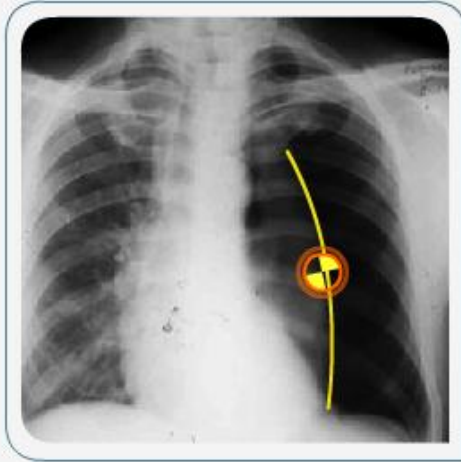


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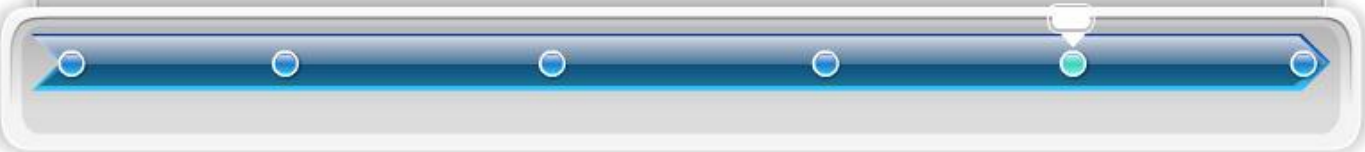


Click on the Lung Edge to confirm that you have seen the correct line.



**That's Right!**

This is the lung edge. In cases of doubt always request a CT scan of the Thorax **before** inserting a chest drain.



Respiratory Emergencies (05:51 / 17:53)

ATTACHMENTS



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## Patient Management

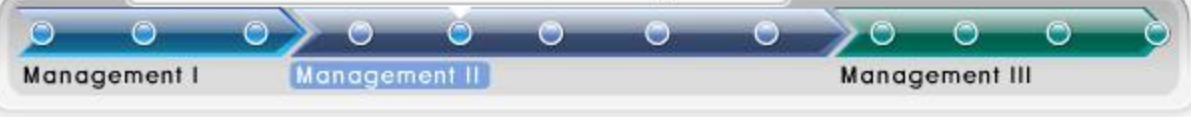
### Insertion of an intercostal drainage tube



00:02 / 02:49

Insertion of the drainage tube.

### Insertion of an intercostal drainage tube



SLIDE 6 OF 46   PLAYING   02:05 / 07:27



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## Patient Management

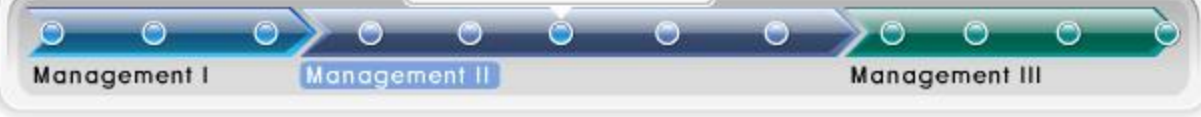
### Underwater drain



00:43 / 02:04

Tube being connected to underwater drain

### Underwater drain





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## Patient Management

### Management of the underwater drain

Management of an underwater drain. Do's and don'ts of chest drains. (Click)

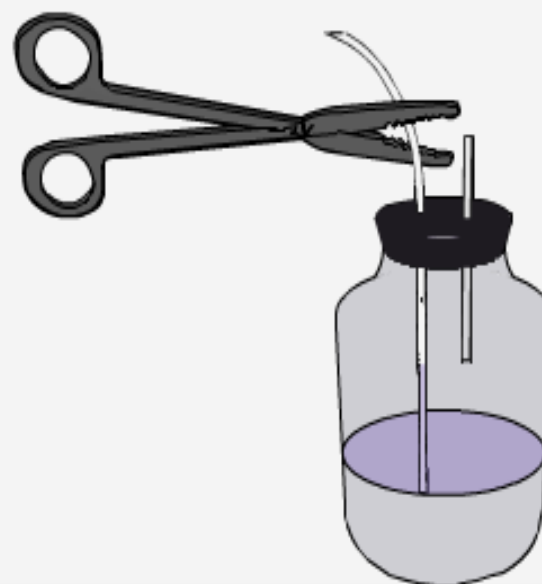
Don't clamp drains ✓

Drain level

Fluid Swinging

Froth on the water

Fluid like a millpond



Do not clamp  
drains other than  
when changing  
the bottle.

### Management of the underwater drain







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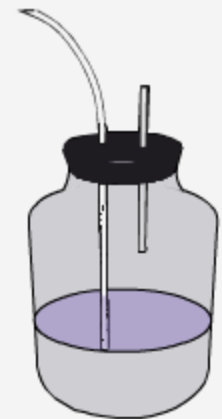
## Patient Management

### Management of the underwater drain

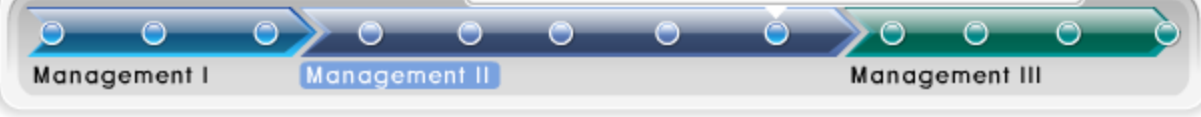
Management of an underwater drain. Do's and don'ts of chest drains. (Click)

- Don't clamp drains
- Drain level
- Fluid Swinging ✓
- Froth on the water
- Fluid like a millpond

Always check that the fluid in the tube is swinging with respiration. If not, the tube is blocked.



### Management of the underwater drain





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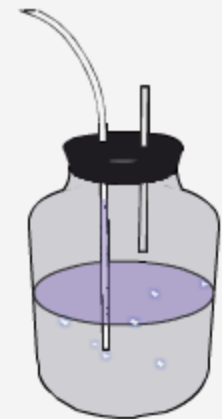
## Patient Management

### Management of the underwater drain

Management of an underwater drain. Do's and don'ts of chest drains. (Click)

- Don't clamp drains
- Drain level
- Fluid Swinging
- Froth on the water** ✓
- Fluid like a millpond

A swinging fluid level in the tube, froth on the surface of the water in the bottle, and visible bubbling suggests an ongoing persistent leak. Consider low pressure suction.



### Management of the underwater drain

Management I   Management II   Management III

## Aims of the 3 Lectures

- To revise ground covered in Year 3
- To stimulate you to see as many patients with lung disease as possible over the next 3 months
- To appreciate the changing burden of lung disease
- To understand the size and diversity of the problem
- To be able to make prompt and more accurate diagnoses
- To understand how to *manage* common lung diseases (not just prescribe for them)
- To be aware of pitfalls and less common diseases

## Aims of the 3 Lectures

- To revise ground covered in Year 3
- To stimulate you to see as many patients with lung disease as possible over the next 3 months
- To appreciate the changing burden of lung disease
- To understand the size and diversity of the problem
- To be able to pass Finals and look after those with lung diseases to a high standard when qualified
- To understand how to manage common lung diseases (not just prescribe for them)
- To be aware of pitfalls and less common diseases

## Aims of today's lecture

- Appreciate the changing burden of lung disease
- To understand the size and diversity of the problem
- To be able to make prompt and more accurate diagnoses
- To understand how to *manage* common lung diseases (not just prescribe for them)
- To be aware of pitfalls and less common diseases

First get a recommendation from your family doctor that your eyes need testing. Then hand that recommendation to any doctor with special qualifications (lists will be available) or to any ophthalmic optician taking part in the new service. If you need glasses, these will be provided without charge. For re-testing you can go direct to any of the doctors with special qualifications, or to an ophthalmic optician.

The National Health Service will provide several kinds of spectacles of different types. For specially expensive types you will have to pay the extra cost.

**Deafness** Specialist ear clinics will be established as resources allow. At them you will get not only an expert opinion upon deafness but also, if necessary, a *new hearing aid* invented by a special committee of the Medical Research Council. Production of these aids is now going on, but will not meet all demands at once. They will be supplied free, when ready, together with a reasonable allowance of maintenance batteries.

**Home Health Services** Your local County or County Borough Council will, as soon as it can, make special provision for: (1) advice and care of expectant and nursing mothers and children under five (for particulars ask your doctor, health visitor, or Welfare Centre); (2) midwifery (ask your doctor or Welfare Centre); (3) home nursing where there is illness in the family (ask your doctor); (4) all necessary vaccination or immunisation (through your doctor or Welfare Centre); and (5) a health visitor service to deal with problems of illness in the home, especially tuberculosis.

**Health Centres** Special premises known as Health Centres may later be opened in your district. Doctors may be accommodated there instead of in their own surgeries, but you will still have "your own doctor" to give you personal and confidential treatment. He will still come to your home as necessary. At the Health Centre he will be able to use equipment supplied from public funds. These Centres may also offer dentistry and other services on the spot.

#### WHAT TO DO NOW

1. Choose your doctor.
2. Get application forms from him or from the Post Office, Public Library, or office of the local Executive Council.
3. Fill one in for each member of the family.
4. Hand them to the doctor.

#### ACT AT ONCE

PREPARED BY THE CENTRAL OFFICE OF INFORMATION FOR THE MINISTRY OF HEALTH

(30077) WL 30102 2/48 H.W.



# THE NEW NATIONAL HEALTH SERVICE

Your new National Health Service begins on 5th July. What is it? How do you get it?

It will provide you with all medical, dental, and nursing care. Everyone—rich or poor, man, woman or child—can use it or any part of it. There are no charges, except for a few special items. There are no insurance qualifications. But it is not a "charity". You are all paying for it, mainly as taxpayers, and it will relieve your money worries in time of illness.

# The Changing NHS

In 1948, a cataract operation meant a week of total immobility with the patient's head supported by sandbags.

# The Changing NHS

In 1948, a cataract operation meant a week of total immobility with the patient's head supported by sandbags.

Eye surgery is now over within 20 minutes, and most patients are out of hospital the same day.





# Referrals with Suspected Obstructive Sleep apnoea syndrome now represent over one half of all referrals to our respiratory service

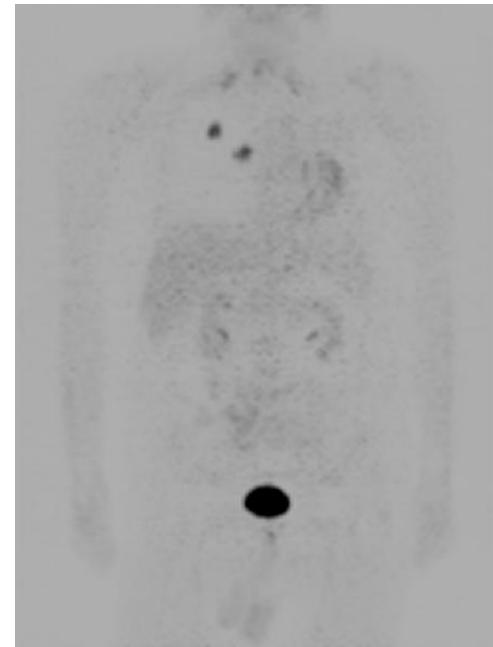




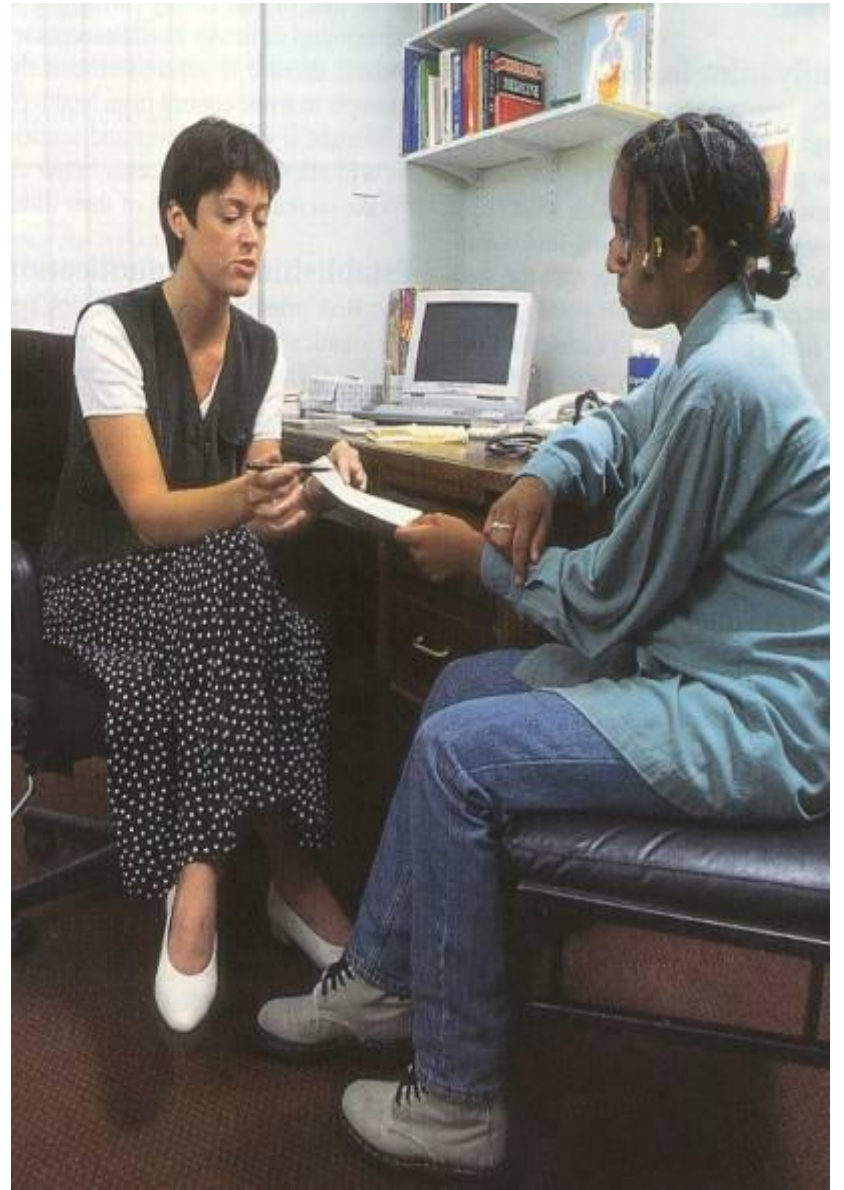
*Laënnec Listening to the Chest of a Patient* (c 1910) by Ernest Board (private collection, UK).



*Laënnec Listening to the Chest of a Patient* (c 1910) by Ernest Board (private collection, UK).







# The burden of respiratory ill health has changed

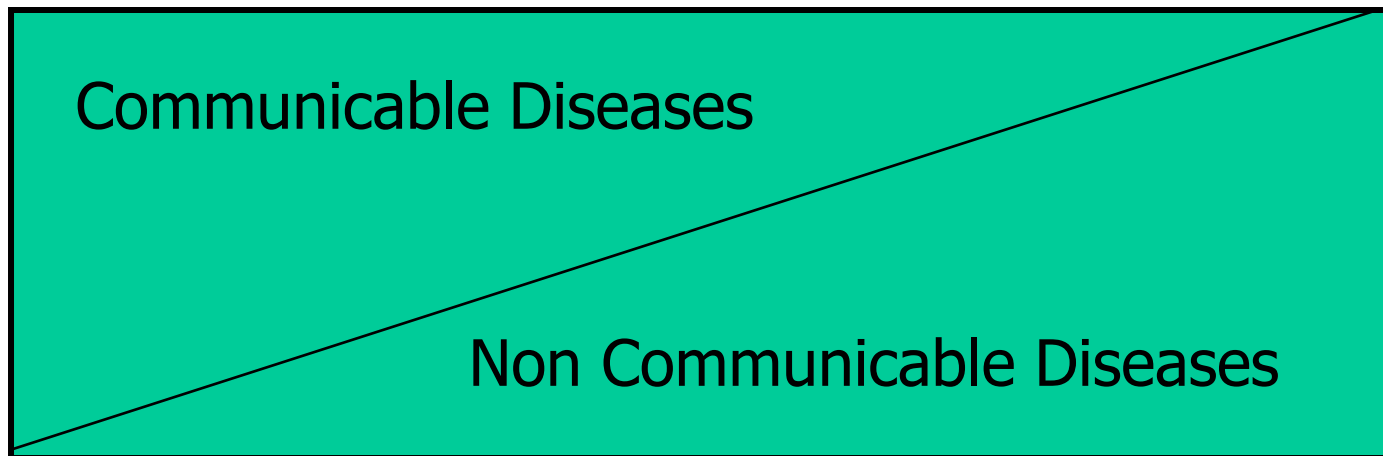


Communicable diseases

Non communicable diseases

# The burden of respiratory ill health is changing; but at different rates in different countries

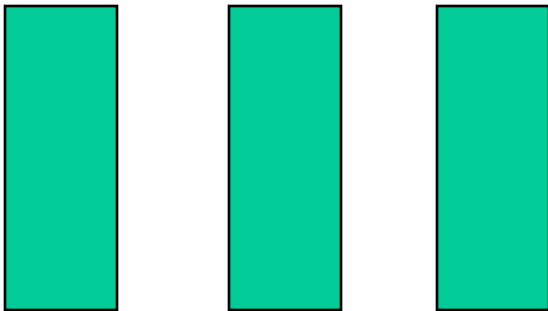
Time





# Changes in the pattern and type of diseases may need different services

A series of acute illnesses (eg diarrhoeal illnesses, ARI,)



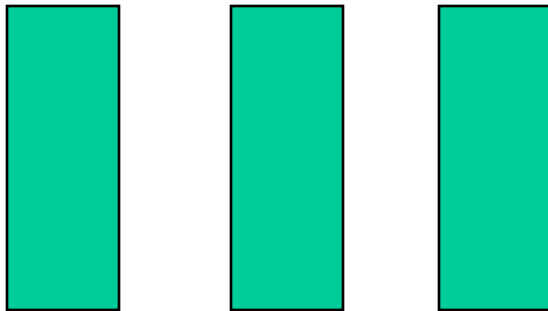
A long term disorder (eg depression, COPD, Asthma, Hypertension, Sleep apnoea syndromes, Diffuse Parenchymal Lung Disease, Diabetes)



# Changes in the pattern and type of diseases may need different services

A series of acute illnesses (eg diarrhoeal illnesses, ARI,)

A long term disorder (eg depression, COPD, Asthma, Hypertension, Sleep apnoea, Rheumatoid arthritis, Diabetes, etc)



**More attention upon:**

- Enhancing compliance
- Long term support
- Teaching self care
- Convenient follow up

# THE BURDEN OF LUNG DISEASE

2nd Edition



A Statistics  
Report from the  
British Thoracic  
Society 2006

# Deaths from different causes

- Respiratory disease kills one in five people in the UK



# Deaths by cause, 2004, UK



Figure 1.1a Deaths by cause. United Kingdom, males and females, 2004

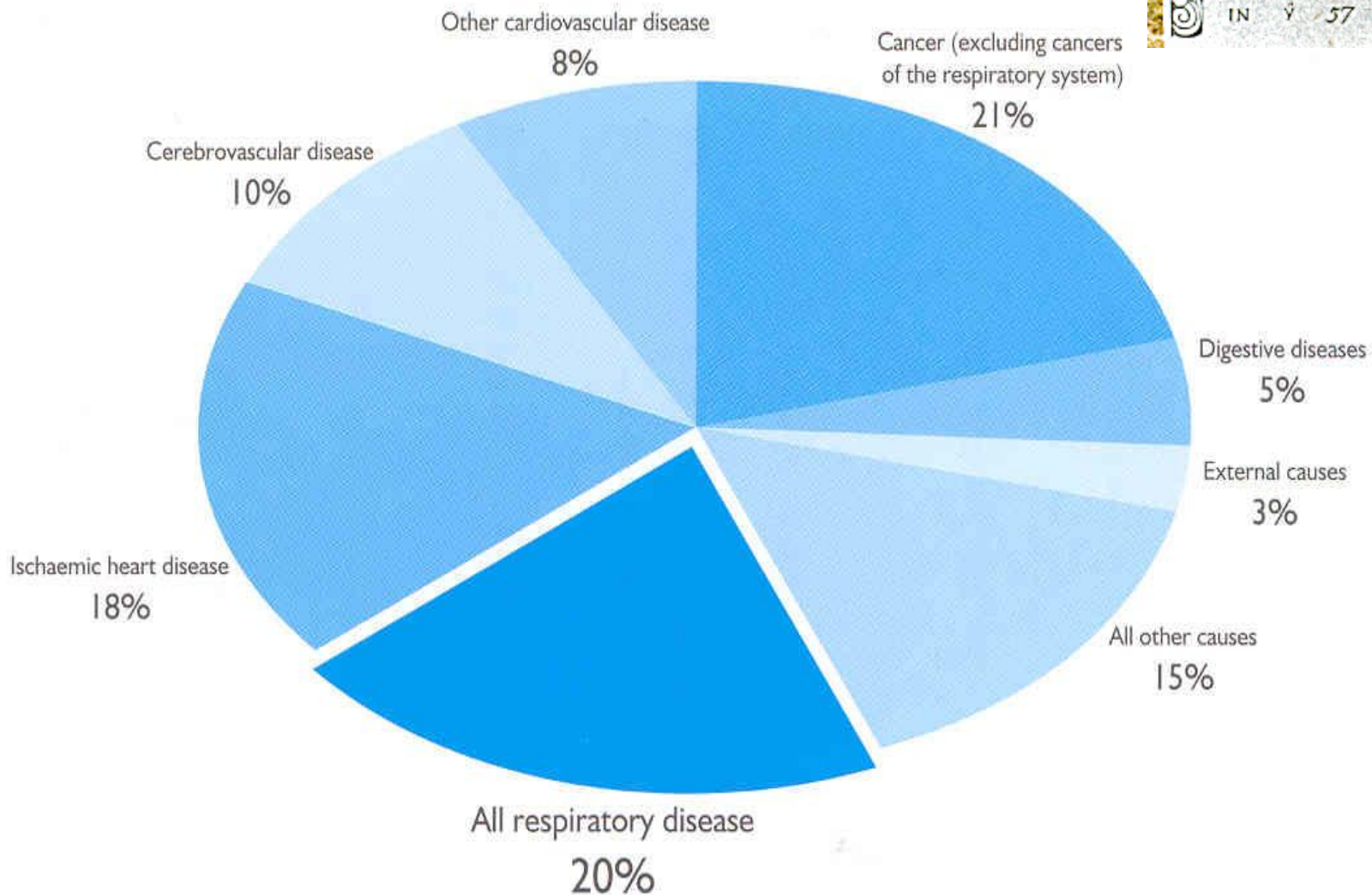


Figure I.2 Respiratory disease deaths by cause. United Kingdom, 2004

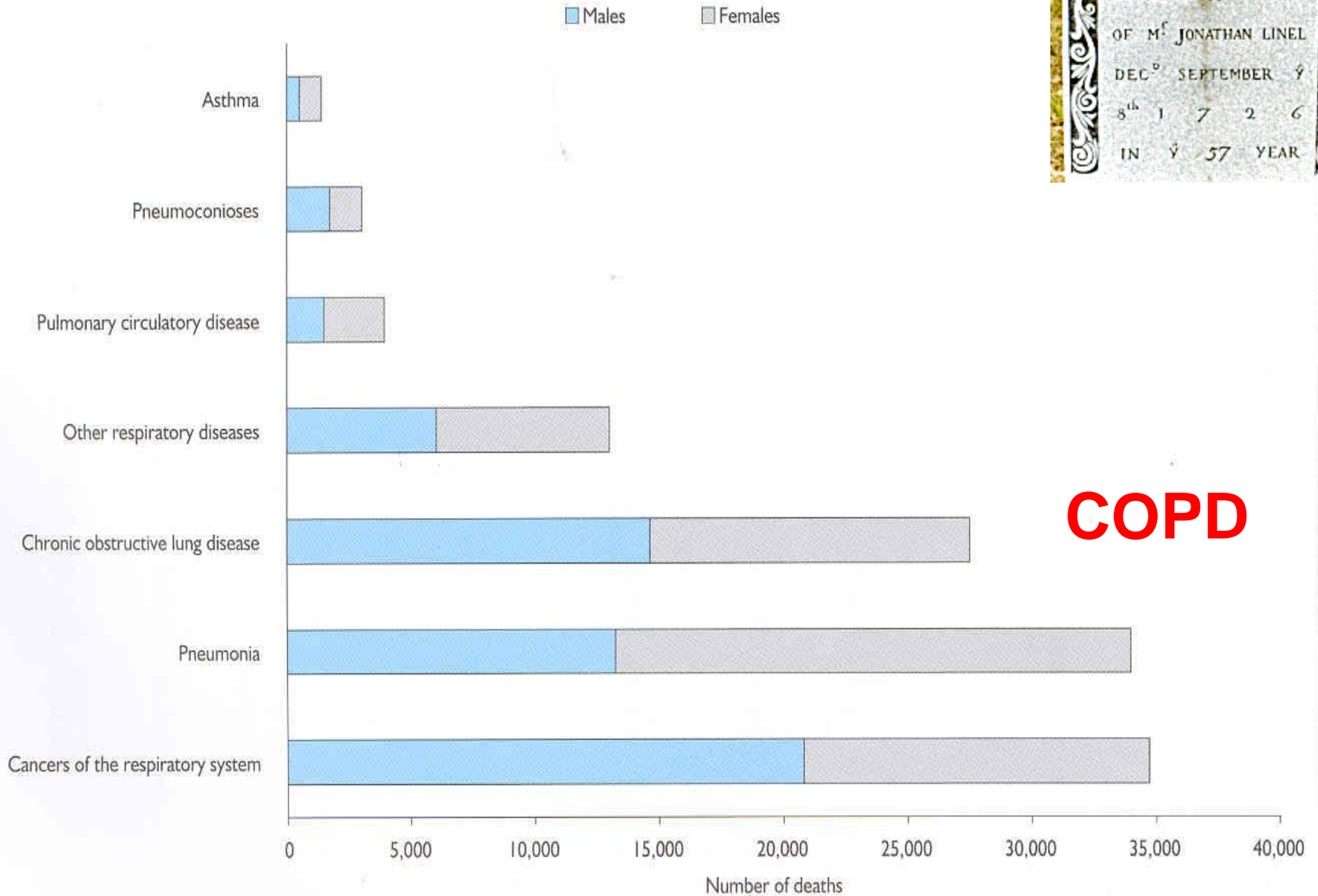


Figure I.2 Respiratory disease deaths by cause. United Kingdom, 2004

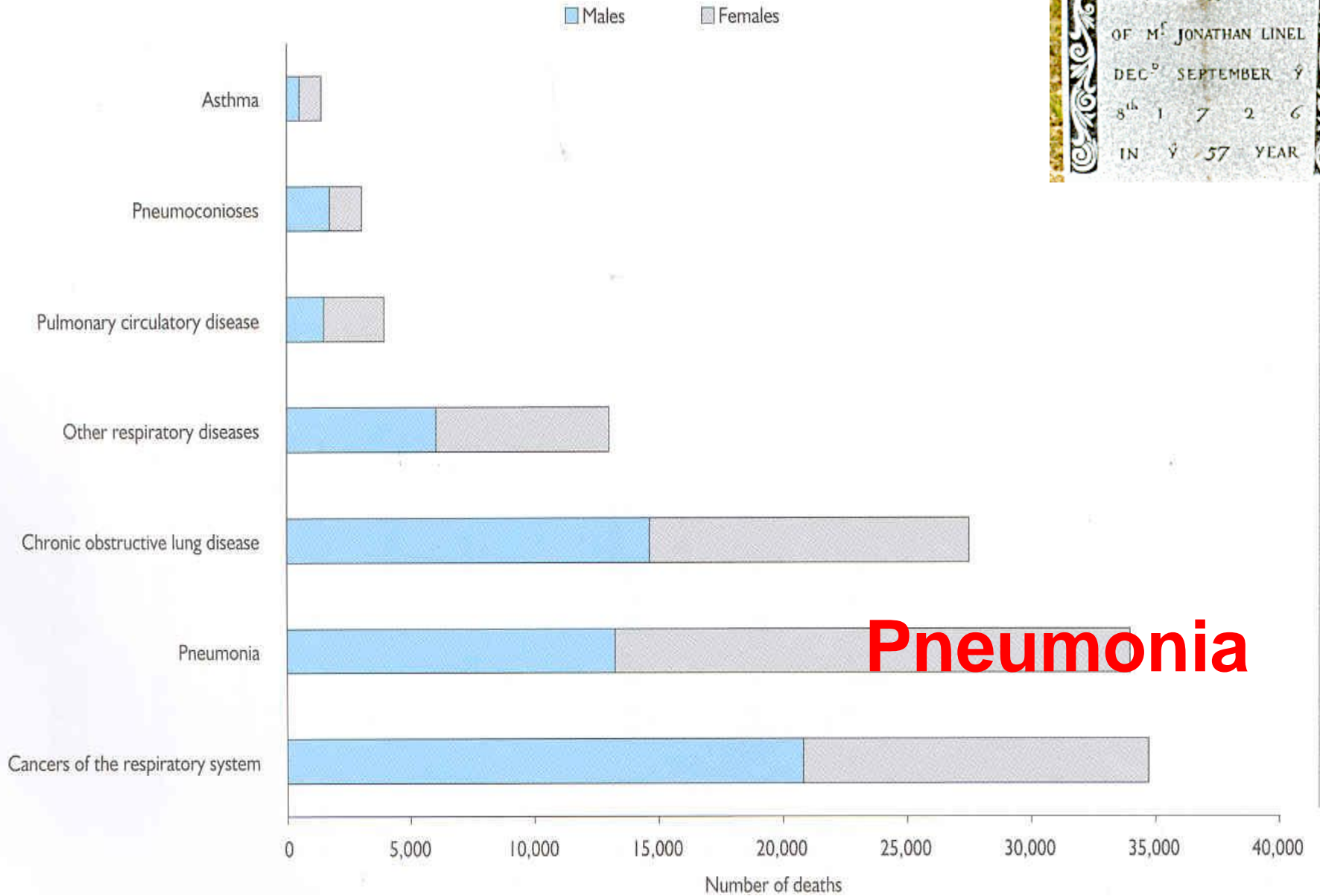
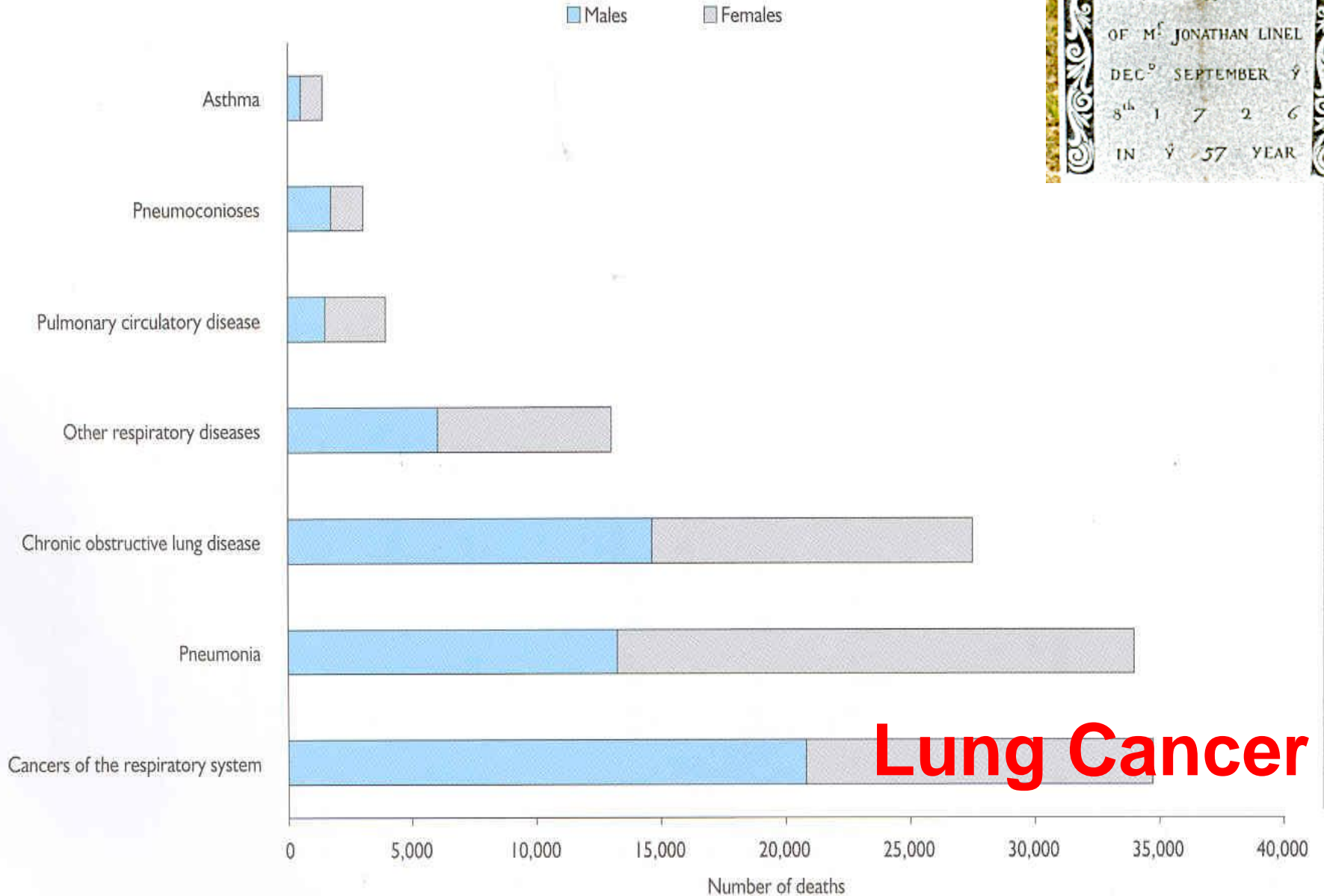


Figure 1.2 Respiratory disease deaths by cause. United Kingdom, 2004



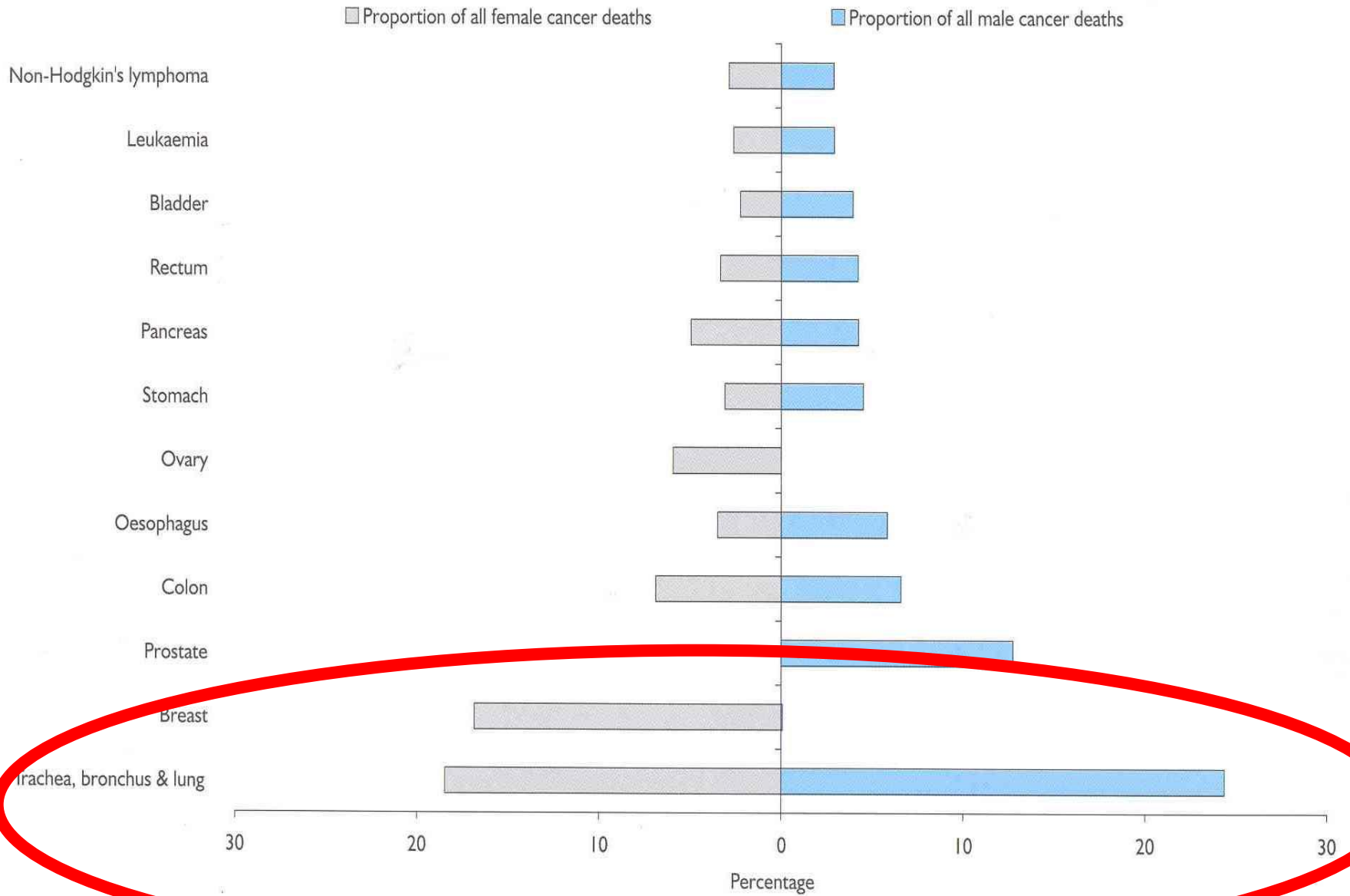
**Lung Cancer**



## Deaths from different cancers

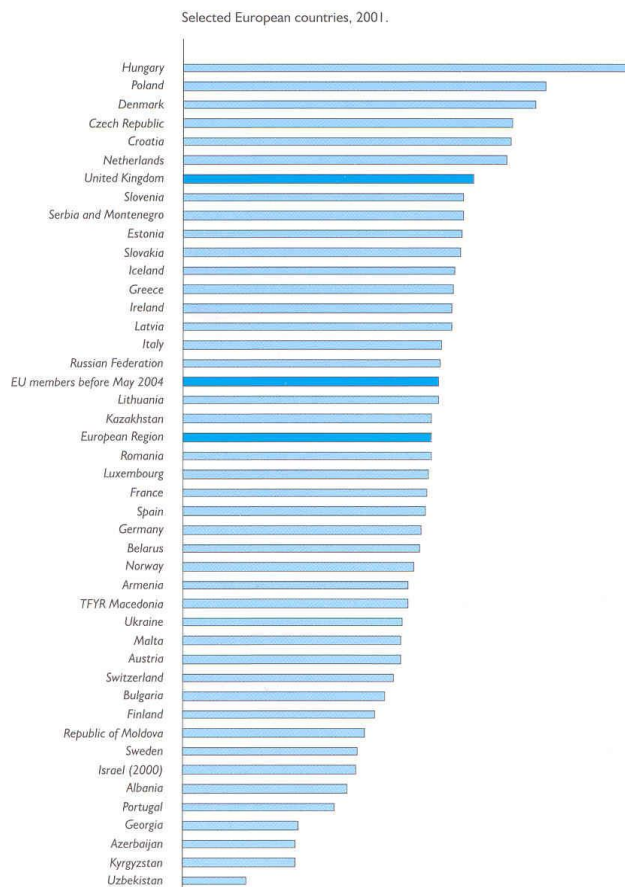
- Lung cancer is the biggest cancer killer in the UK
- Lung cancer now kills more women in the UK than breast cancer

Figure 1.3 Proportion of cancer deaths by type of cancer and sex. United Kingdom, 2004



# UK has one of the highest death rates from lung cancer in Europe

	Males	Females	All
Albania	40.31	8.74	23.73
Armenia	64.25	8.67	32.6
Austria	52.44	15.71	31.46
Azerbaijan	29.67	5.52	16.39
Belarus	79.34	5.53	34.32
Bulgaria	53.46	8.95	29.26
Croatia	92.55	14.3	47.36
Czech Republic	85.78	19.15	47.55
Denmark	64.68	41.13	50.95
Estonia	88.73	11.65	40.3
Finland	51.34	12.16	27.85
France	65.05	10.9	35.21
Georgia	31.79	5.79	16.81
Germany	59.75	15.78	34.39
Greece	72.15	10.81	38.99
Hungary	113.67	30.41	64.84
Iceland	45.09	34.65	39.37
Ireland	56.15	25.37	38.85
Israel (2000)	39.03	13.88	25.04
Italy	69.45	12.65	37.39
Kazakhstan	73.82	11.03	35.93
Kyrgyzstan	28.64	6.87	16.31
Latvia	87.32	9.24	38.79
Lithuania	80.99	8.67	36.93
Luxembourg	61.95	15.32	35.5
Malta	60.85	8.71	31.5
Netherlands	78.17	24.37	46.82
Norway	45.62	24.02	33.34
Poland	99.66	18.53	52.49
Portugal	41.14	6.52	21.87
Republic of Moldova	49.53	9.2	26.31
Romania	65.39	11.33	35.89
Russian Federation	83.63	8.73	37.16
Serbia and Montenegro	68.93	16.42	40.63
Slovakia	81.53	10.74	40.13
Slovenia	76.36	15.83	40.64



# Lung Cancer deaths in Europe

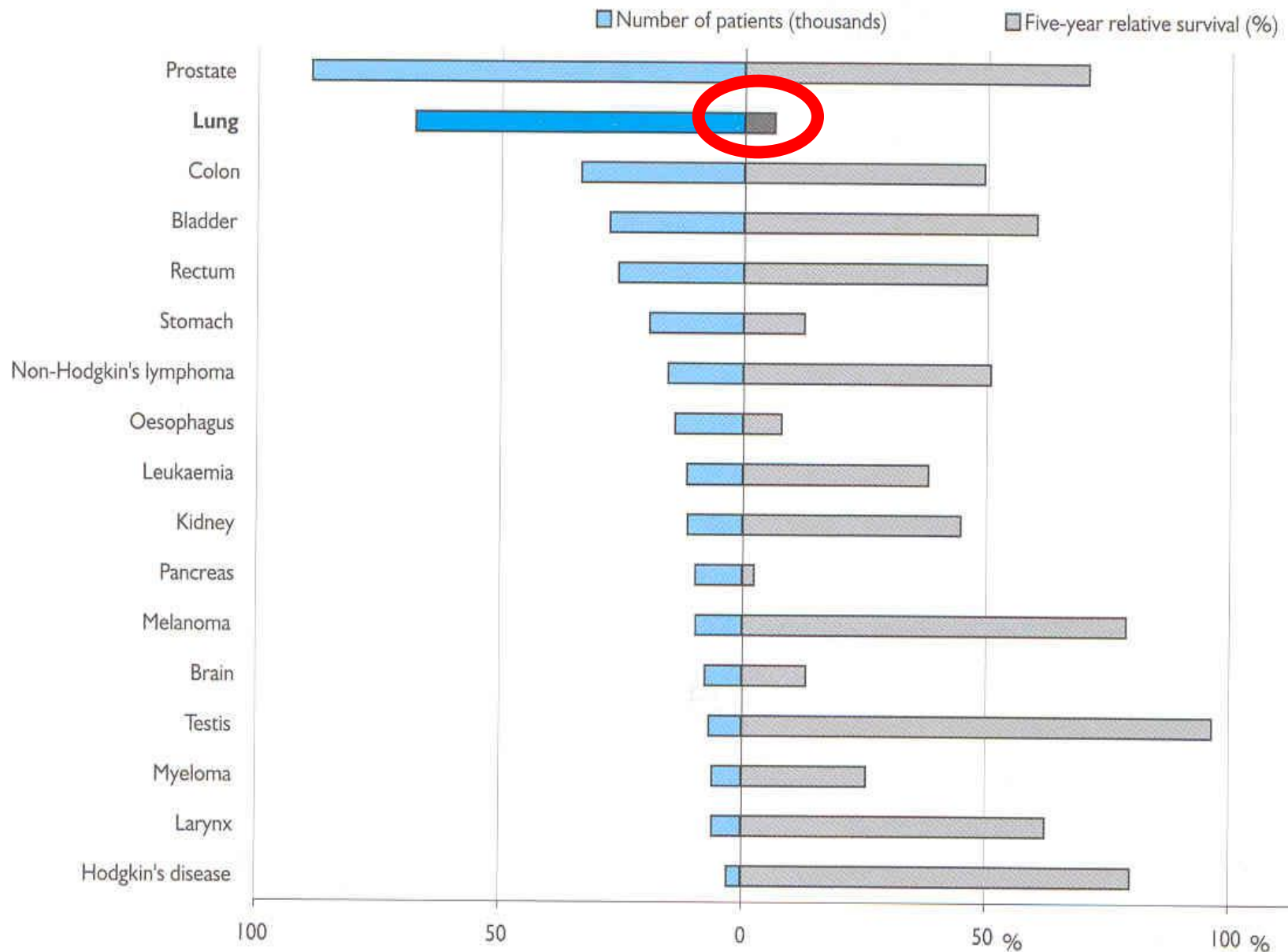
United Kingdom	59.04	29.49	42.06
Uzbekistan	14.92	4.22	9.17
EU members before May 2004	63.87	16.21	36.96
European Region	67.75	13.25	35.91

Source: World Health Organisation (2006), European Health for all Database [www.euro.who.int/hfadb](http://www.euro.who.int/hfadb).

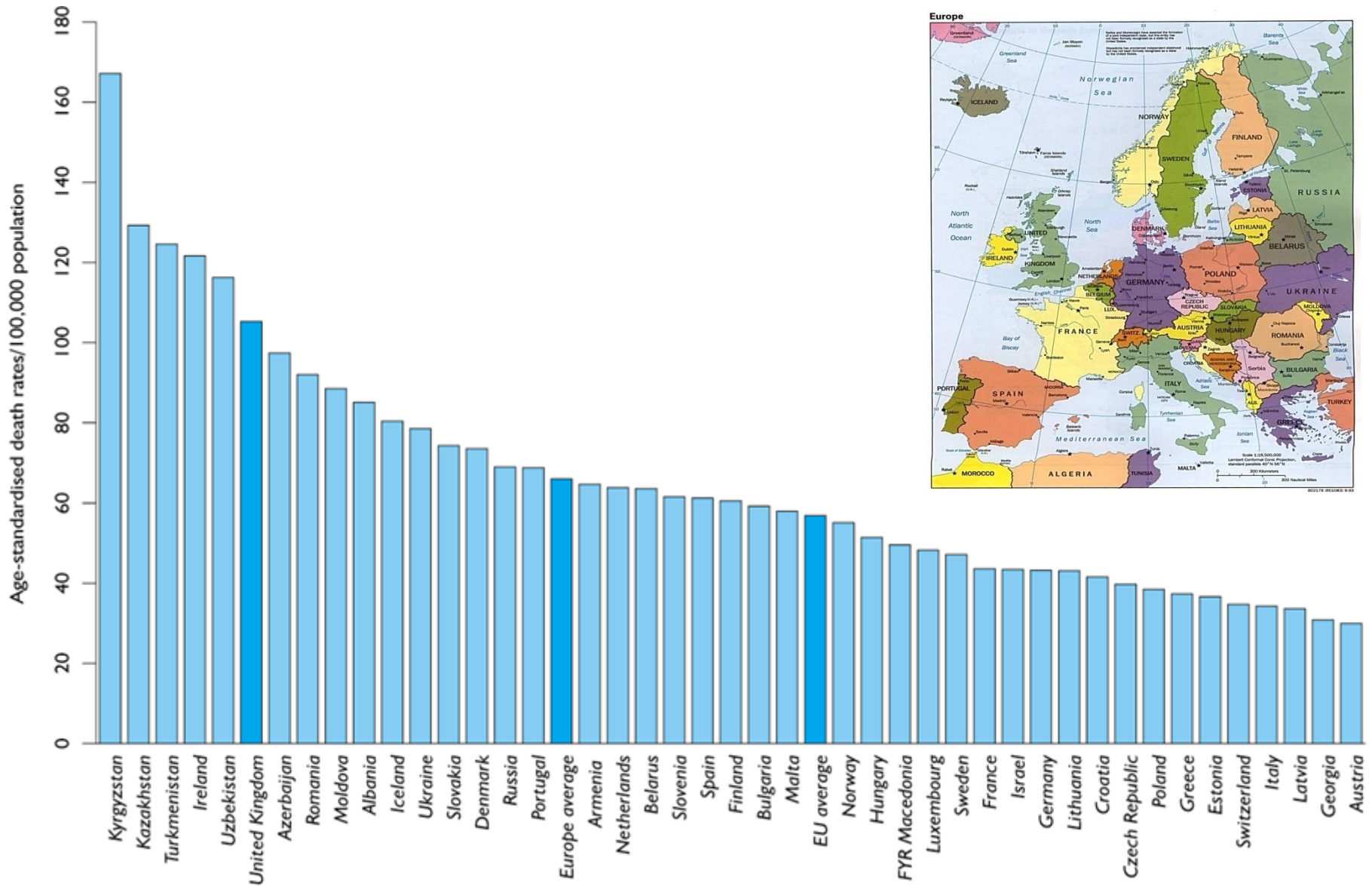
Figure 2.11

Incidence and survival rates in the major cancers by sex. England 1998-2001 (Male)

# 5 year survival rate for different types of cancer...



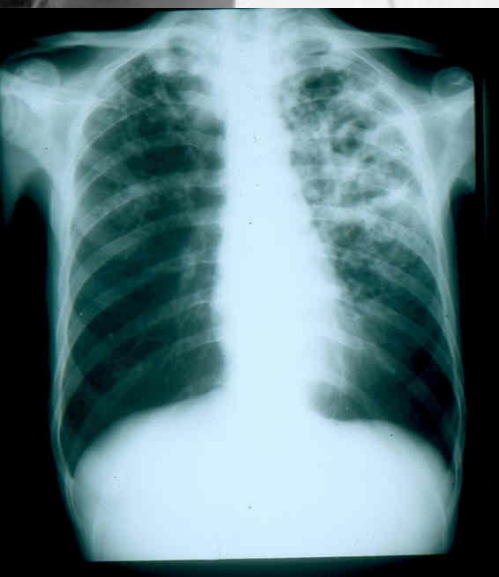
# Age-standardised death rates per 100,000 population from diseases of the respiratory system by sex, 1996,



<b>Airways diseases</b>	<b>Small lung disorders</b> (also known as “restrictive disorders”)
<b><i>Localised</i> obstruction</b>	<b>Due to disease <i>within</i> the lungs</b>
<ul style="list-style-type: none"> <li>Sleep apnoea</li> <li>Laryngeal carcinoma</li> <li>Thyroid enlargement</li> <li>Vocal cord dysfunction</li> <li>Relapsing Polychondritis</li> <li>Tumours</li> <li>Post tracheostomy stenosis</li> <li>Foreign bodies</li> <li>Bronchopulmonary dysplasia</li> </ul>	<ul style="list-style-type: none"> <li>Sarcoidosis</li> <li>Asbestosis</li> <li>Extrinsic Allergic Alveolitis</li> <li>Fibrosing Alveolitis</li> <li>Eosinophilic pneumonia</li> </ul>
<b><i>Generalised</i> obstruction</b>	<b>Due to disease <i>outside</i> the lung</b>
<ul style="list-style-type: none"> <li>Asthma</li> <li>C.O.P.D.</li> <li>Bronchiectasis</li> <li>Cystic Fibrosis</li> <li>Obliterative Bronchiolitis</li> </ul>	<ul style="list-style-type: none"> <li>Pleural effusions</li> <li>Pneumothorax</li> <li>Scoliosis</li> <li>Respiratory muscle weakness</li> <li>Obesity</li> </ul>

<b>Infections</b>	<b>Pulmonary vascular disorders</b>
<ul style="list-style-type: none"> <li>Tuberculosis</li> <li>Infective bronchitis</li> <li>Pneumonia</li> <li>Empyema</li> </ul>	<ul style="list-style-type: none"> <li>Pulmonary emboli</li> <li>Pulmonary hypertension</li> </ul>

Are these diseases increasing or decreasing in prevalence?





# Airways diseases

# Small lung disorders

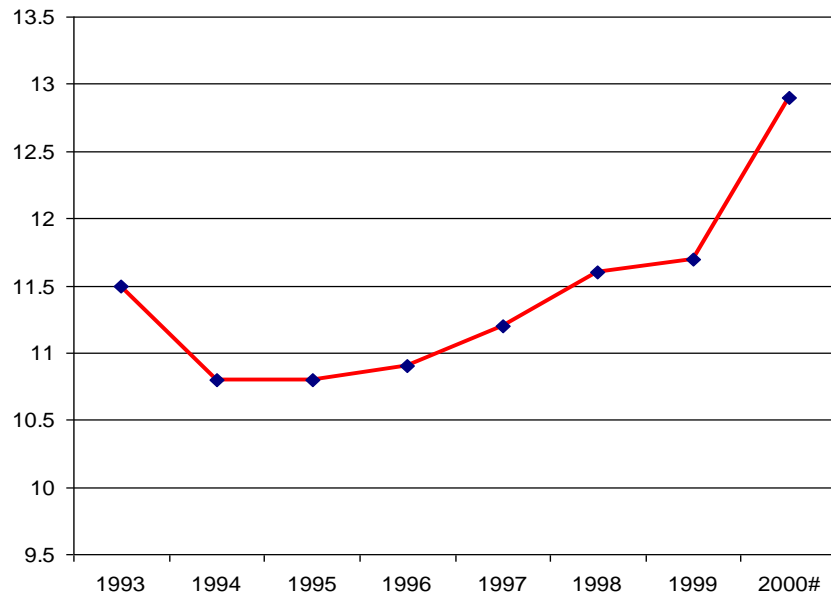
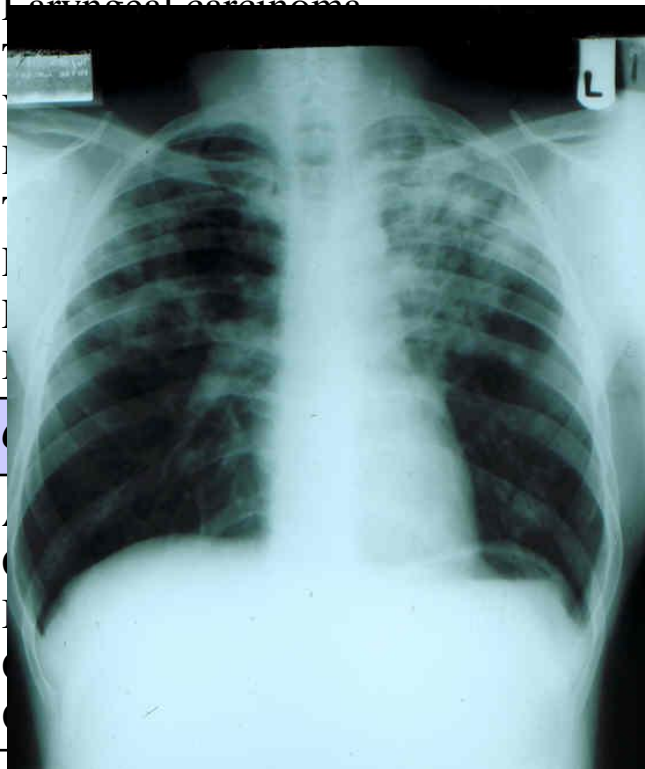
(also known as "restrictive disorders")

## Localised obstruction

## Due to disease *within* the lungs

Sleep apnoea

Laryngeal carcinoma

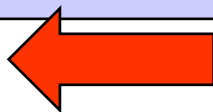


Respiratory muscle weakness  
Obesity

## Infections

## Pulmo

- Tuberculosis
- Infective bronchitis
- Pneumonia
- Empyema



- Pulmonary e
- Pulmonary h

Rates of TB rising again especially in London

# Small lung disorders

(also known as “restrictive disorders”)

## Due to disease *within* the lungs

Sarcoidosis  
Asbestosis  
Extrinsic allergic alveolitis  
Fibrosis  
Eosinophilic pneumonia

Increasing prevalence of obesity causes both increased respiratory workload, but also respiratory dysfunction

## Due to disease *outside* the lung

Pleural effusions  
Pneumothorax  
Scoliosis  
Respiratory muscle weakness  
Obesity



## Infections

Tuberculosis  
Infective bronchitis  
Pneumonia  
Empyema

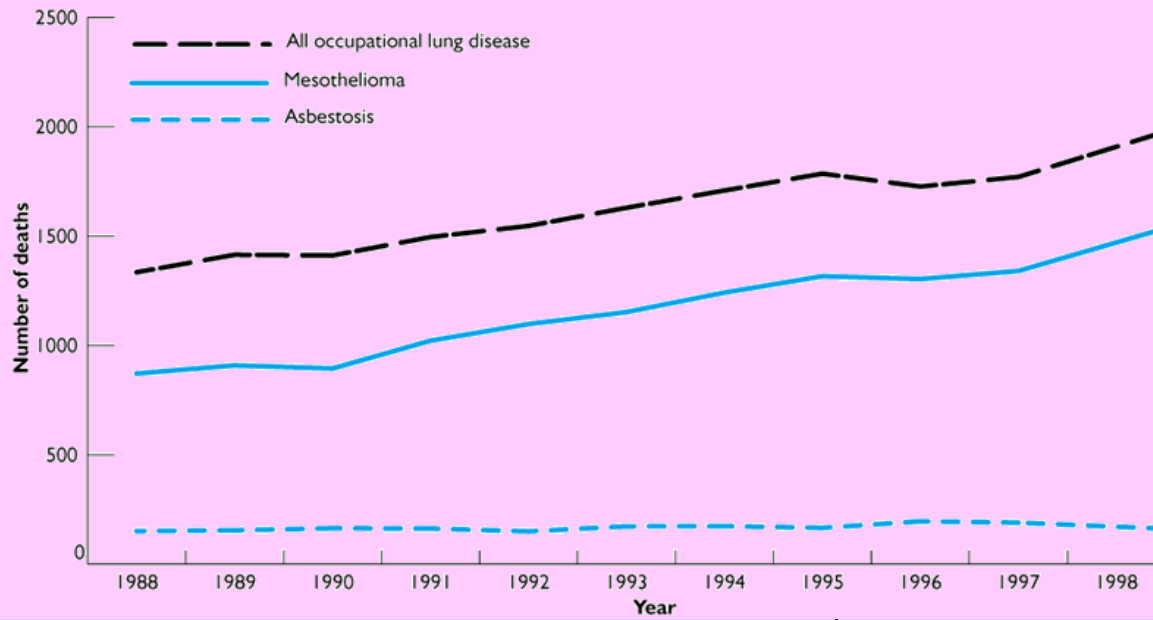
## Pulmonary vascular disorders

Pulmonary emboli  
Pulmonary hypertension

# lung disorders

as "restrictive disorders")

*thin the lungs*

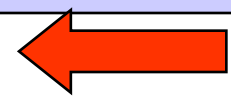


Alveolitis  
is  
monia

*outside the lung*

Asthma  
C.O.P.D.  
Bronchiectasis  
Cystic Fibrosis  
Obliterative Bronchiolitis

Mesothelioma  
Pneumothorax  
Scoliosis  
Respiratory muscle weakness



**Deaths due to asbestos related lung disease increasing significantly**

## Infectious

## Disorders

Tuberculosis  
Infective bronchitis  
Pneumonia  
Empyema

Pulmonary emboli  
Pulmonary hypertension

# Airways diseases

# Small lung disorders

(also known as "restrictive disorders")

## Localised obstruction

## Due to disease *within* the lungs

- Sleep apnoea
- Laryngeal carcinoma
- Thyroid enlargement
- Vocal cord dysfunction
- Relapsing Polychondritis
- Tumours
- Post tracheotomy
- Foreign body
- Bronchopulmonary sequestration

Leads to a six times normal risk of having a road traffic crash

- Extrinsic Allergic Alveolitis
- Fibrosing Alveolitis

## Generalised obstruction

- Asthma
- C.O.P.D.
- Bronchiectasis
- Cystic Fibrosis
- Obliterative bronchiolitis

lung



disorders

- Tuberculosis
- Infective bronchiolitis
- Pneumonia
- Empyema

# Airways diseases

# Small lung disorders

## Localised obstruction

Sleep apnoea

Larynx

Thyroid

Vocal cords

Relaxation

Tumours

Postoperative

Foreign bodies



Bronchopulmonary dysplasia



## Generalised obstruction

## Due to disease *outside* the lung

Asthma

C.O.P.D.

Bronchiectasis

Cystic Fibrosis

Obliterative Bronchiolitis



One in eight of all medical admissions is due to COPD

## Infections

## Pulmonary vascular disorders

Tuberculosis

Infective bronchitis

Pneumonia

Empyema

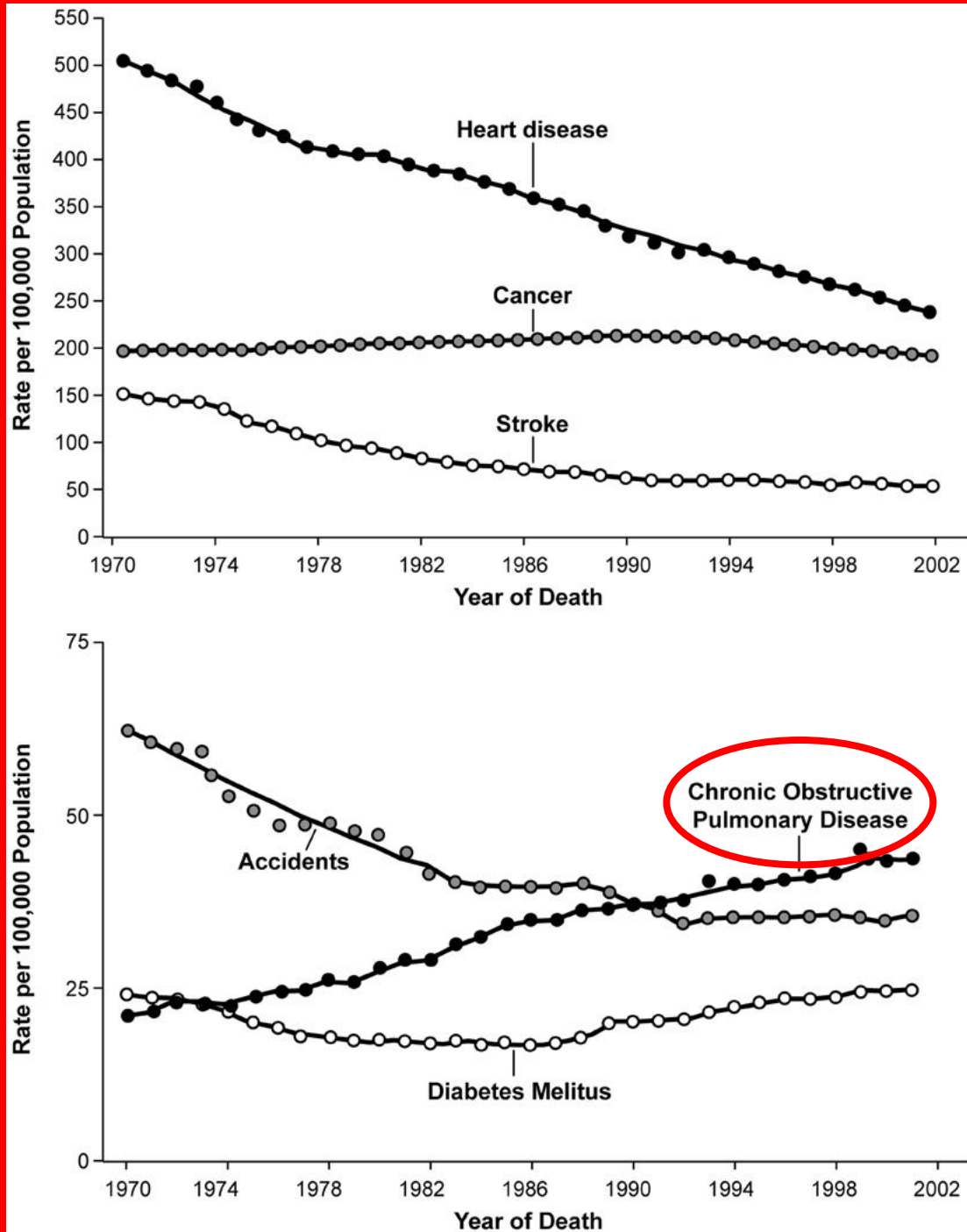
Pulmonary emboli

Pulmonary hypertension



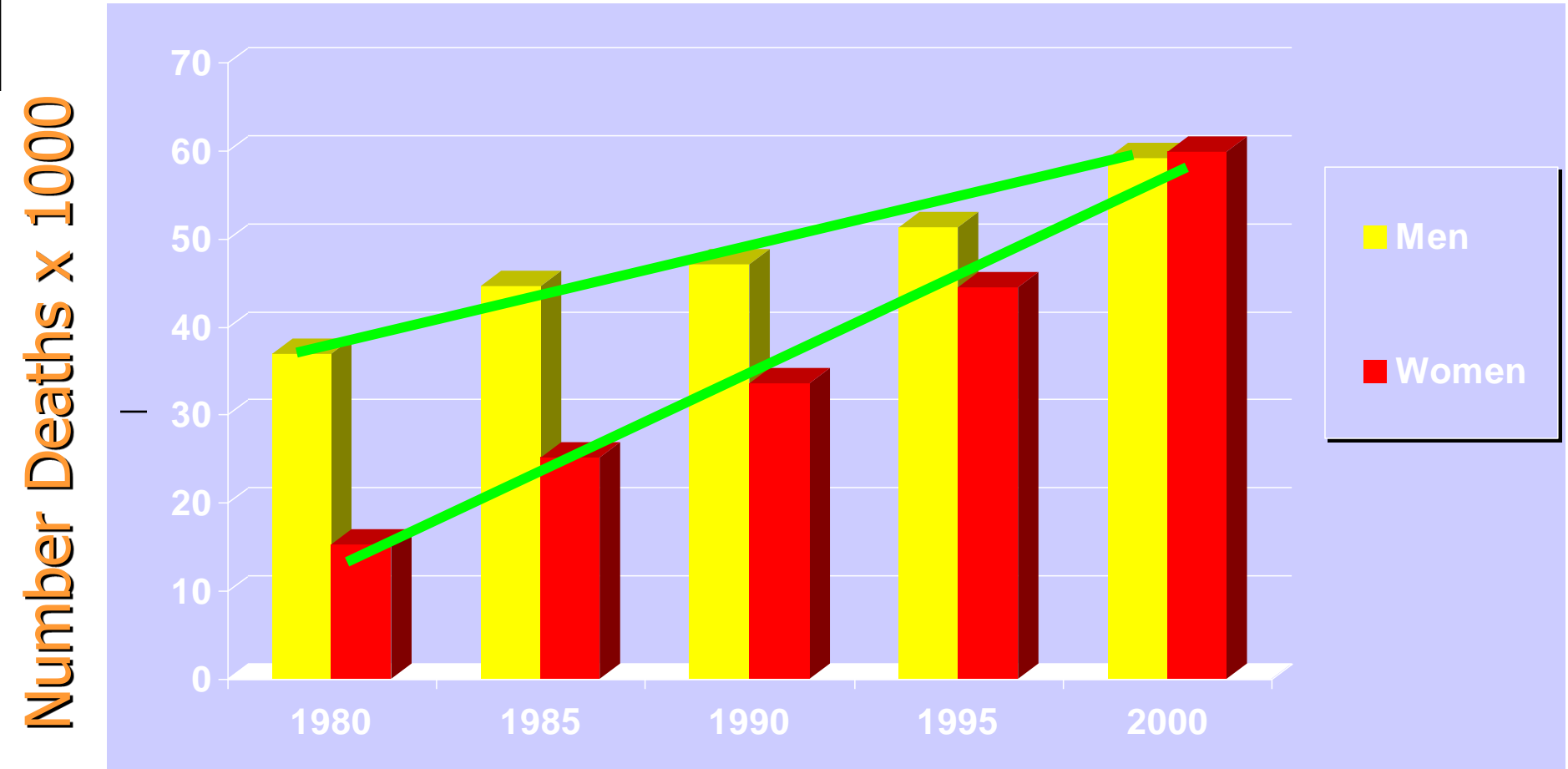
Of the six leading causes of death in the United States, only COPD has been increasing steadily since 1970

Source: Jemal A. et al. *JAMA* 2005



# COPD: The gender switch

## COPD Mortality by Gender, U.S., 1980-2000



## Airways diseases

## Small lung disorders

(also known as “restrictive disorders”)

### Localised obstruction

Sleep apnoea  
Laryngeal carcinoma  
Thyroid enlargement  
Vocal cord dysfunction  
Relapsing Polychondritis  
Tumours  
Post tracheostomy stenosis  
Foreign bodies  
Bronchopulmonary dysplasia



### Due to disease *within* the lungs

Sarcoidosis  
Asbestosis  
Extrinsic Allergic Alveolitis  
Fibrosing Alveolitis  
Eosinophilic pneumonia

### Generalised obstruction

Asthma  
C.O.P.D.  
Bronchiectasis  
Cystic Fibrosis  
Obliterative Bronchiolitis

5.2 million people in the UK have asthma

Scoliosis  
Respiratory muscle weakness  
Obesity

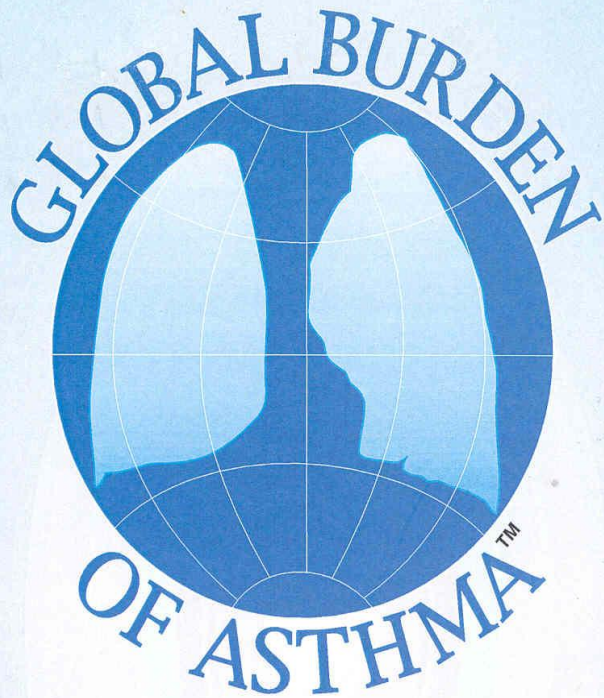
## Infections

Tuberculosis  
Infective bronchitis  
Pneumonia  
Empyema

## Pulmonary vascular disorders

Pulmonary emboli  
Pulmonary hypertension





Matthew Masoli

Denise Fabian

Shaun Holt

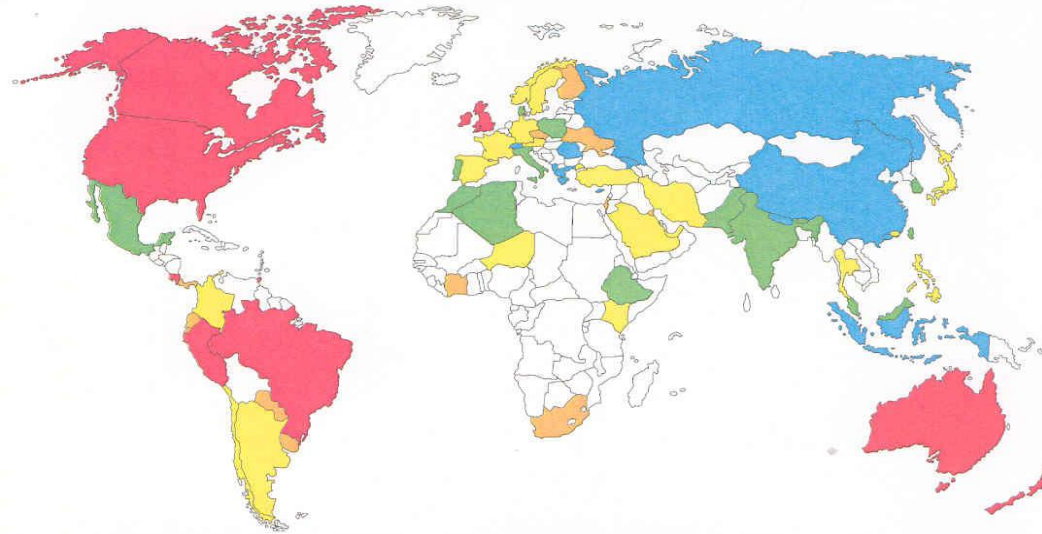
Richard Beasley

Medical Research Institute of New Zealand  
Wellington, New Zealand

University of Southampton  
Southampton, United Kingdom

Developed for the Global Initiative for Asthma

## World Map of the Prevalence of Clinical Asthma



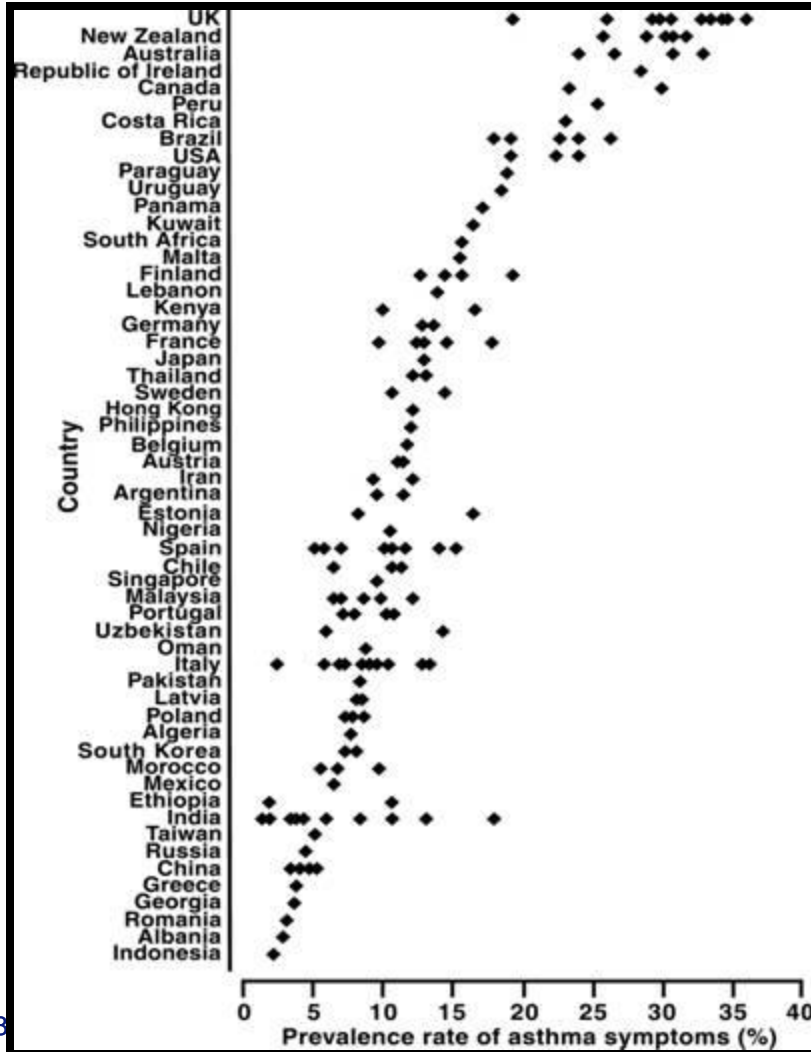
### Proportion of population (%)\*



Scotland	18.4	Ivory Coast	7.8	Oman	4.5
Jersey	17.6	Colombia	7.4	Pakistan	4.3
Guernsey	17.5	Turkey	7.4	Tunisia	4.3
Wales	16.8		7.2	Cape Verde	4.2
Isle of Man	16.7		7.0	Latvia	4.2
England	15.3		6.9	Poland	4.1
New Zealand	15.1		6.8	Algeria	3.9
Australia	14.7	France	6.8	South Korea	3.9
Republic of Ireland	14.6	Norway	6.8	Bangladesh	3.8
Canada	14.1	Japan	6.7	Morocco	3.8
Peru	13.0	Sweden	6.5	Occupied Territory of Palestine	3.6
Trinidad & Tobago	12.6	Thailand	6.5	Mexico	3.3
Costa Rica	11.9	Hong Kong	6.2	Ethiopia	3.1
Brazil	11.4	Philippines	6.2	Denmark	3.0
United States of America	10.9	United Arab Emirates	6.2	India	3.0
Fiji	10.5	Belgium	6.0	Taiwan	2.6
Paraguay	9.7	Austria	5.8	Cyprus	2.4
Uruguay	9.5	Spain	5.7	Switzerland	2.3
Israel	9.0	Saudi Arabia	5.6	Russia	2.2
Barbados	8.9	Argentina	5.5	China	2.1
Panama	8.8	Iran	5.5	Greece	1.9
Kuwait	8.5	Estonia	5.4	Georgia	1.8
Ukraine	8.3	Nigeria	5.4	Nepal	1.5
Ecuador	8.2	Chile	5.1	Romania	1.5
South Africa	8.1	Singapore	4.9	Albania	1.3
Czech Republic	8.0	Malaysia	4.8	Indonesia	1.1
Finland	8.0	Portugal	4.8	Macau	0.7
Malta	8.0	Uzbekistan	4.6		
		FYR Macedonia	4.5		
		Italy	4.5		

15.3%

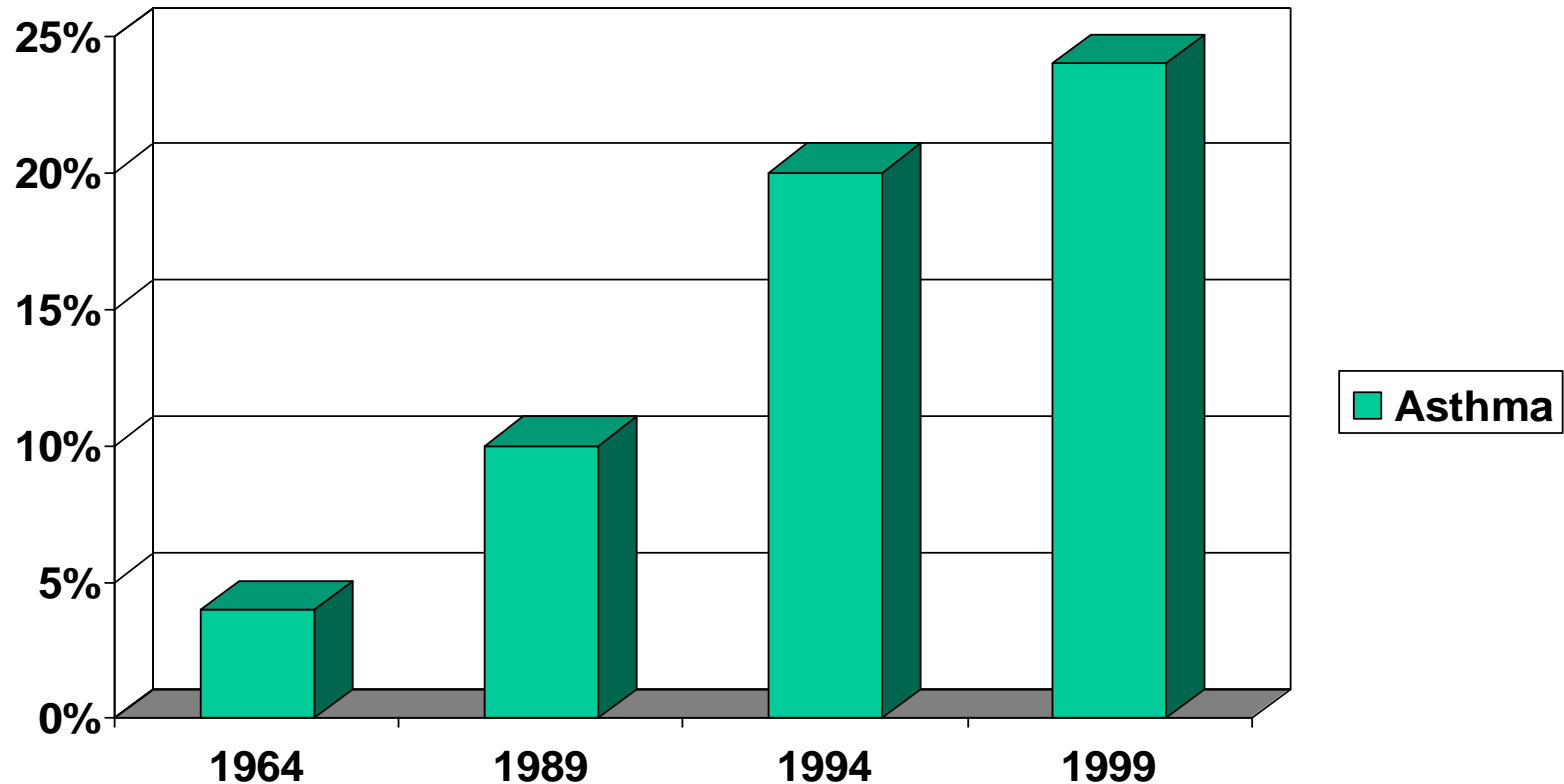
# Worldwide Variation in Prevalence of Asthma Symptoms



International Study of  
Asthma and Allergies in  
Children (ISAAC)

*Lancet* 1998;351:1225

# Increasing prevalence of asthma (9-12 year olds)

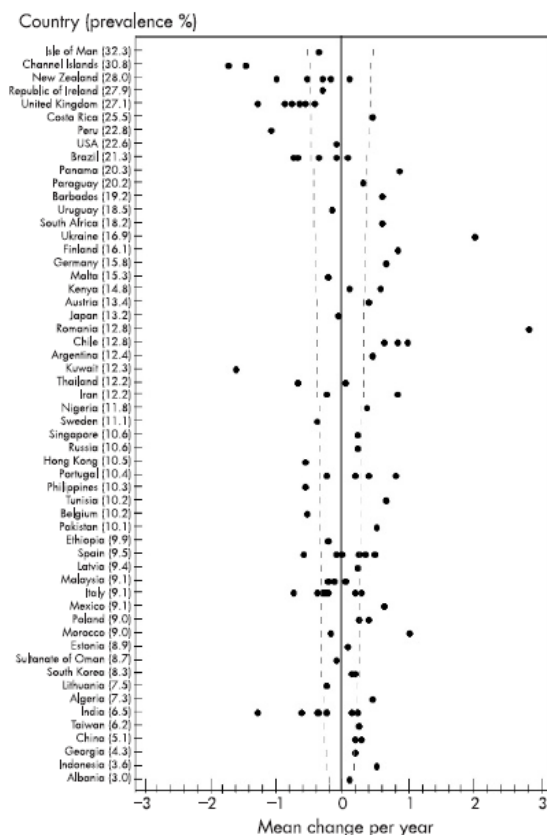


*Devenny A et al BMJ 2004 329: 489-90*

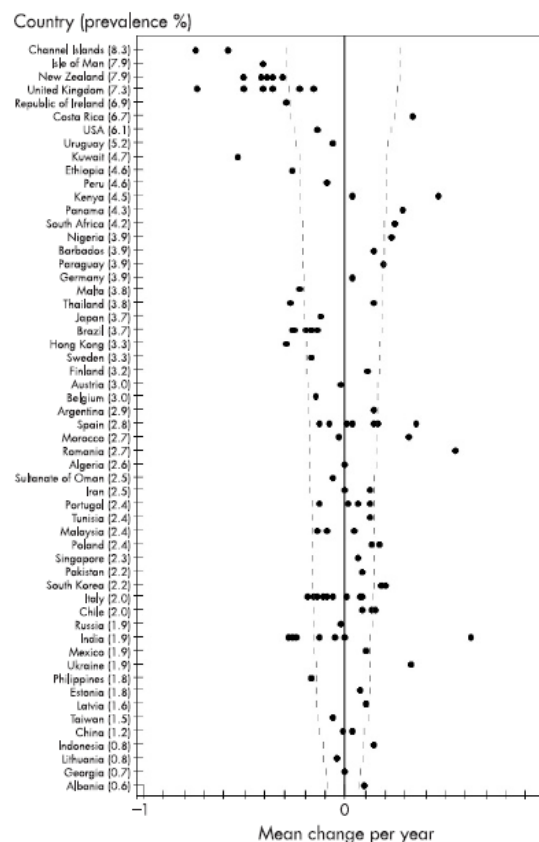
# Worldwide trends in the prevalence of asthma symptoms: phase III of the International Study of Asthma and Allergies in Childhood (ISAAC)

Neil Pearce, Nadia Ait-Khaled, Richard Beasley, Javier Mallof, Ulrich Keil, Ed Mitchell, Colin Robertson and the ISAAC Phase Three Study Group

*Thorax* 2007;62;757-765; originally published online 15 May 2007;  
doi:10.1136/thx.2006.070169



**Figure 1** Ranking plot showing the change per year in prevalence of current wheeze (wheeze in the past 12 months) in children aged 13–14 years for each centre by country, with countries ordered by their mean prevalence (for all centres combined) across phase I and phase III. The plot also shows the confidence interval about zero change for a given level of prevalence (ie, the mean prevalence across phases I and III) given a sample size of 3000 and no cluster sampling effect.

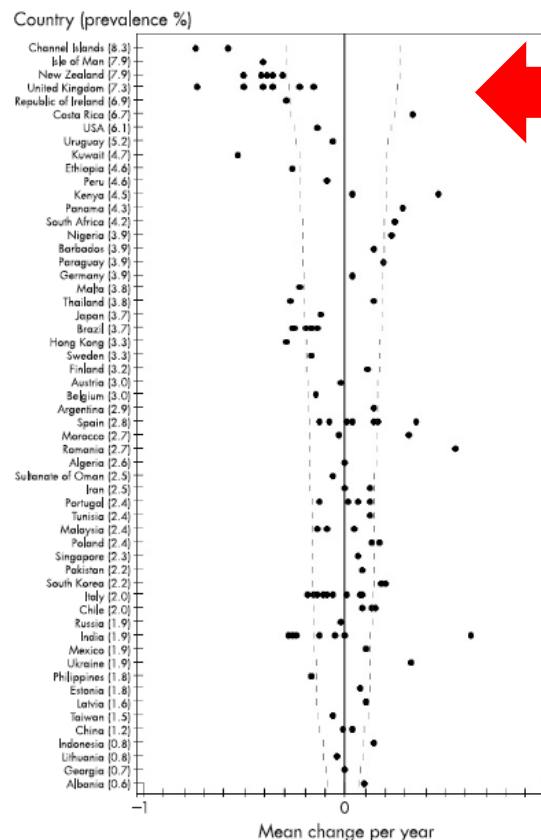
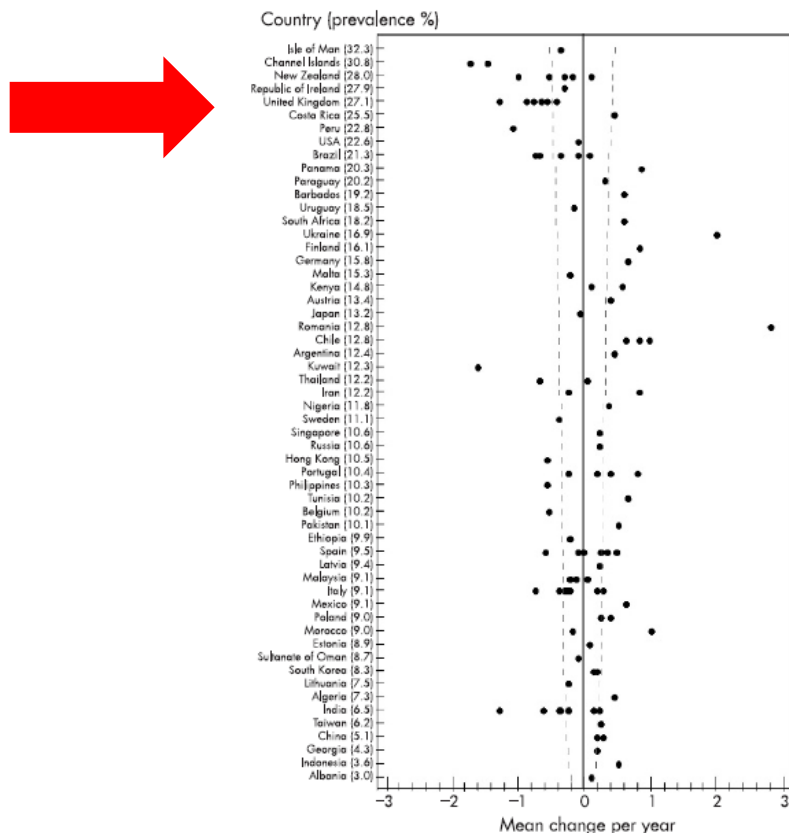


**Figure 2** Ranking plot showing the change per year in prevalence of  $\geq 4$  attacks of wheezing in the previous 12 months in children aged 13–14 years for each centre by country, with countries ordered by their average prevalence (for all centres combined) across phase I and phase III. The plot also shows the confidence interval about zero change for a given level of prevalence (ie, the mean prevalence across phases I and III) given a sample size of 3000 and no cluster sampling effect.

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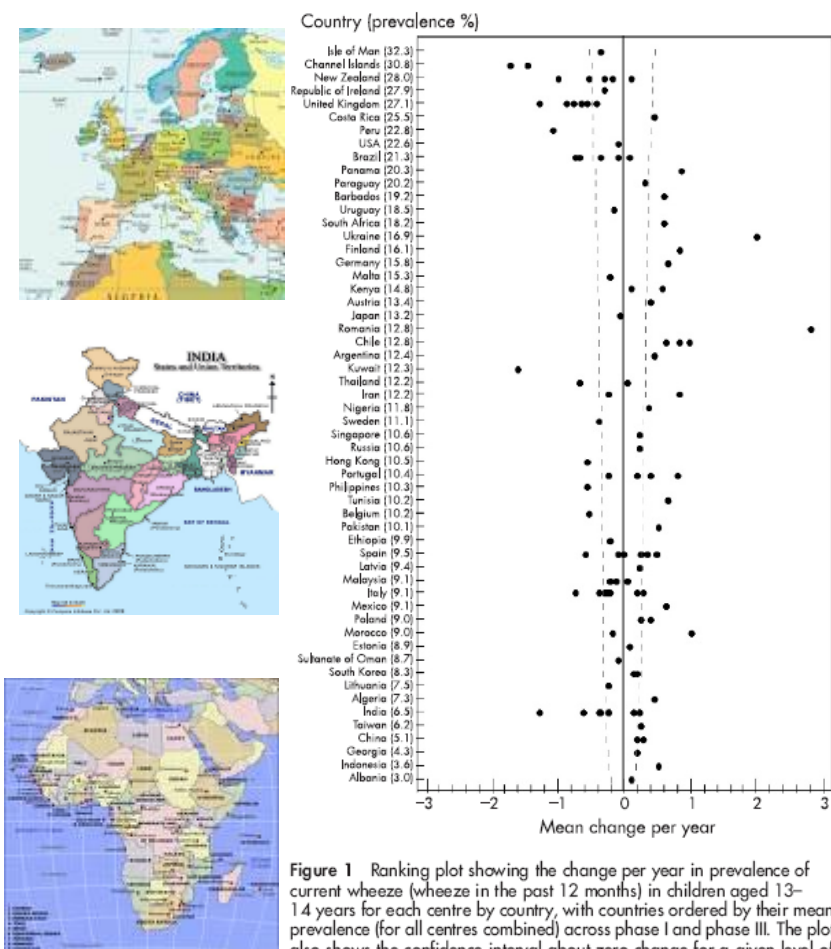
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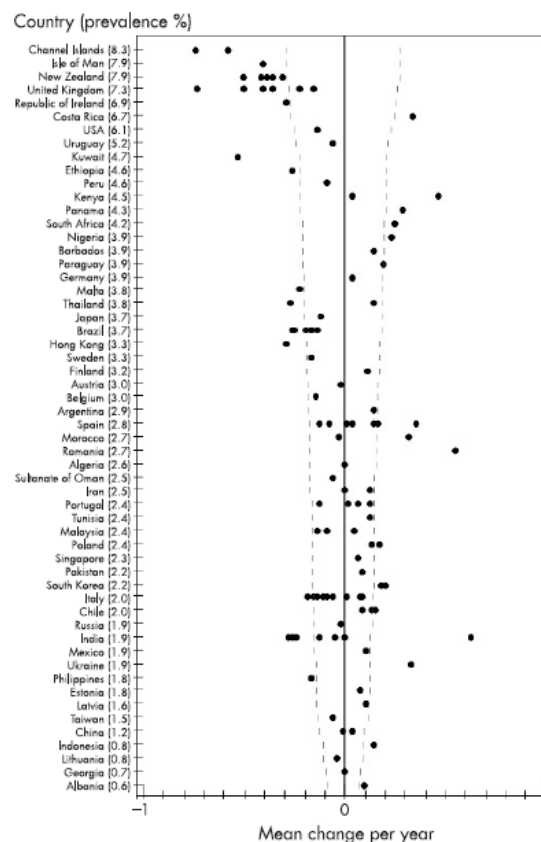
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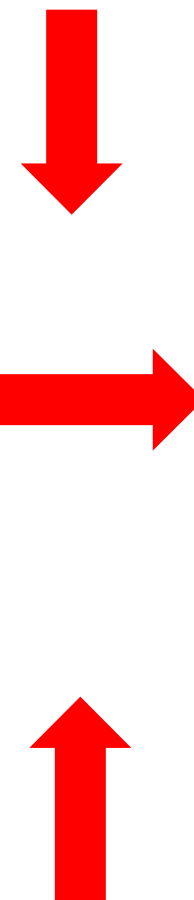
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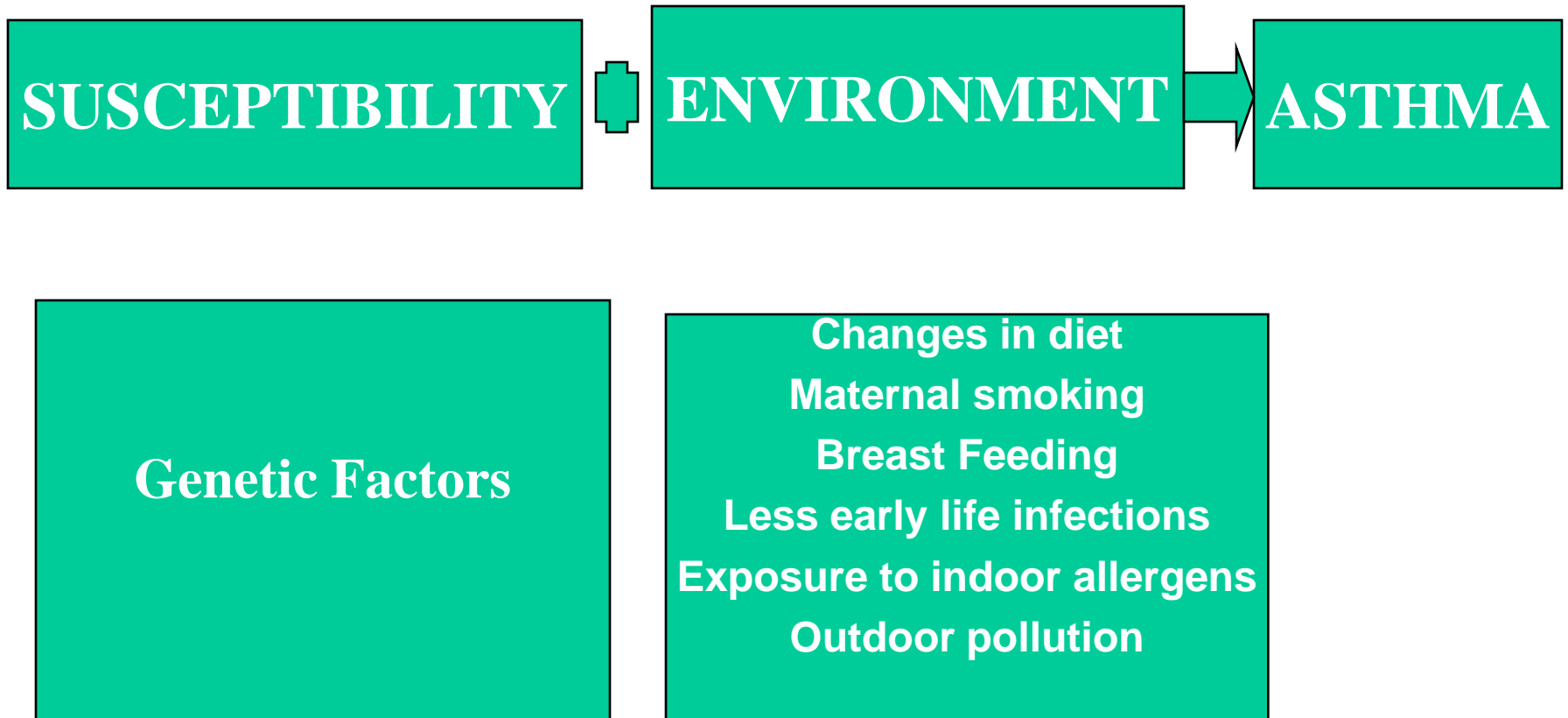
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# Why is asthma increasing?



Many diseases, many people affected by them



# Many diseases, many people affected by them

- What symptoms might people with lung disease have?

# Many diseases, many people affected by them

- What symptoms might reflect lung disease?
  - **Breathlessness**
  - **Cough**
  - **Sputum production**
  - **Haemoptysis**
  - **Chest discomfort**
  - **Wheeze or musical breathing**
  - **Stridor**
  - **Hoarseness**
  - **Snoring history /Daytime sleepiness**
  - **(Weight loss. Anorexia, Fever)**


Spend a minute or two thinking about the following clinical scenario and what more you would like to know in the history, and in a second list structure a differential diagnosis

A 47 year old lorry driver attends his General Practitioner with a complaint of moderately severe breathlessness. He is married with two children and drinks alcohol in moderation and has a 20 pack year smoking history. There is no significant past medical or surgical history.

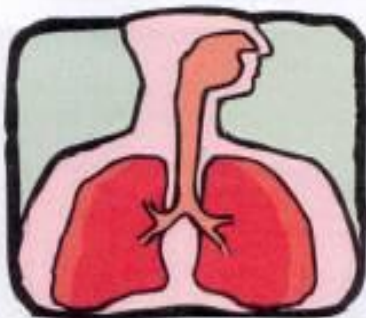
## Breathlessness may be due to:

- Heart Disease
- Pulmonary Thrombo-embolic Disease
- Lung Disease
- Systemic diseases (Anaemia, obesity, hyperthyroidism)
- Respiratory Muscle weakness
- Psychogenic dyspnoea

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- Pulmonary Thrombo-embolic Disease
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- Respiratory Muscle weakness
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# Community Respiratory Assessment Unit (CRAU)



- What the unit offers
- How to make your appointment
- What to expect when you arrive



ELSEVIER

ORIGINAL RESEARCH

## Enhancing the accuracy of respiratory diagnoses in primary care: a report on the establishment of a Community Respiratory Assessment Unit

Rosemarie Hassett<sup>a</sup>, Karen Meade<sup>a</sup>, Martyn R. Partridge<sup>b,\*</sup>

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Received 3 August 2006; accepted 2 October 2006

### KEYWORDS

Respiratory diseases;  
Diagnosis;  
Service provision;  
Primary care;  
Spirometry;  
Community Respiratory  
Assessment Unit

### Summary

**Aims:** To establish a Community Respiratory Assessment Unit and to evaluate its role in enhancing the accuracy of respiratory diagnosis in primary care.

**Methods:** We established a central and peripatetic nurse-led service utilising semi-structured history taking, spirometry, oxygen saturation monitoring and semi-structured reporting, coupled with the provision of educational materials to both primary care physicians and patients.

**Results:** Phased access to the service was offered to 32 general practices. Use varied widely between practices and a total of 364 patients were referred in the first year. The single biggest diagnostic group consisted of patients with definite or suspected COPD, but the diagnosis was often not confirmed. Patient and GP satisfaction with the service was extremely high; without it misdiagnoses and inappropriate therapeutic trials are possible.

**Conclusion:** A community respiratory assessment unit such as this is one way of offering a centrally-directed, quality-controlled, diagnostic support service for primary care physicians.

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### Introduction

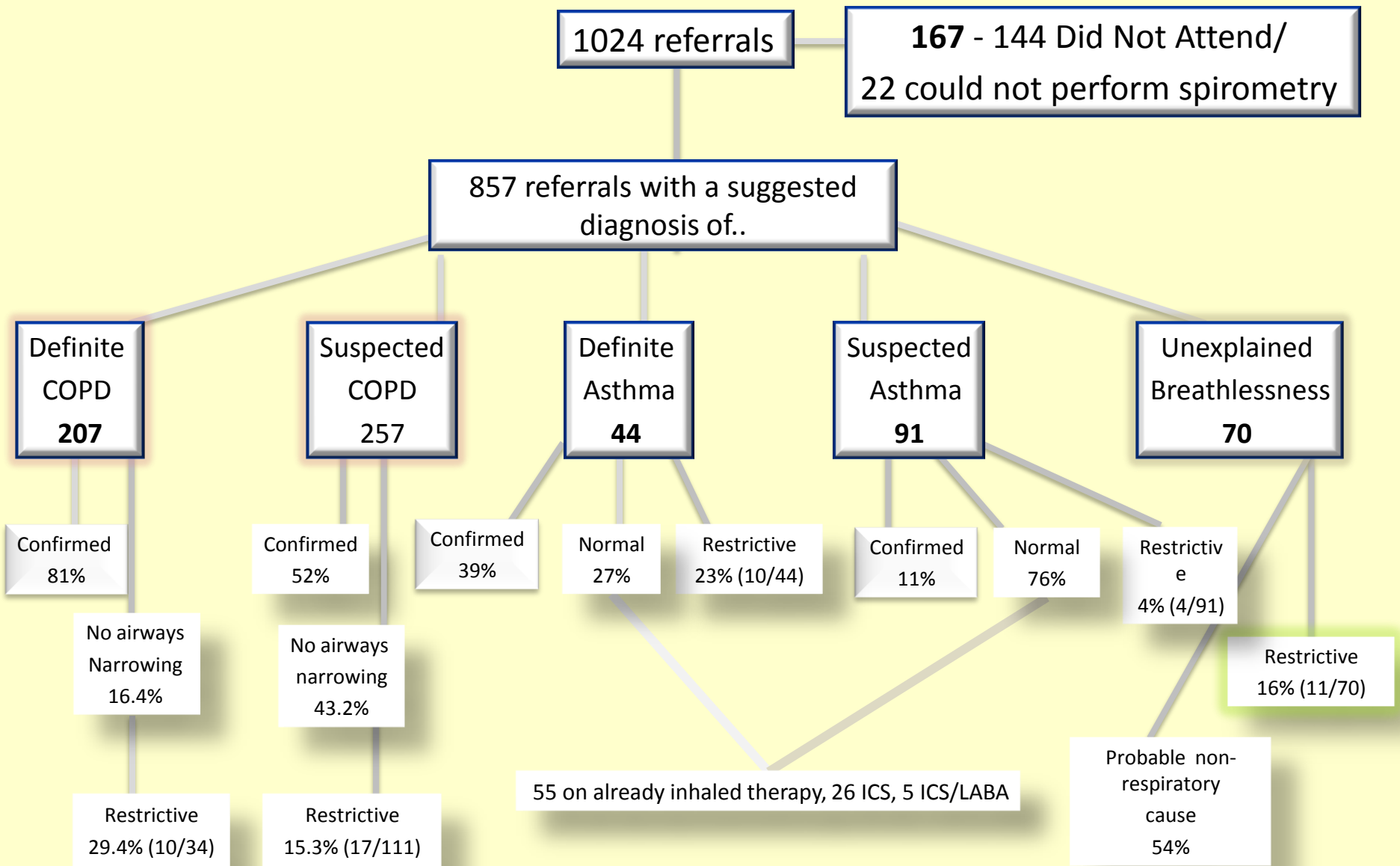
The death rates from respiratory disease in the UK are amongst the highest in Europe and currently

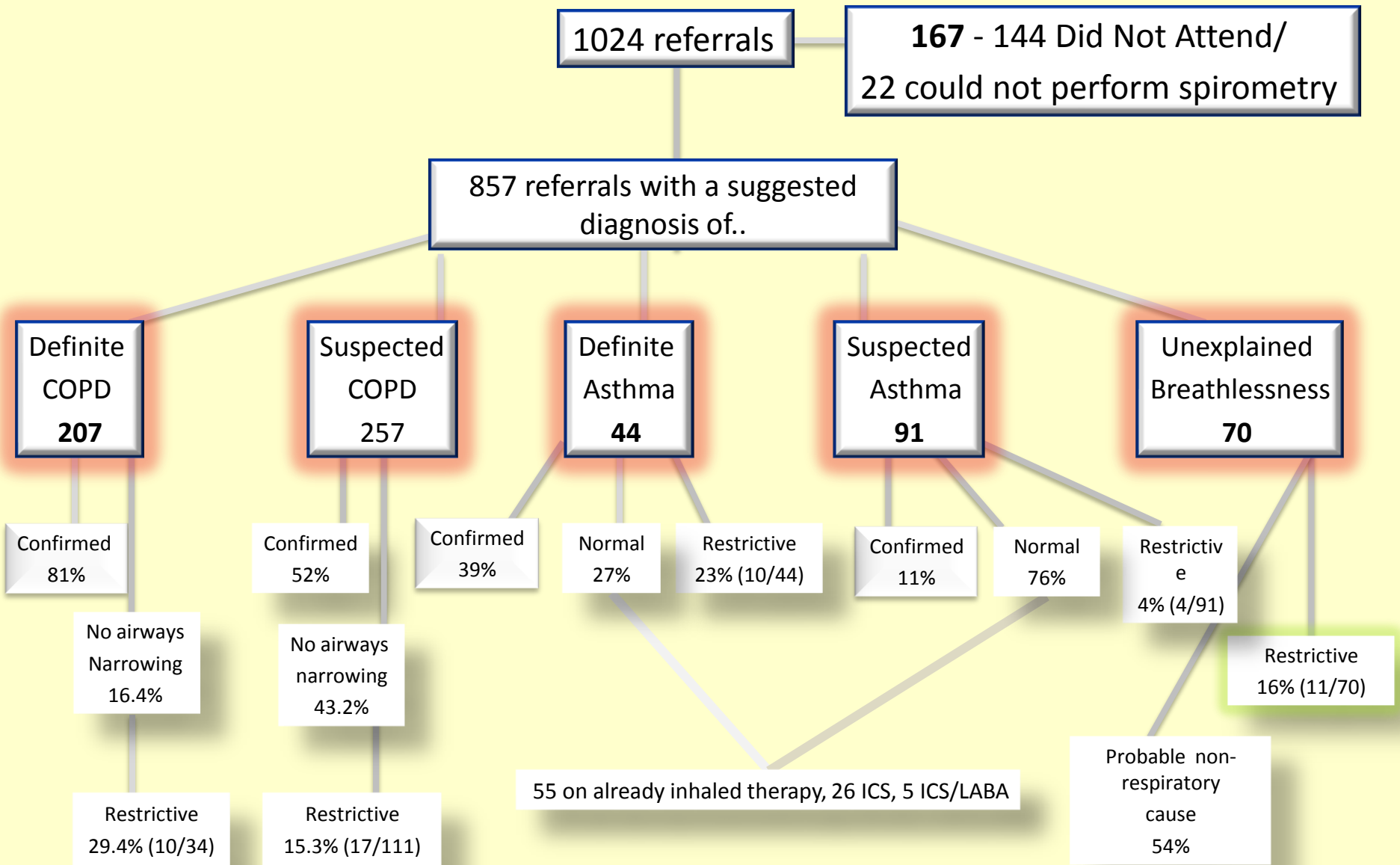
lung disease kills one in four people in the UK [1]. Respiratory disease is also the most common illness responsible for an emergency medical admission to hospital and is the most common reason for patients to visit their general practitioner (GP); almost a third will visit their GP at least once a year because of a respiratory condition [1]. Such a burden of disease necessitates assurance that best practice is being implemented, and within the

\* Corresponding author. Tel.: +44 20 8846 7587;

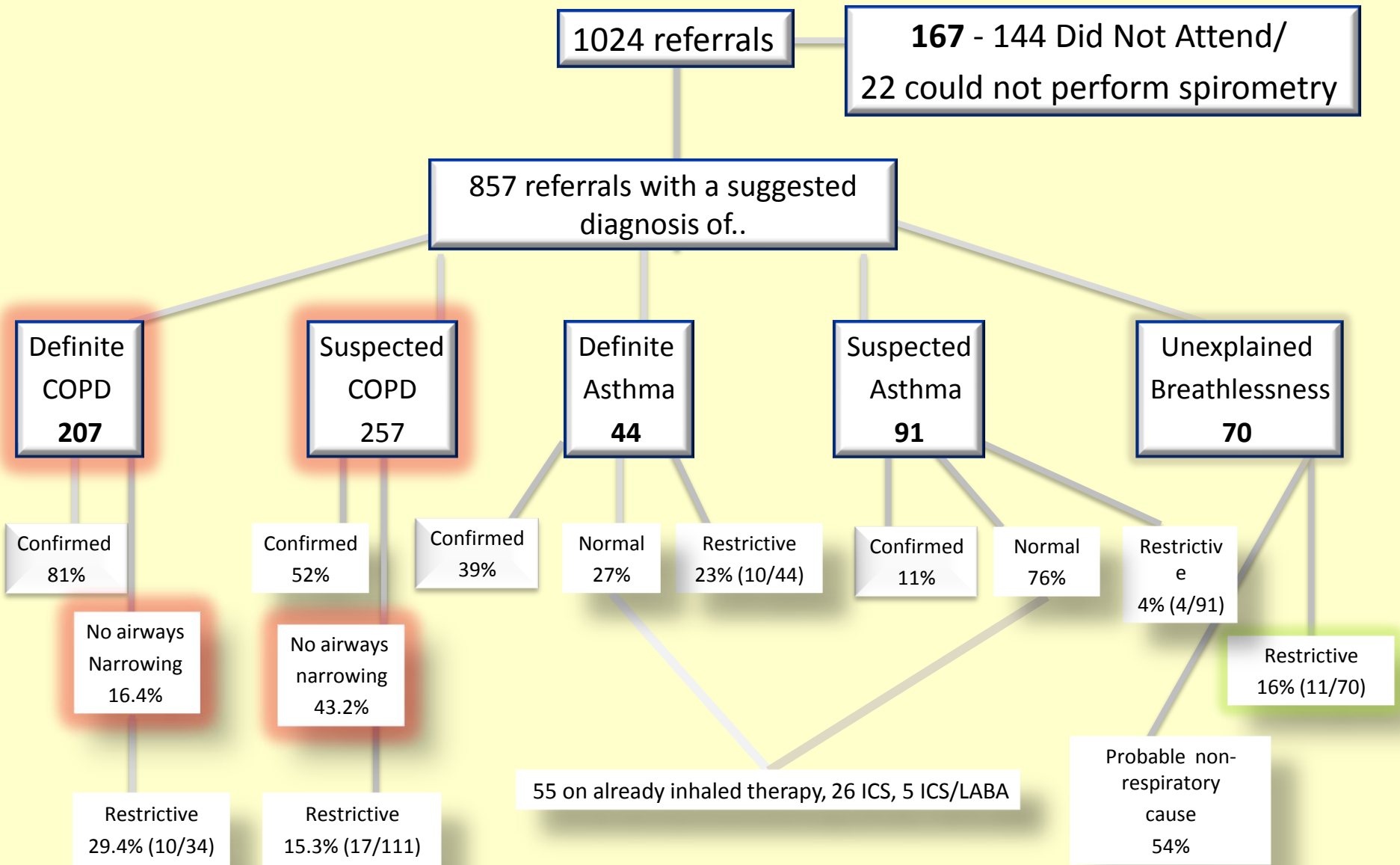
fax: +44 20 8846 7999.

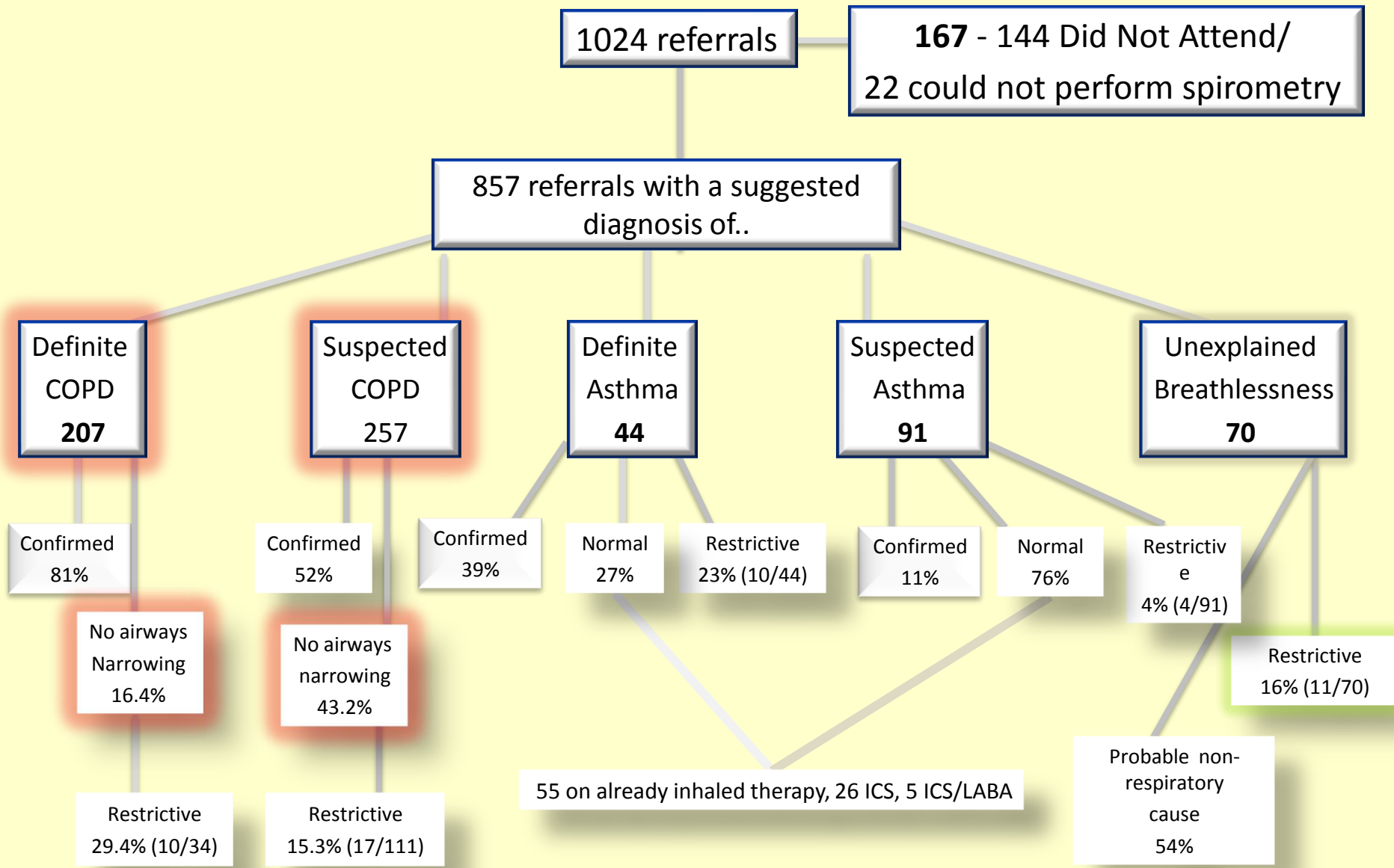
E-mail address: [m.partridge@imperial.ac.uk](mailto:m.partridge@imperial.ac.uk)  
(M.R. Partridge).



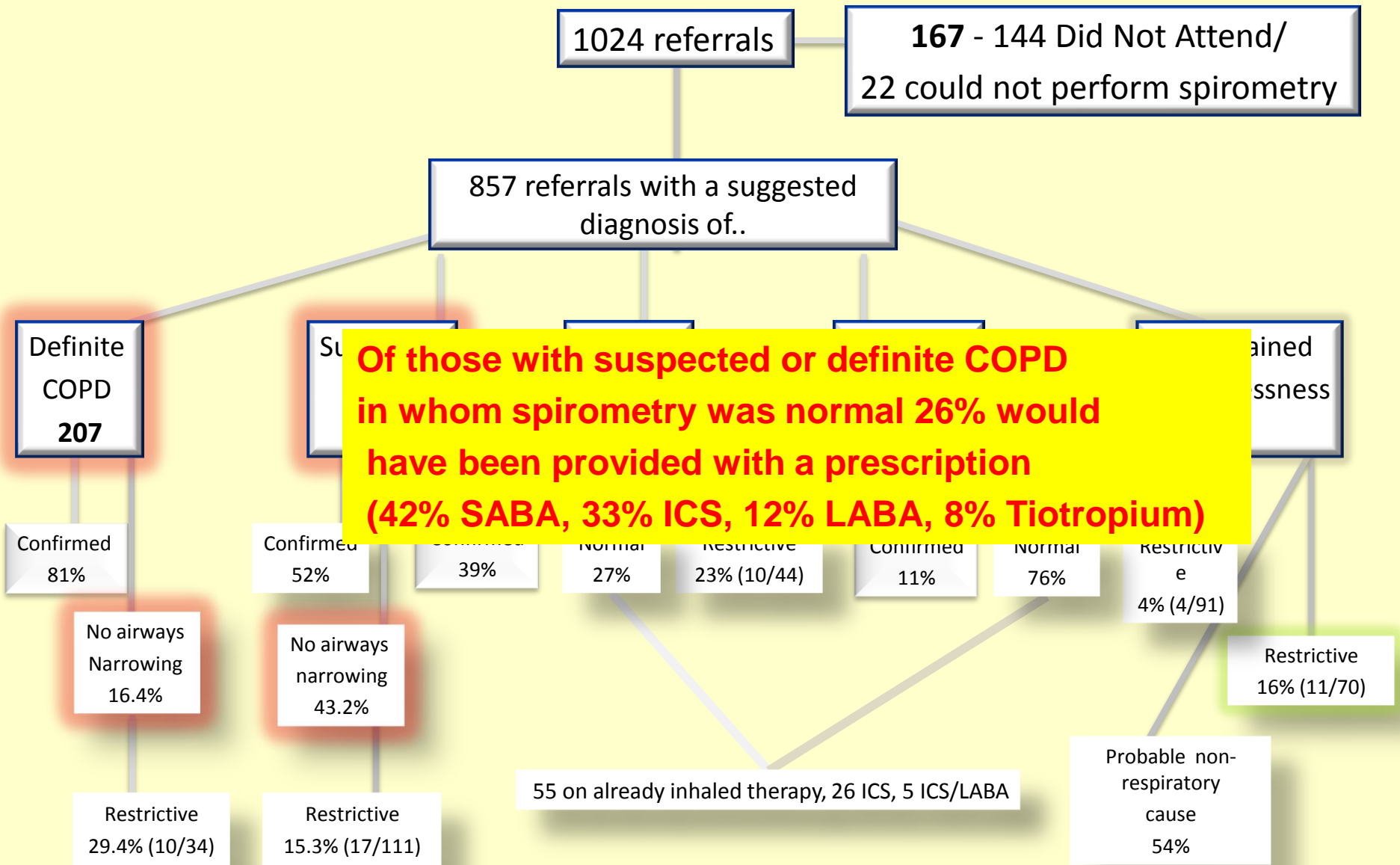




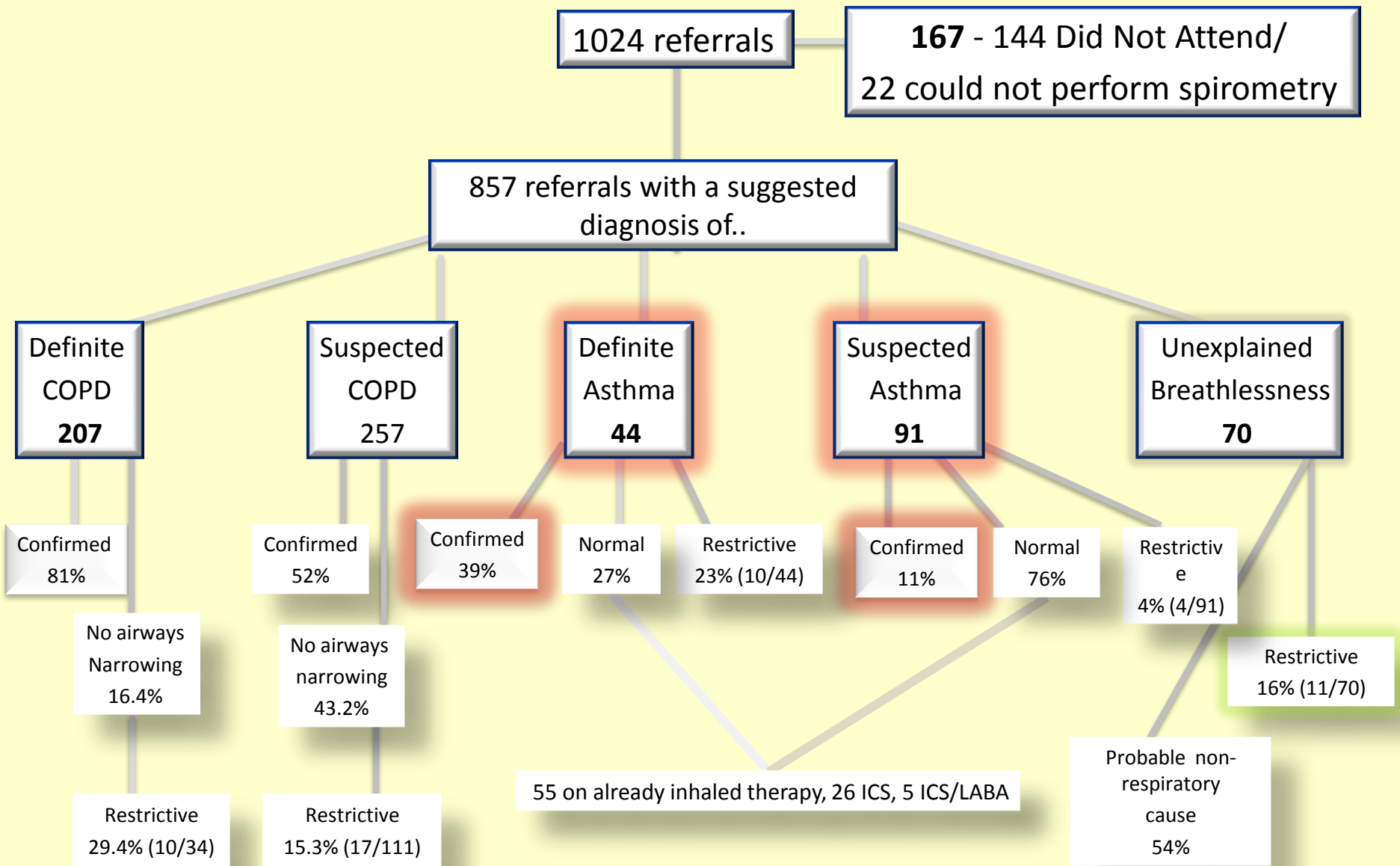


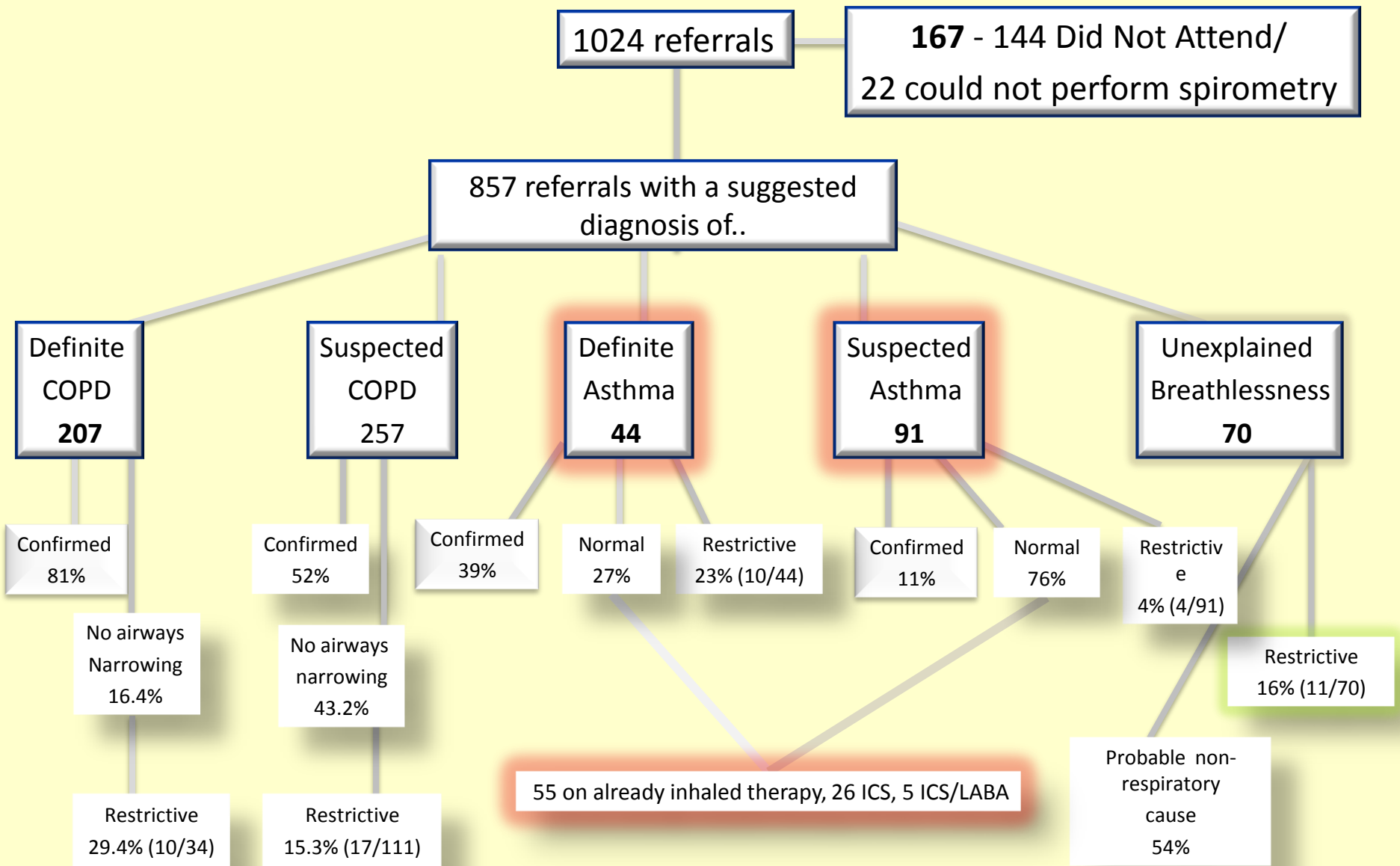


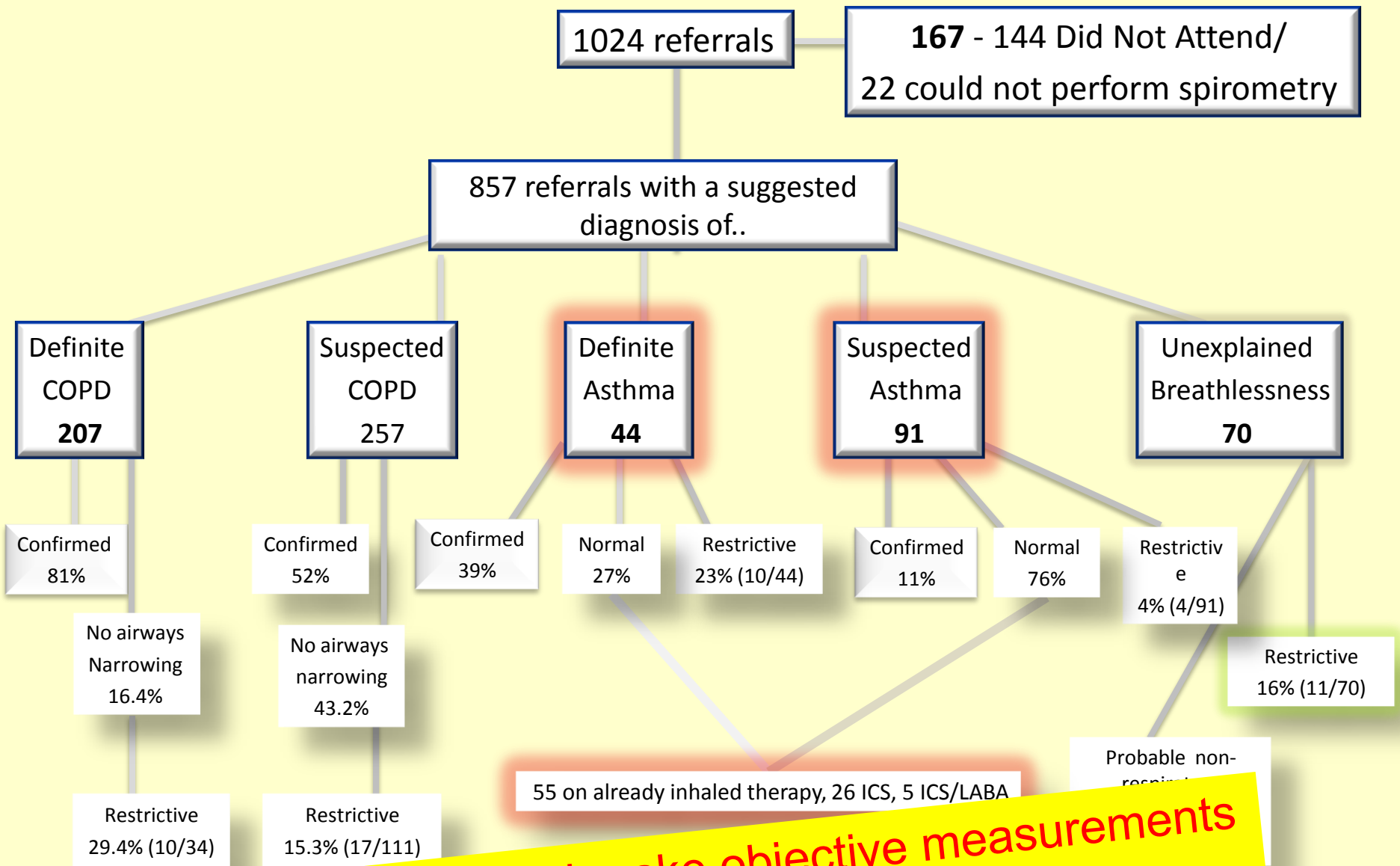
**So Spirometry is essential for accurate diagnosis of COPD**



**So Spirometry is essential for accurate diagnosis of COPD**







**So try and make objective measurements before starting therapy**

# The Diagnosis of asthma

(in other than the very young) is made by :

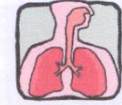
- History taking and by
- Seeing if the patient fulfils the diagnostic definition of asthma

## History suggests asthma

Symptoms include, cough, wheezing, chest tightness and breathlessness

- Onset early in life
- Symptoms vary form day to day
- Symptoms at night/early morning
- May have associated allergic disease
- May have family history of asthma
- Largely reversible airflow

**Community  
Respiratory  
Assessment  
Unit (CRAU)**



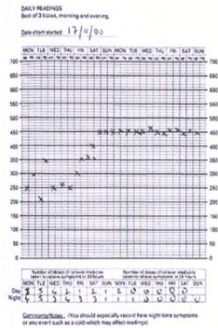
## Carry out a confirmatory diagnostic test

The diagnostic definition of asthma

“Generalised narrowing of the airways which varies over short periods of time either spontaneously or as a result of treatment”  
may be fulfilled by:

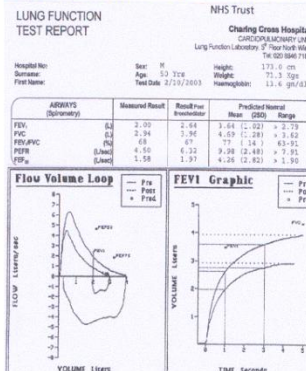
1

Demonstrating variability with time, often most easily done by home peak flow monitoring



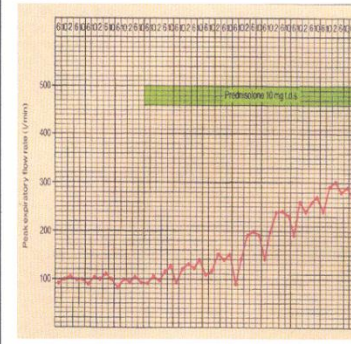
2

Assessing the response of spirometry to inhaled bronchodilators (15% change and at least 200mls increase in FEV1)



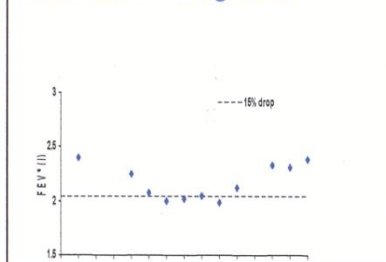
3

Assessing response to a trial of inhaled or oral steroids (If the latter 30mg /day for a minimum of 2 weeks.) Look for 20% increase in Peak Flow or 15% change and at least 200mls in FEV1

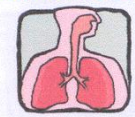


4

Positive exercise test. Exercise by 6 minutes free running recording Peak Flow (or FEV1) pre, and at 2 minute intervals for 20 minutes after. May induce bronchoconstriction and bronchodilators should be available. Any fall is abnormal; more than 15% diagnostic.



**Diagnosis of Asthma confirmed**



# The Diagnosis of asthma

(in other than the very young) is made by :

- History taking and by
- Seeing if the patient fulfils the diagnostic definition of asthma

## History suggests asthma

Symptoms include, cough, wheezing, chest tightness and breathlessness

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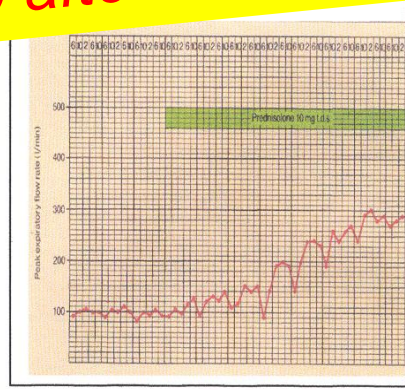
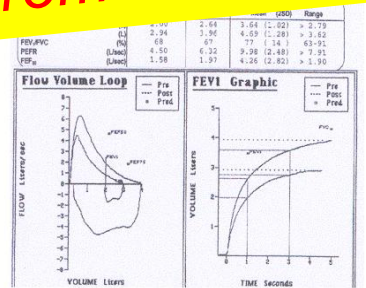
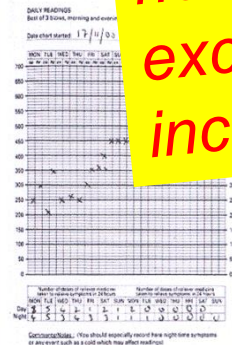
## Carry out a confirmatory diagnostic test

The diagnostic definition of asthma is:

“Generalised narrowing of the airways which is reversible”

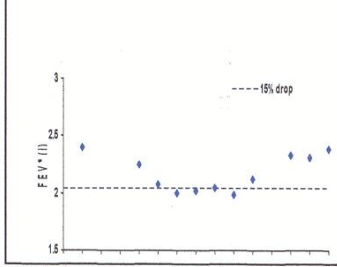
Always document clearly in the notes the grounds upon which the diagnosis was made; eg History of nocturnal wheezing, positive family history and excellent response to treatment, or Peak Flow increased from 200 to 380 after salbutamol

Demonstrate time, often at home peak



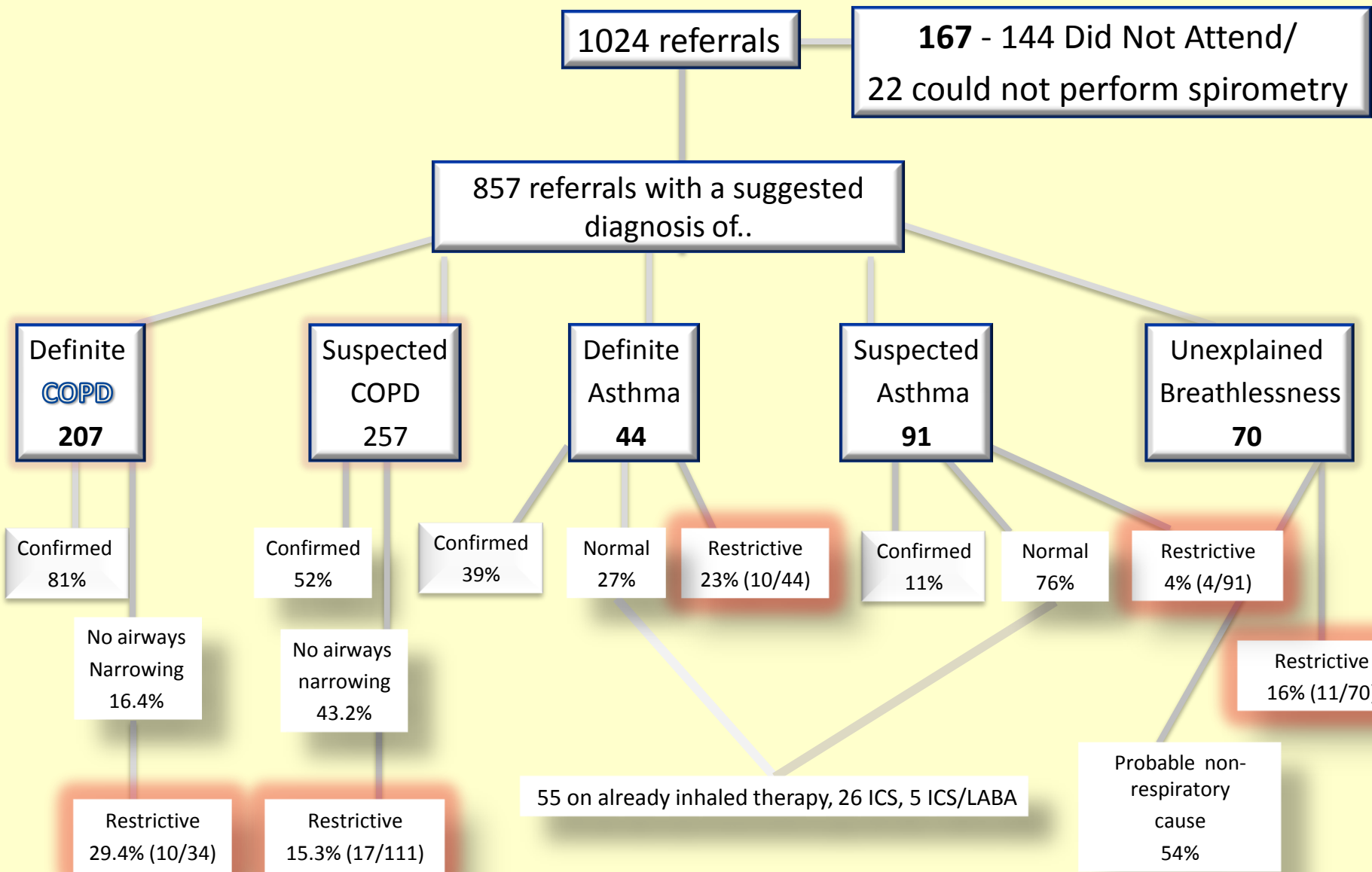
Exercise by recording time, and at 2 minutes

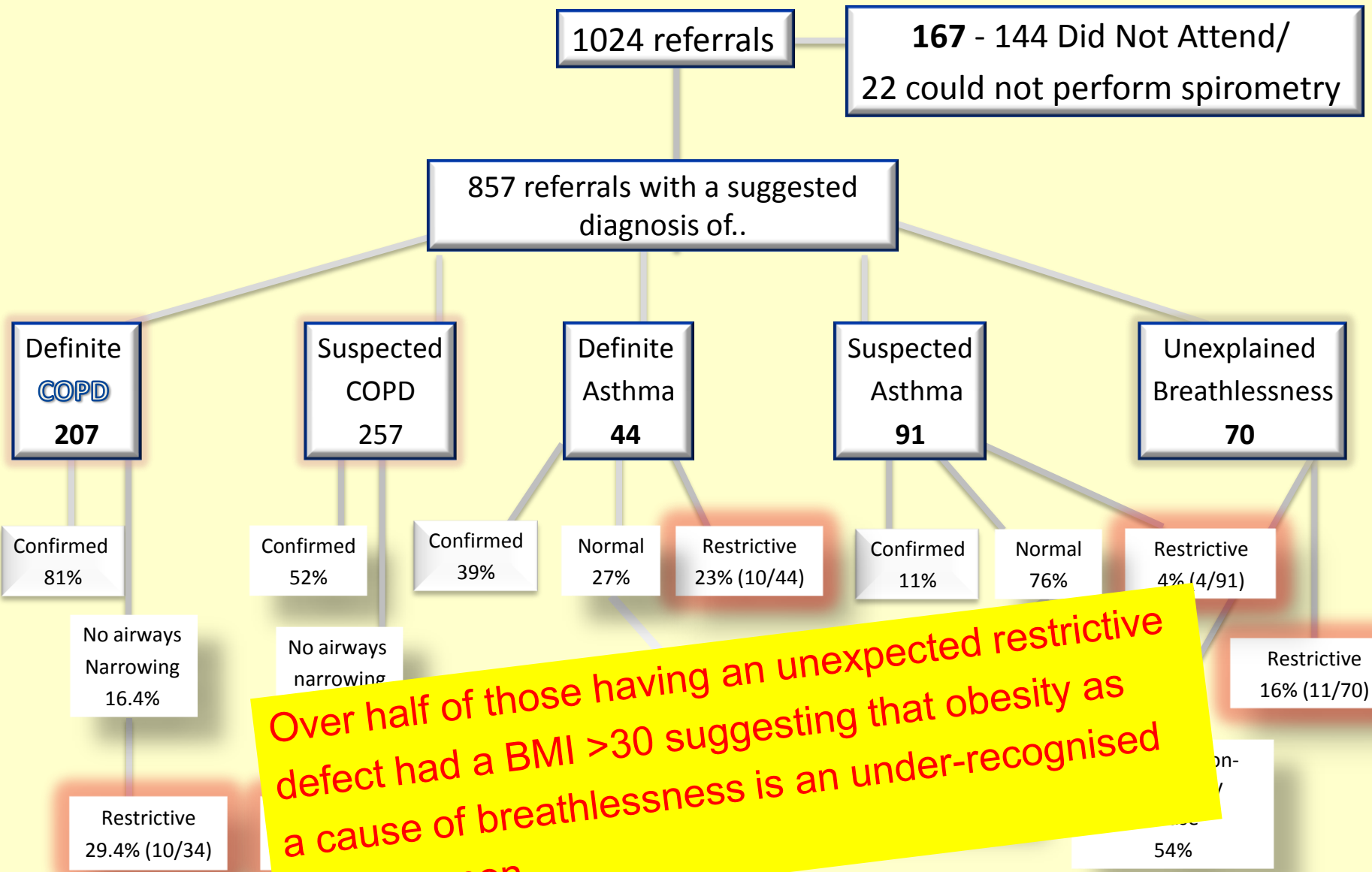
bronchodilators should be available. Any fall is abnormal; more than 15% drop



# Diagnosis of Asthma confirmed







Over half of those having an unexpected restrictive defect had a BMI >30 suggesting that obesity as a cause of breathlessness is an under-recognised phenomenon

# What are the practical implications of these results?

- These GPs are prepared to make a provisional diagnosis
- These GPs recognise that we are all fallible and that investigations are often necessary
- The investigations suggest that often their provisional clinical diagnosis was wrong
- Trials of therapy are often wasteful
- Obesity as a cause of breathlessness is often under recognised
- Spirometry in asthma may be of little value if performed after already starting treatment

# What lung diseases do we know?

<b>Airways diseases</b>	<b>Small lung disorders</b> (also known as “restrictive disorders”)
<b><i>Localised</i> obstruction</b>	<b>Due to disease <i>within</i> the lungs</b>
<ul style="list-style-type: none"> <li>Sleep apnoea</li> <li>Laryngeal carcinoma</li> <li>Thyroid enlargement</li> <li>Vocal cord dysfunction</li> <li>Relapsing Polychondritis</li> <li>Tumours</li> <li>Post tracheostomy stenosis</li> <li>Foreign bodies</li> <li>Bronchopulmonary dysplasia</li> </ul>	<ul style="list-style-type: none"> <li>Sarcoidosis</li> <li>Asbestosis</li> <li>Extrinsic Allergic Alveolitis</li> <li>Fibrosing Alveolitis</li> <li>Eosinophilic pneumonia</li> </ul>
<b><i>Generalised</i> obstruction</b>	<b>Due to disease <i>outside</i> the lung</b>
<ul style="list-style-type: none"> <li>Asthma</li> <li>C.O.P.D.</li> <li>Bronchiectasis</li> <li>Cystic Fibrosis</li> <li>Obliterative Bronchiolitis</li> </ul>	<ul style="list-style-type: none"> <li>Pleural effusions</li> <li>Pneumothorax</li> <li>Scoliosis</li> <li>Respiratory muscle weakness</li> <li>Obesity</li> </ul>

<b>Infections</b>	<b>Pulmonary vascular disorders</b>
<ul style="list-style-type: none"> <li>Tuberculosis</li> <li>Infective bronchitis</li> <li>Pneumonia</li> <li>Empyema</li> </ul>	<ul style="list-style-type: none"> <li>Pulmonary emboli</li> <li>Pulmonary hypertension</li> </ul>

# DIAGNOSIS AND MANAGEMENT OF RESPIRATORY DISEASE

## Cough

Check the patient is not taking an ACE Inhibitor. If yes stop, if not determine length of history of cough

Cough has lasted **less than 12 weeks** - if no sinister features (and not a Smoker or ex-smoker) may be post viral

Cough has lasted **more than 12 weeks**

Send for Chest Xray

Chest x-ray abnormal; refer to respiratory physician

Chest X-ray is normal

Abnormal spirometry or personal or family history of other atopic disease? - consider asthma or COPD

Advise smoking cessation or trial of anti-asthma therapy as appropriate

Symptoms of gastro-oesophageal reflux or overweight - consider trial of proton pump inhibitor in highish dosage for 2/12

Nasal stuffiness or catarrh or other suggestion of post nasal drip disease - consider trial of intranasal steroids

No response → refer respiratory physician

# DIAGNOSIS AND MANAGEMENT OF RESPIRATORY DISEASE

## Cough

Check the patient is not taking an ACE Inhibitor. If yes stop, if not determine length of history of cough

Cough has lasted **less than 12 weeks** - if no sinister features (and not a Smoker or ex-smoker) may be post viral

Cough has lasted **more than 12 weeks**

Send for Chest Xray

Chest x-ray abnormal; refer to respiratory physician

Chest X-ray is normal

Abnormal spirometry or personal or family history of other atopic disease? - consider asthma or COPD

Advise smoking cessation or trial of anti-asthma therapy as appropriate

Symptoms of gastro-oesophageal reflux or overweight - consider trial of proton pump inhibitor in high dose for 2/12

Nasal stuffiness or catarrh or other suggestion of post nasal drip disease - consider trial of intranasal steroids

No response → refer respiratory physician

## Breathlessness?

Heart disease?

Irregular pulse?  
Clinical signs of left ventricular hypertrophy or failure?  
Personal or family history of ischaemic heart disease?  
ECG abnormal?

Chest x-ray shows cardiac enlargement?

Treat or refer to cardiologist

Lung disease?

Pulmonary embolus/infarction?

- Is a major risk factor present?
- Recent immobility
- Recent lower limb trauma/surgery
- Clinical DVT
- Previous or FH of VTE
- Pregnancy or puerperium
- Major medical illness

Refer urgently for investigation

A systemic disorder?

- Anaemia - check haemoglobin
- Obesity - check BMI
- Overactive thyroid - check T4

Treat or refer

Diaphragm weakness?

Is the breathlessness worse on lying flat or in water? Does the vital capacity fall on lying compared with sitting or standing?

Refer to a respiratory physician

Psychogenic dyspnoea?

Note that this is usually a diagnosis of exclusion

If in doubt refer to a respiratory physician

Infection?

Is there a fever, a cough productive of purulent sputum or focal signs on examination of the chest?

Treat &/or refer for a chest x-ray and or a respiratory opinion

Small lung disease?

Is this a small lung disorder, and if so is it due to an abnormality

Within the lung:  
Sarcoidosis  
Asbestosis  
Extrinsic allergic alveolitis  
Fibrosing alveolitis

Or

Outside the lung:  
Pleural effusions  
Scoliosis  
Respiratory muscle weakness  
Obesity

Refer to a respiratory physician

Pulmonary embolus/infarction?

Airways disease?

Is this an airway disorder? Is there a cough, wheeze, breathlessness or obstructive spirometry or reduced peak flow? If so is it a localised or a generalised obstruction?

Localised obstruction?  
? Stridor  
? Monophonic wheeze  
? Unilateral wheezing

Localised obstruction:  
Laryngeal carcinoma?  
Retrosternal thyroid?  
Relapsing polychondritis?  
A bronchial or tracheal tumour?  
Post tracheostomy stenosis?  
Inhaled foreign body?  
Bronchopulmonary dysplasia?

Refer to an ENT or respiratory physician

Generalised obstruction?  
? Polyphonic wheezing  
? Bilateral wheezing

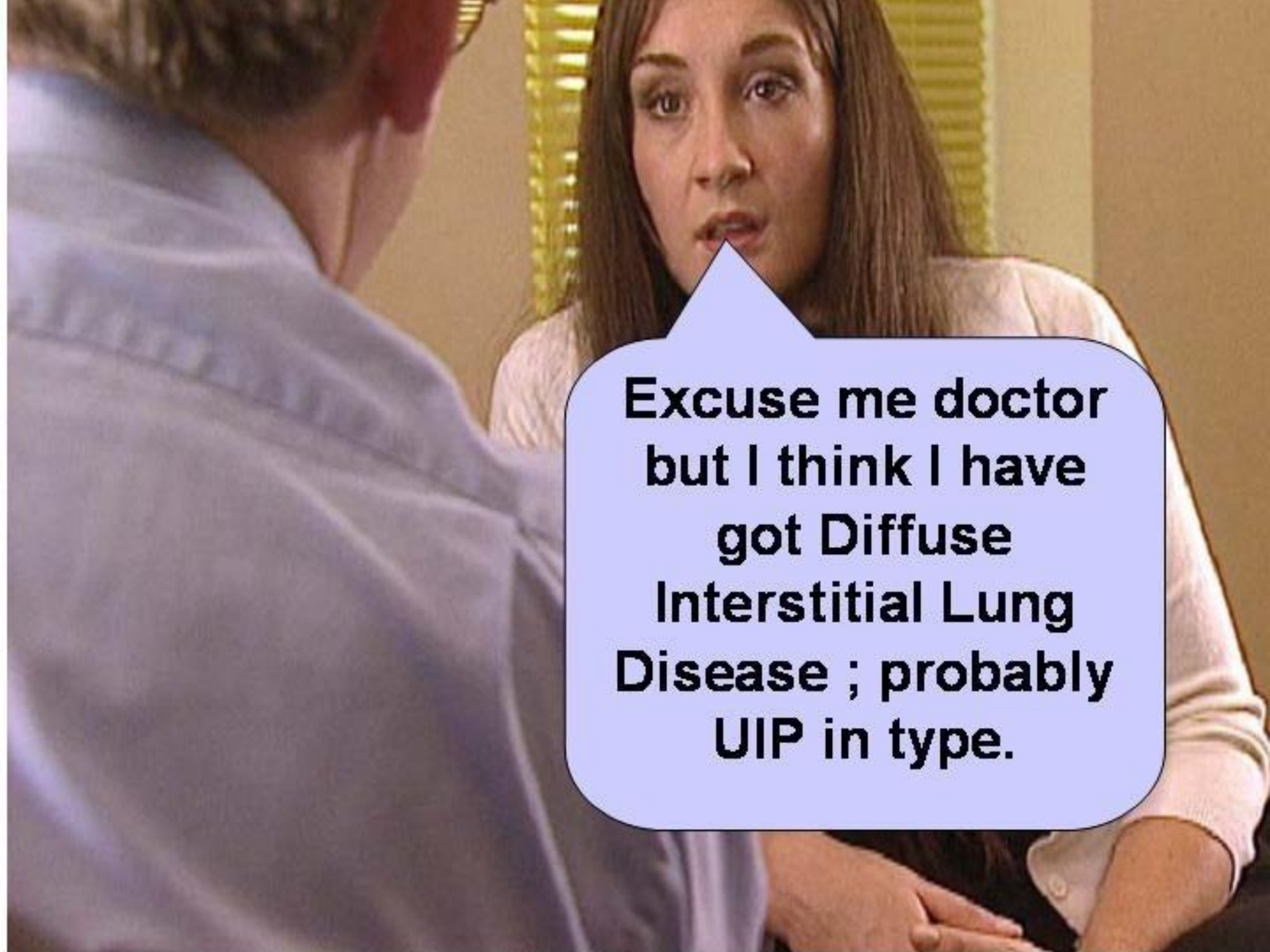
Generalised obstruction:  
Asthma?  
Chronic obstructive pulmonary disease?  
Bronchiectasis?  
Cystic fibrosis?  
Obliterative bronchiolitis?

Treat or refer to a respiratory physician

<b>Airways diseases</b>	<b>Small lung disorders</b> (also known as “restrictive disorders”)
<b><i>Localised</i> obstruction</b>	<b>Due to disease <i>within</i> the lungs</b>
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A woman with long brown hair, wearing a white top, is speaking to a doctor whose back is to the camera. The doctor is wearing a light blue lab coat. The scene is set in a clinical or office environment with a yellow wall and a window with blinds in the background.

**Excuse me doctor  
but I think I have  
got Diffuse  
Interstitial Lung  
Disease ; probably  
UIP in type.**

How might we reduce the size of this differential diagnostic list?



# Report on this lady's lung function tests

## LUNG FUNCTION TEST REPORT

NHS Trust

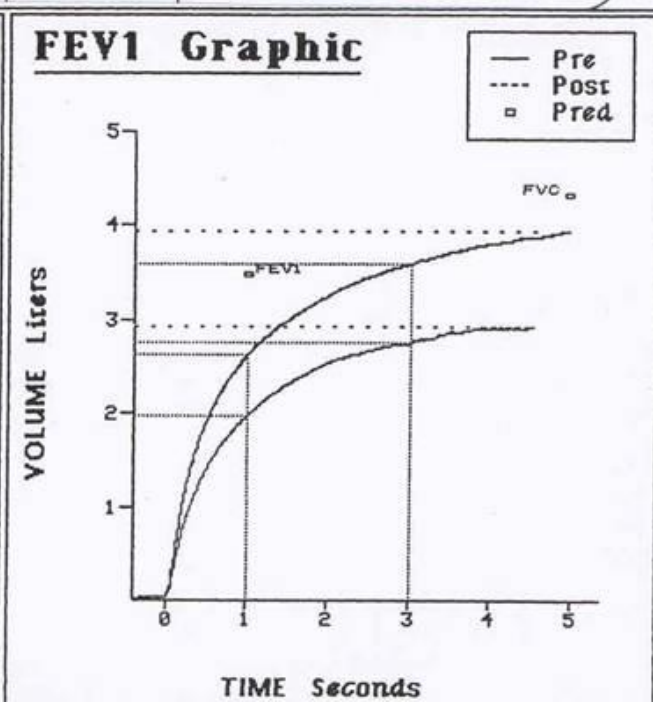
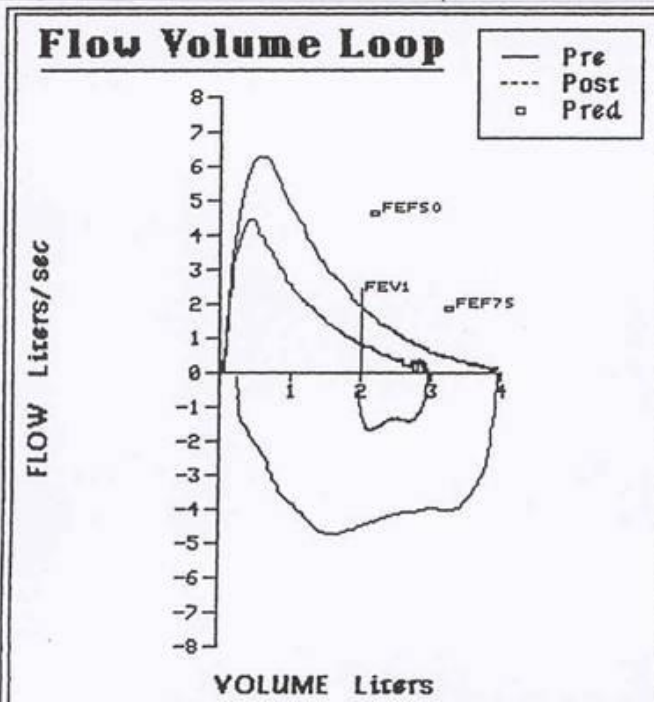
**Charing Cross Hospital**  
 CARDIOPULMONARY UNIT  
 Lung Function Laboratory, 5<sup>th</sup> Floor North Wing  
 Tel: 020 8846 7180

Hospital No:  
 Surname:  
 First Name:

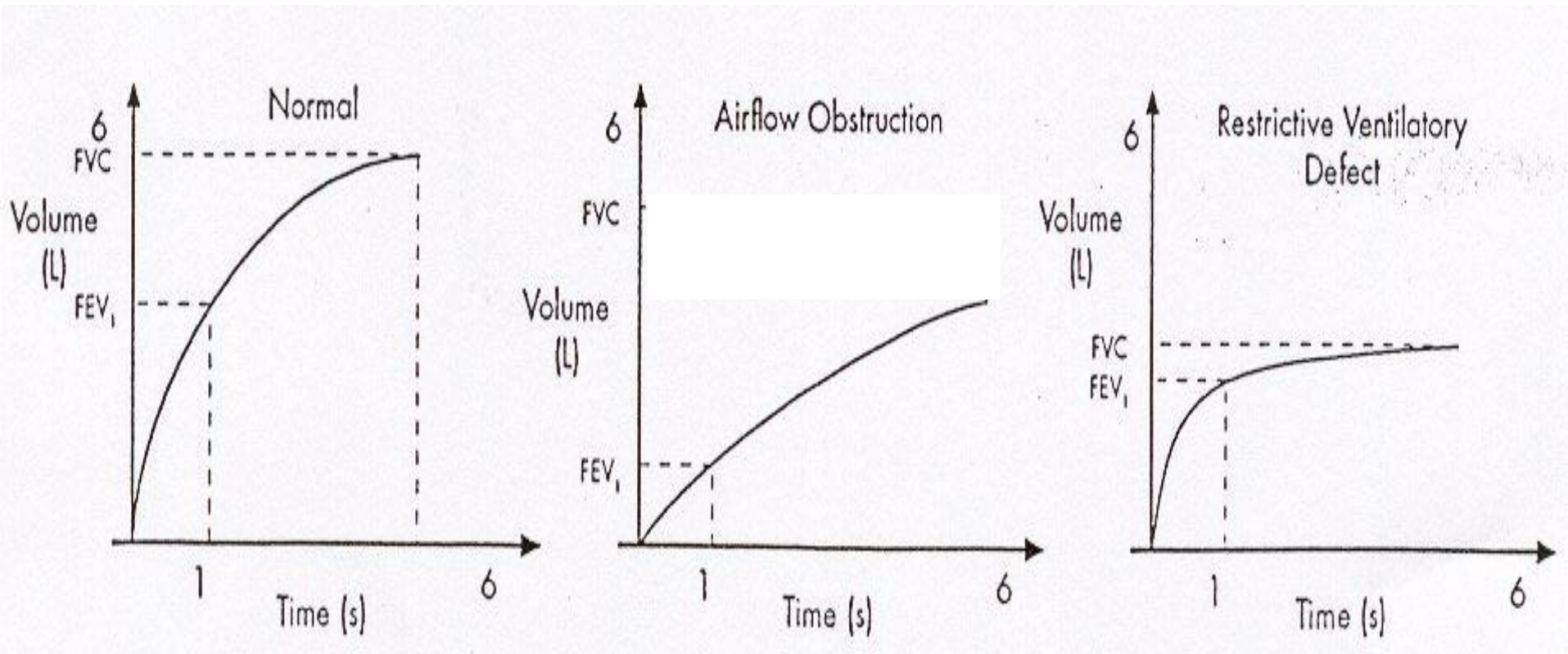
Sex: M  
 Age: 50 Yrs  
 Test Date 2/10/2003

Height: 173.0 cm  
 Weight: 71.3 Kgs  
 Haemoglobin: 13.6 gm/dl

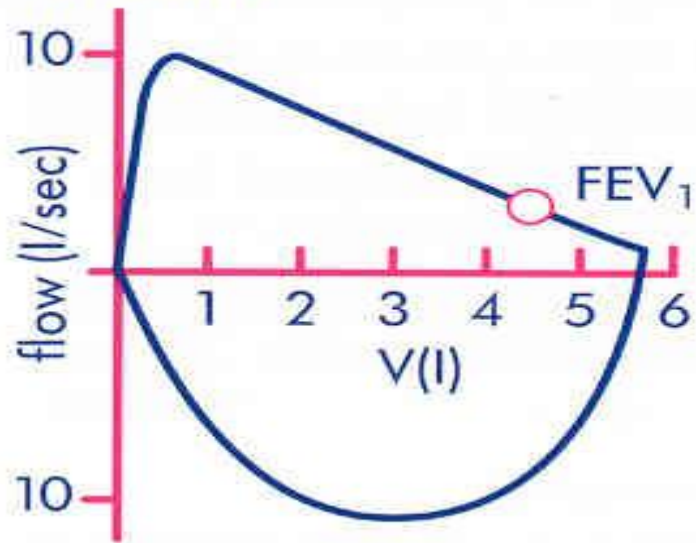
AIRWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal	
			Mean (2SD)	Range
FEV <sub>1</sub> (L)	2.00	2.64	3.64 (1.02)	> 2.79
FVC (L)	2.94	3.96	4.69 (1.28)	> 3.62
FEV <sub>1</sub> /FVC (%)	68	67	77 ( 14 )	63-91
PEFR (L/sec)	4.50	6.32	9.98 (2.48)	> 7.91
FEF <sub>50</sub> (L/sec)	1.58	1.97	4.26 (2.82)	> 1.90



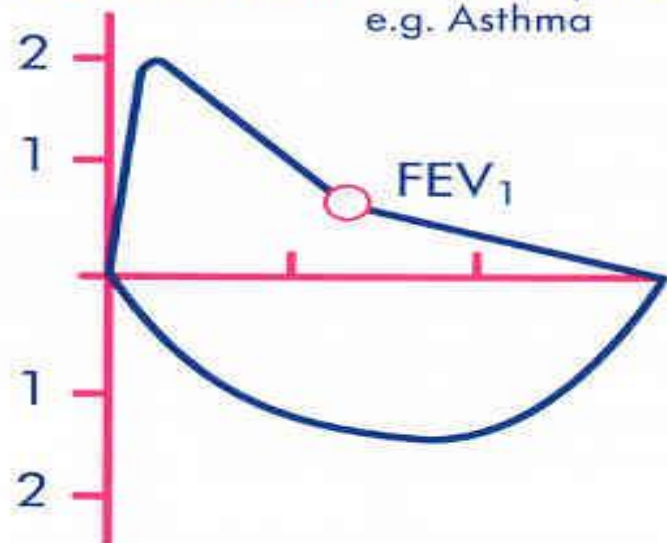
# Examples of spirometry



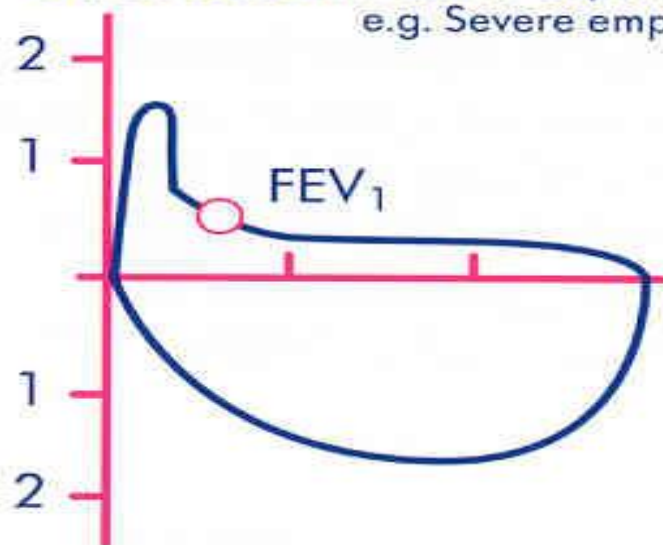
Normal



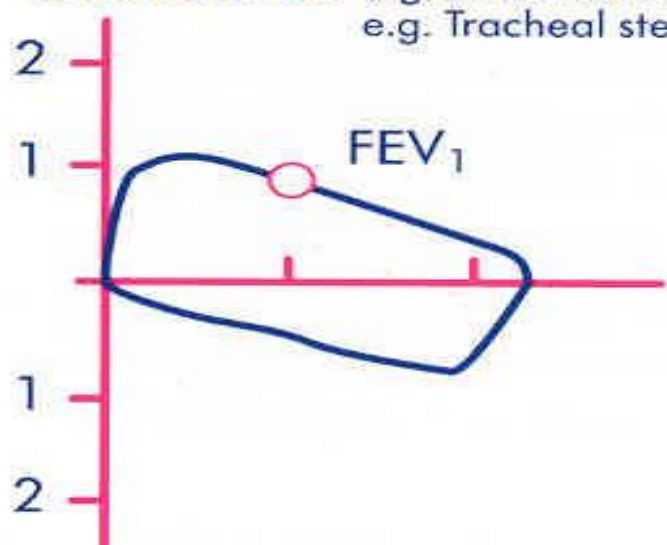
Obstruction Volume dependent  
e.g. Asthma



Obstruction Pressure dependent  
e.g. Severe emphysema



Obstruction Rigid obstruction  
e.g. Tracheal stenosis



# LUNG FUNCTION TEST REPORT

NHS Trust

**Charing Cross Hospital**

CARDIOPULMONARY UNIT

Lung Function Laboratory, 5<sup>th</sup> Floor North Wing

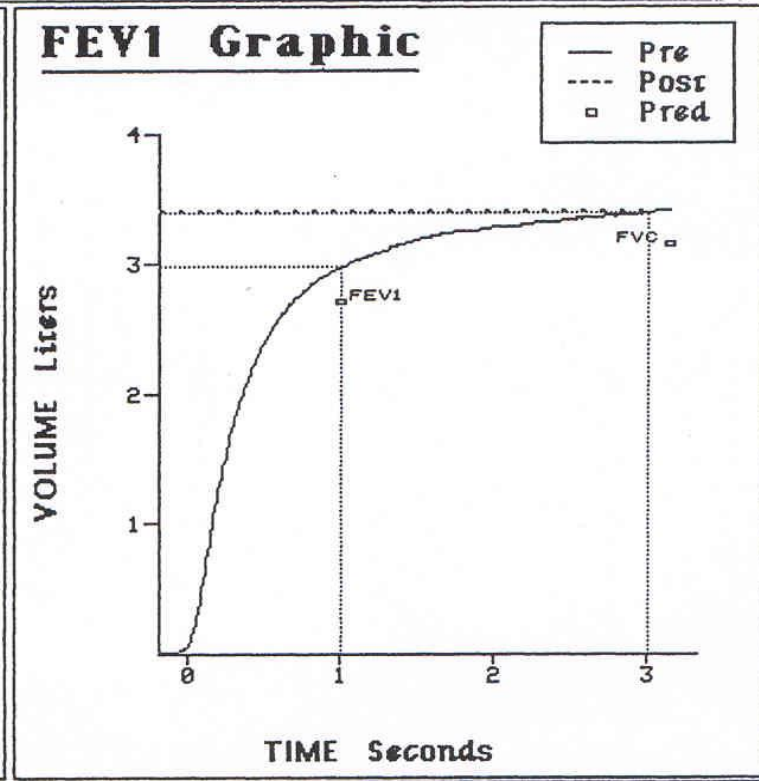
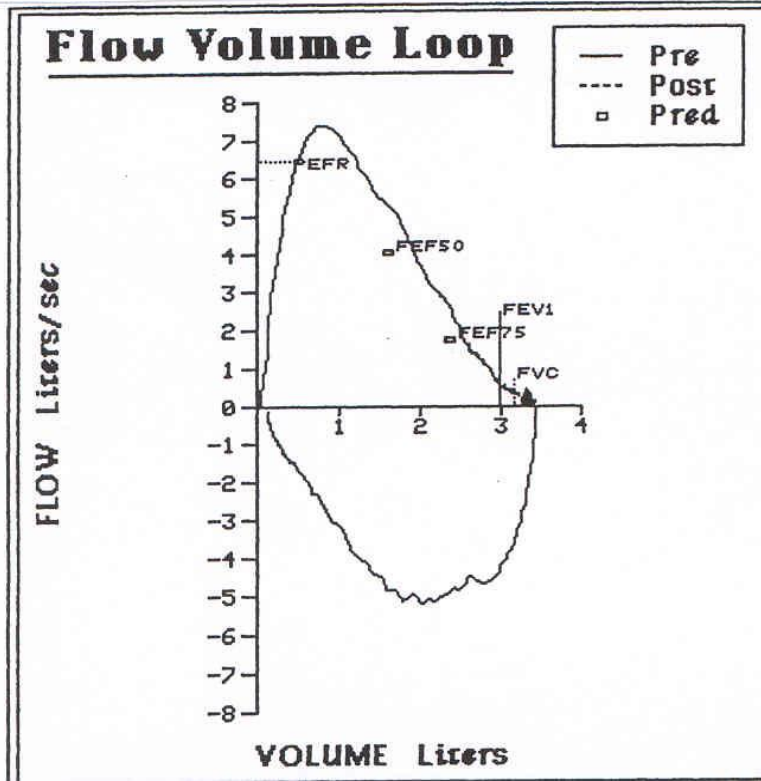
Tel: 020 8846 7180

Hospital No:  
Surname:  
First Name:

Sex: F  
Age: 40 Yrs  
Test Date 8/08/2003

Height: 159.7 cm  
Weight: 58.0 Kgs  
Haemoglobin: 12.2 gm/dl

AIRWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal		
			Mean	(2SD)	Range
FEV <sub>1</sub> (L)	2.98		2.91 (0.78)	> 2.26	
FVC (L)	3.43		3.60 (0.98)	> 2.78	
FEV <sub>1</sub> /FVC (%)	87		81 (13)	68-95	
PEFR (L/sec)	7.60		7.47 (2.20)	> 5.63	
FEF <sub>50</sub> (L/sec)	5.00		4.04 (2.10)	> 2.28	



# LUNG FUNCTION TEST REPORT

NHS Trust

**Charing Cross Hospital**

CARDIOPULMONARY UNIT

Lung Function Laboratory, 5<sup>th</sup> Floor North Wing

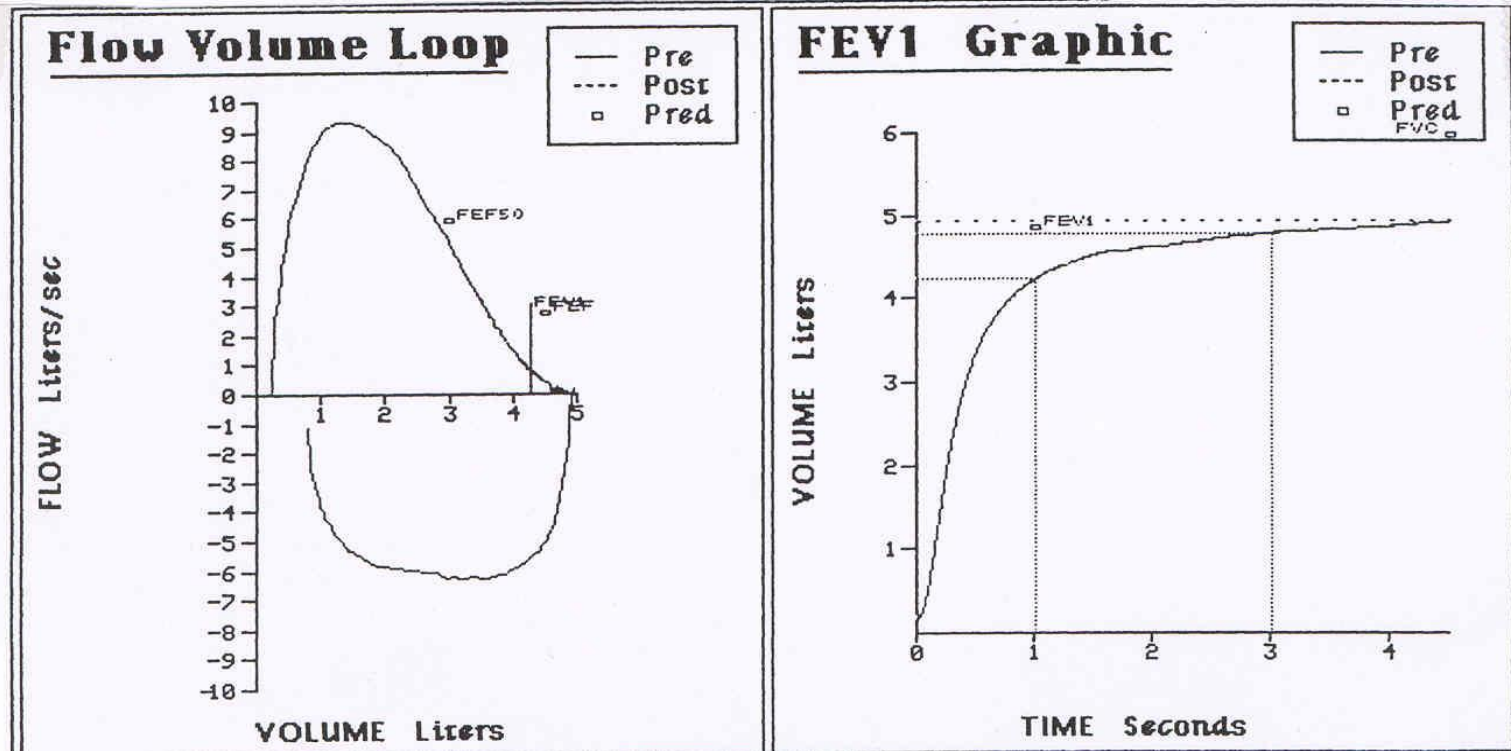
Tel: 020 8846 7180

Hospital No:  
Surname:  
First Name:

Sex: M  
Age: 36 Yrs  
Test Date 7/02/2003

Height: 195.2 cm  
Weight: 165.2 Kgs  
Haemoglobin: gm/dl

AIRWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal	
			Mean (2SD)	Range
FEV <sub>1</sub> (L)	4.26		4.99 (1.02)	> 4.13
FVC (L)	4.94		6.55 (1.28)	> 5.48
FEV <sub>1</sub> /FVC (%)	86		76 ( 14 )	62-89
PEFR (L/sec)	9.35		12.03 (2.48)	> 9.96
FEF <sub>50</sub> (L/sec)	7.11		4.87 (2.82)	> 2.52





# LUNG FUNCTION TEST REPORT

NHS Trust

**Charing Cross Hospital**

CARDIOPULMONARY UNIT

Lung Function Laboratory, 5<sup>th</sup> Floor North Wing

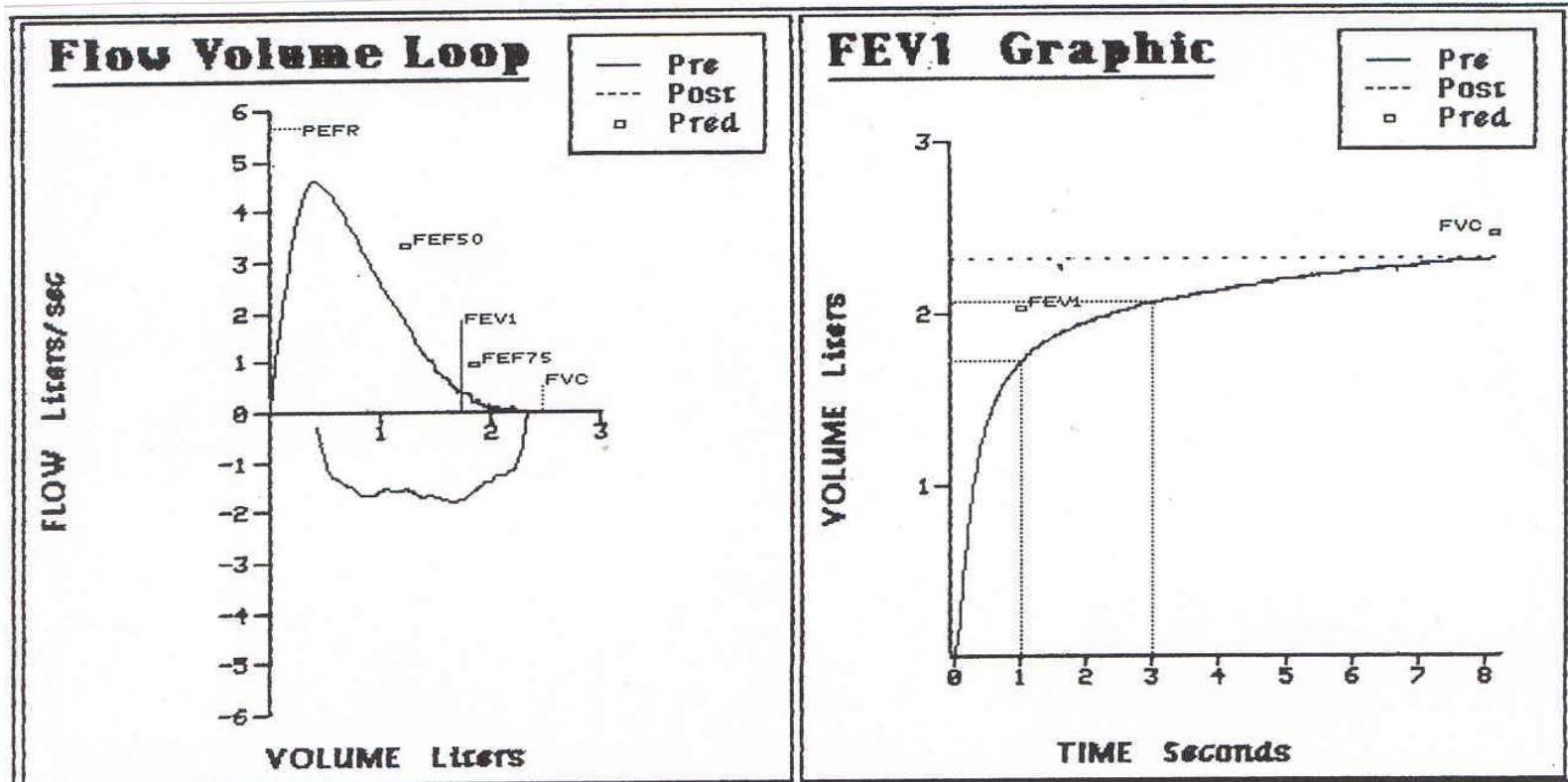
Tel: 020 8846 7180

Hospital No:  
Surname:  
First Name:

Sex: F  
Age: 74 Yrs  
Test Date 6/10/2003

Height: 164.3 cm  
Weight: 79.8 Kgs  
Haemoglobin: 8.2 gm/dl

AIRWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal		
			Mean	(2SD)	Range
FEV <sub>1</sub> (L)	1.74		2.21	(0.78)	> 1.56
FVC (L)	2.34		3.02	(0.98)	> 2.20
FEV <sub>1</sub> /FVC (%)	74		75	( 13 )	62-89
PEFR (L/sec)	4.62		5.96	(2.20)	> 4.12
FEF <sub>50</sub> (L/sec)	2.07		2.74	(2.10)	> 0.99



# LUNG FUNCTION TEST REPORT

NHS Trust

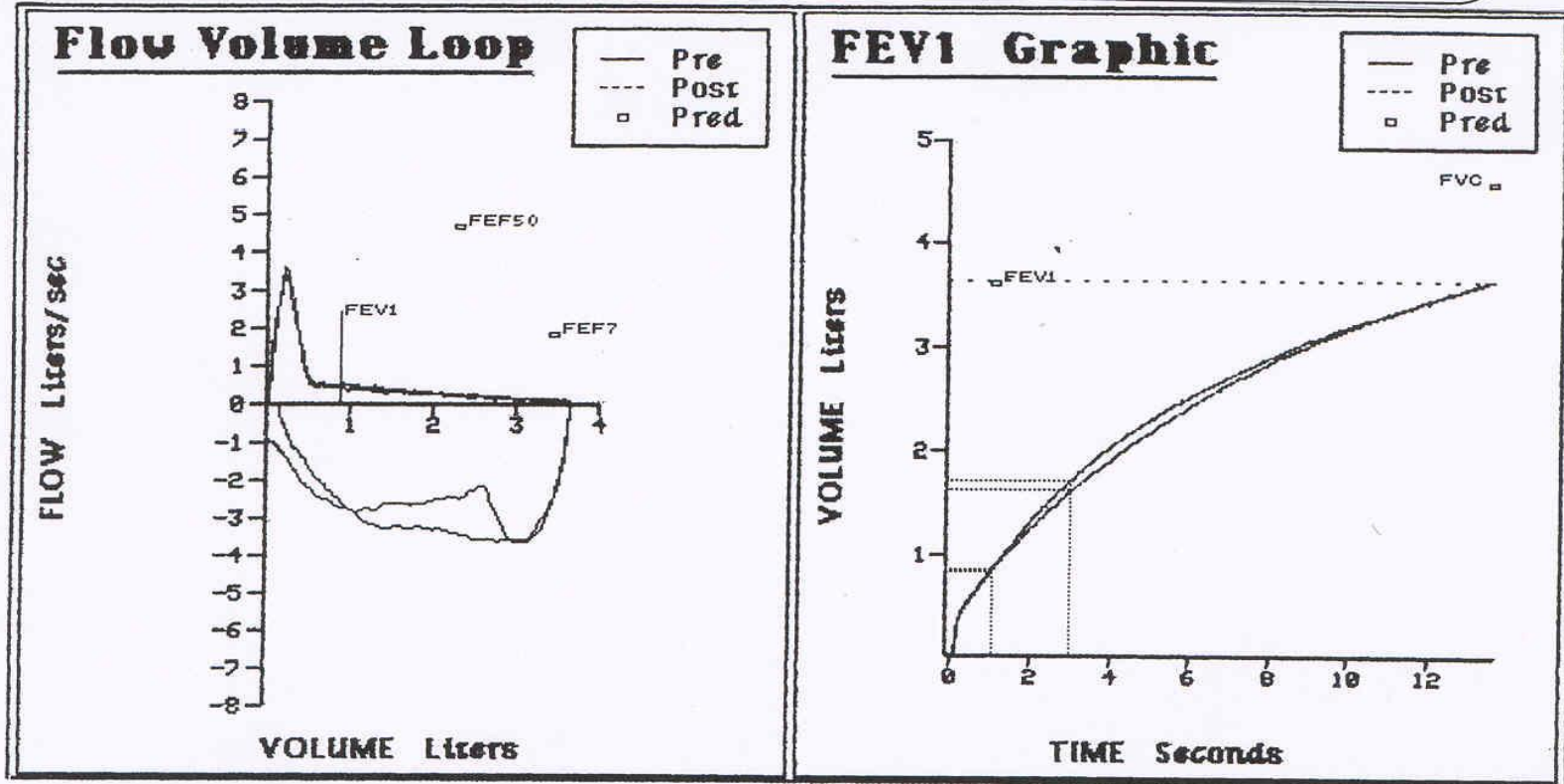
**Charing Cross Hospital**  
 CARDIOPULMONARY UNIT  
 Lung Function Laboratory, 5<sup>th</sup> Floor North Wing  
 Tel: 020 8846 7180

Hospital No:  
 Surname:  
 First Name:

Sex: M  
 Age: 59 Yrs  
 Test Date: 6/10/2003

Height: 181.6 cm  
 Weight: 79.3 Kgs  
 Haemoglobin: 14.6 gm/dl

AIRWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal		
			Mean	(2SD)	Range
FEV <sub>1</sub> (L)	0.86	0.85	3.69	(1.02)	> 2.84
FVC (L)	3.65	3.65	5.01	(1.28)	> 3.94
FEV <sub>1</sub> /FVC (%)	24	23	73	( 14 )	59-87
PEFR (L/sec)	3.48	3.66	9.88	(2.48)	> 7.81
FEF <sub>50</sub> (L/sec)	0.30	0.35	3.86	(2.82)	> 1.51



Airways diseases	Small lung disorders (also known as “restrictive disorders”)
<b><i>Localised obstruction</i></b>	<b><i>Due to disease within the lungs</i></b>
Sleep apnoea Laryngeal carcinoma Thyroid enlargement Vocal cord dysfunction Relapsing Polychondritis Tumours Post tracheostomy stenosis Foreign bodies Bronchopulmonary dysplasia	Sarcoidosis Asbestosis Extrinsic Allergic Alveolitis Fibrosing Alveolitis Eosinophilic pneumonia
<b><i>Generalised obstruction</i></b>	<b><i>Due to disease outside the lung</i></b>
Asthma <b>C.O.P.D.</b> Bronchiectasis Cystic Fibrosis Obliterative Bronchiolitis	Pleural effusions Pneumothorax Scoliosis Respiratory muscle weakness Obesity

Infections	Pulmonary vascular disorders
Tuberculosis Infective bronchitis Pneumonia Empyema	Pulmonary emboli Pulmonary hypertension

## LUNG FUNCTION TEST REPORT

### Charing Cross Hospital

CARDIOPULMONARY UNIT

Lung Function Laboratory, 5<sup>th</sup> Floor North Wing

Tel: 020 8846 7180

Hospital No: CX271793

Surname:

First Name:

Dob :

DELIA

11/10/1954

Sex: F

Age: 53 Yrs

Test Date: 21/02/2008

Height: 167.2 cm

Weight: 56.7 Kgs

BMI: 20.3

Haemoglobin: 14.8 gm/dl

AIRWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal	
			Mean (2SD)	Range
FEV <sub>1</sub> (L)	2.43		2.83 (0.78)	> 2.18
FVC (L)	3.87		3.63 (0.98)	> 2.81
FEV <sub>1</sub> /FVC (%)	63		79 ( 13 )	66-92
PEFR			7.13 (2.20)	> 5.29
FEF <sub>50</sub>			54 (2.10)	> 1.79

How would you grade the severity of this lady's COPD?

# Classification of COPD Severity by Spirometry

Stage I: Mild	$FEV_1/FVC < 0.70$ $FEV_1 \geq 80\%$ predicted
Stage II: Moderate	$FEV_1/FVC < 0.70$ $50\% \leq FEV_1 < 80\%$ predicted
Stage III: Severe	$FEV_1/FVC < 0.70$ $30\% \leq FEV_1 < 50\%$ predicted
Stage IV: Very Severe	$FEV_1/FVC < 0.70$ $FEV_1 < 30\%$ predicted <i>or</i> $FEV_1 < 50\%$ predicted <i>plus</i> chronic respiratory failure

# LUNG FUNCTION TEST REPORT

## Charing Cross Hospital

CARDIOPULMONARY UNIT  
Lung Function Laboratory, 5<sup>th</sup> Floor North Wing  
Tel: 020 8846 7180

Hospital No: CX271793  
Surname: [REDACTED]  
First Name: [REDACTED]  
Dob: [REDACTED]

Sex: F  
Age: 53 Yrs  
Test Date: 21/02/2008

Height: 167.2 cm  
Weight: 56.7 Kgs  
BMI: 20.3  
Haemoglobin: 14.8 gm/dl

AIRWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal		
			Mean	(2SD)	Range
FEV <sub>1</sub> (L)	2.43		2.83	(0.78)	> 2.18
FVC (L)	3.87		3.63	(0.98)	> 2.81
FEV <sub>1</sub> /FVC (%)	63		79	( 13 )	66-92
PEFR (L/sec)	6.32		7.13	(2.20)	> 5.29
FEF <sub>50</sub> (L/sec)	1.75		3.54	(2.10)	> 1.79

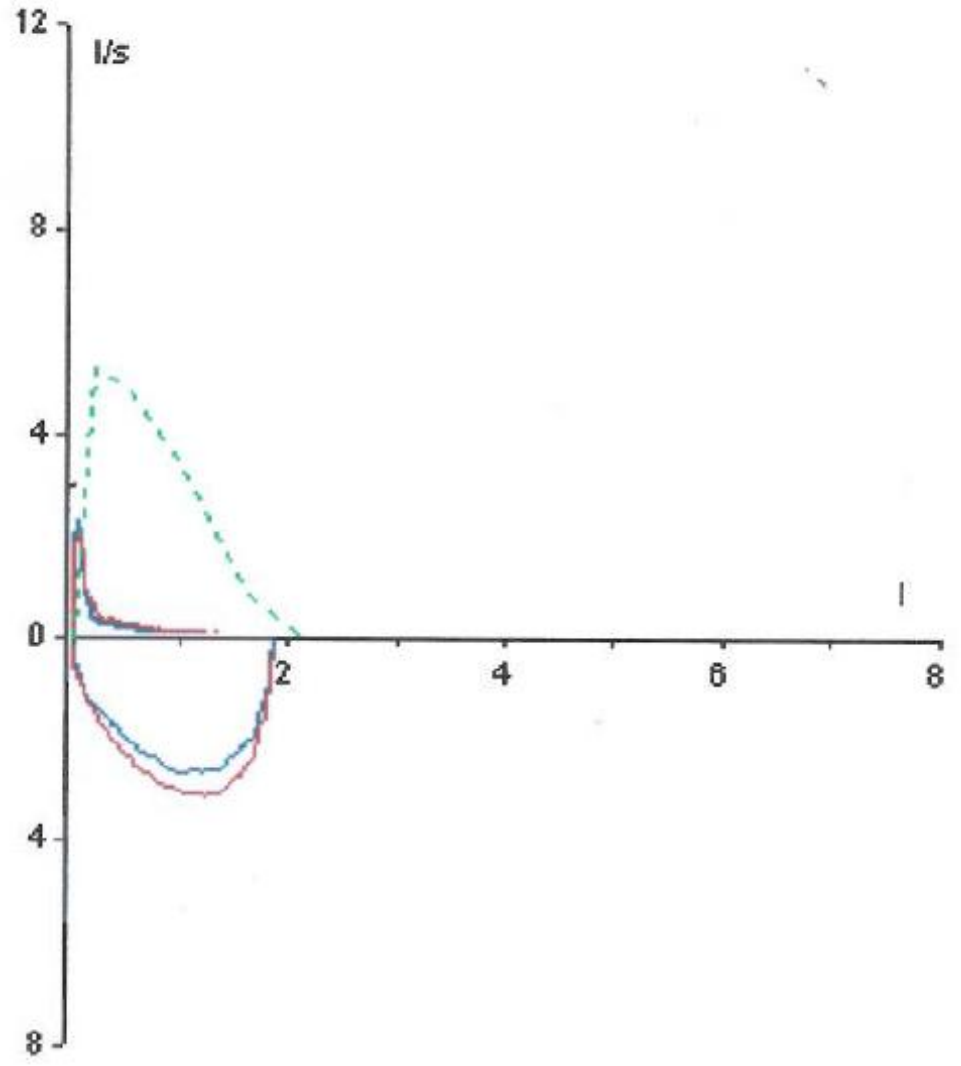
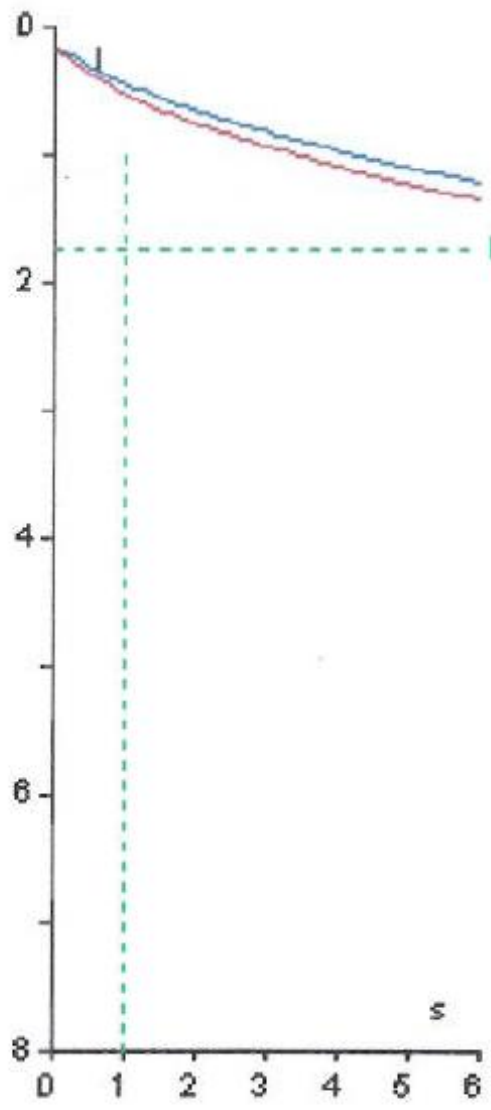
LUNG VOLUMES (Helium Dilution)	Measured Result	Mean Result	Predicted Normal		
			Mean	(2SD)	Range
FRC (L)	3.93	3.93	3.07	(0.70)	2.37-3.77
TLC (L)	6.83	6.83	5.45	(1.06)	4.3- 6.5
VC (L)	4.40	4.40	3.63	(0.98)	2.65-4.61
RV <sub>mb</sub> (L)	2.43	2.43	1.77	(0.58)	1.19-2.35
RV <sub>mb</sub> /TLC (%)	36	36	33	( 11 )	22-44

CARBON MONOXIDE TRANSFER (Single Breath)	Measured Result	Mean Result	Predicted Normal		
			Mean	(2SD)	Range
TL <sub>CO</sub> [Transfer Factor] (mmol/min/kPa)	3.66 3.68	3.67	7.90	(2.38)	5.5-10.3
K <sub>CO</sub> [T <sub>CO</sub> per lung vol] (mmol/min/kPa/L)	0.68 0.67	0.67	1.62	(0.54)	1.08-2.16
V <sub>A</sub> (L)	5.43 5.56	5.49			
RV <sub>sb</sub> (L)	2.13 2.15	2.14			
Mixing Index [TLC <sub>sb</sub> /TLC <sub>mb</sub> ] (%)		82	93	( 13 )	> 83

Arterial Blood Gases	Measured Result	Normal Range
pH		7.38 - 7.42
PCO <sub>2</sub> (kPa)		4.8 - 5.9 (36-44 mmHg)
PO <sub>2</sub> (kPa)		10.6 - 13.3 (80-100 mmHg)
SpO <sub>2</sub> (%)	98	

Smoking History:

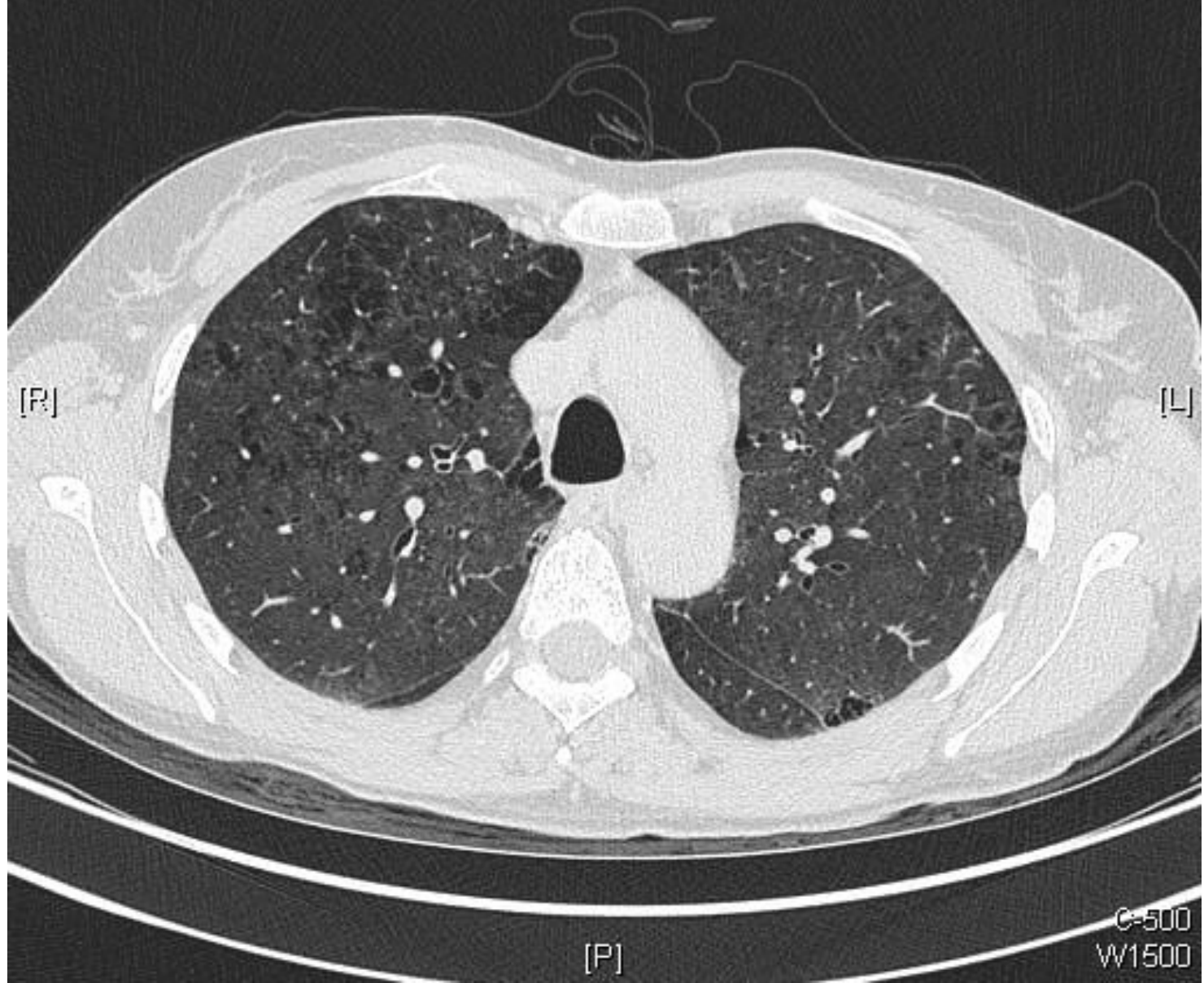
Smoker, 40 Cig/day for 30.0 Years



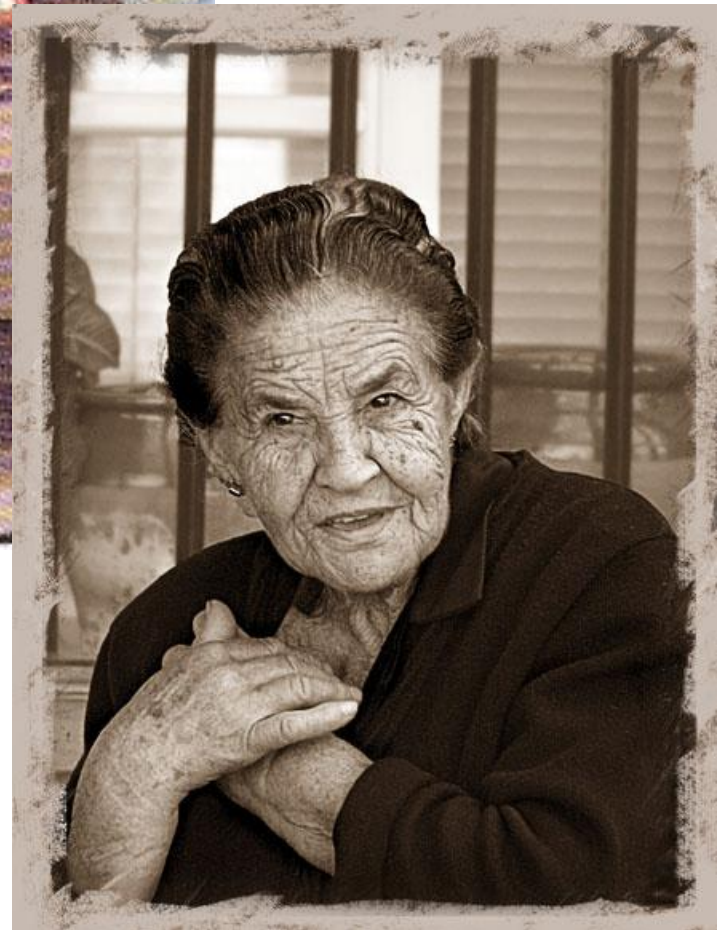
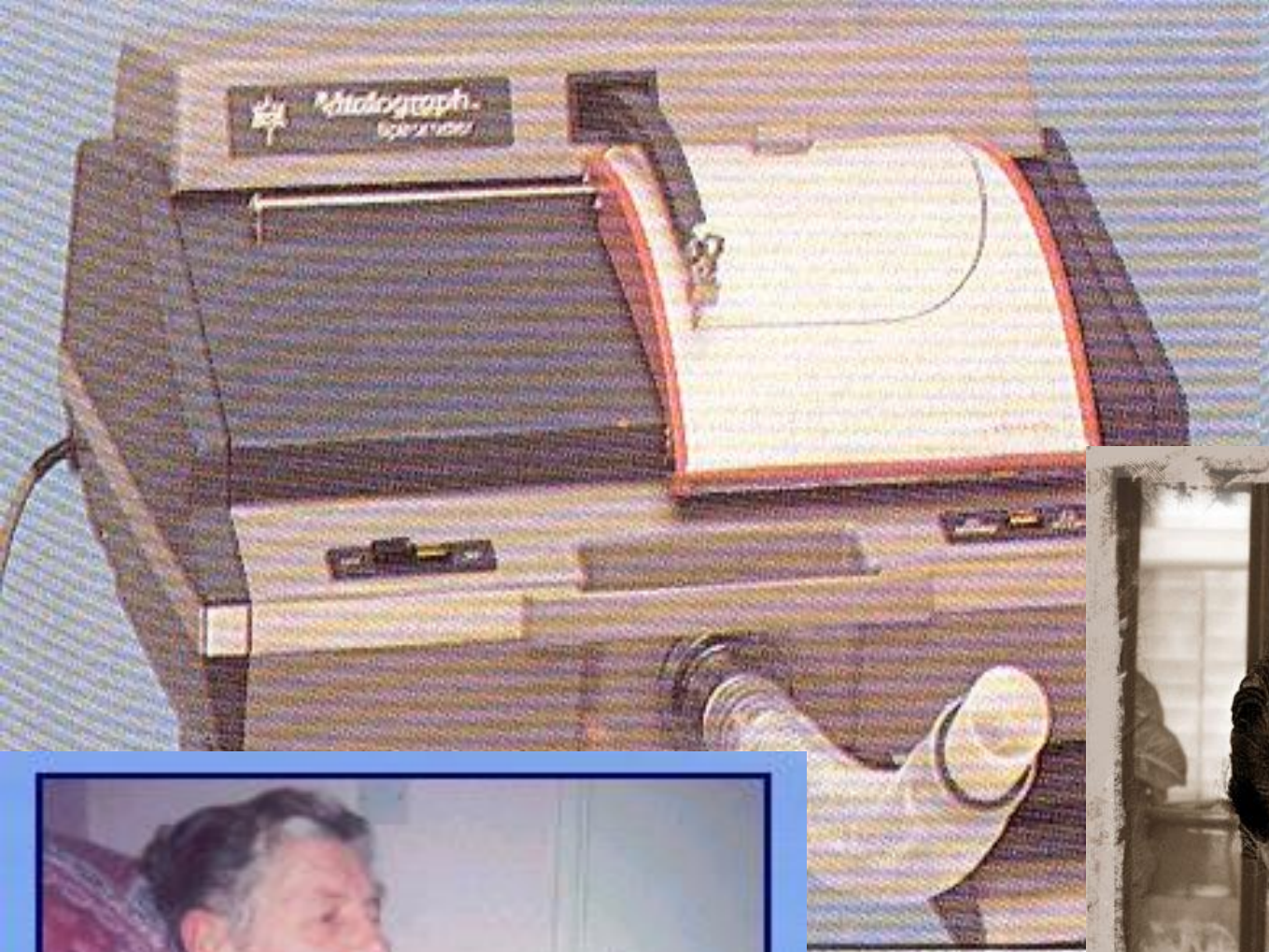
Se:2  
Im:20

[A]

Study Date: 06/07/2008  
Study Time: 15:02:26  
MRN:







# MRC dyspnoea grade

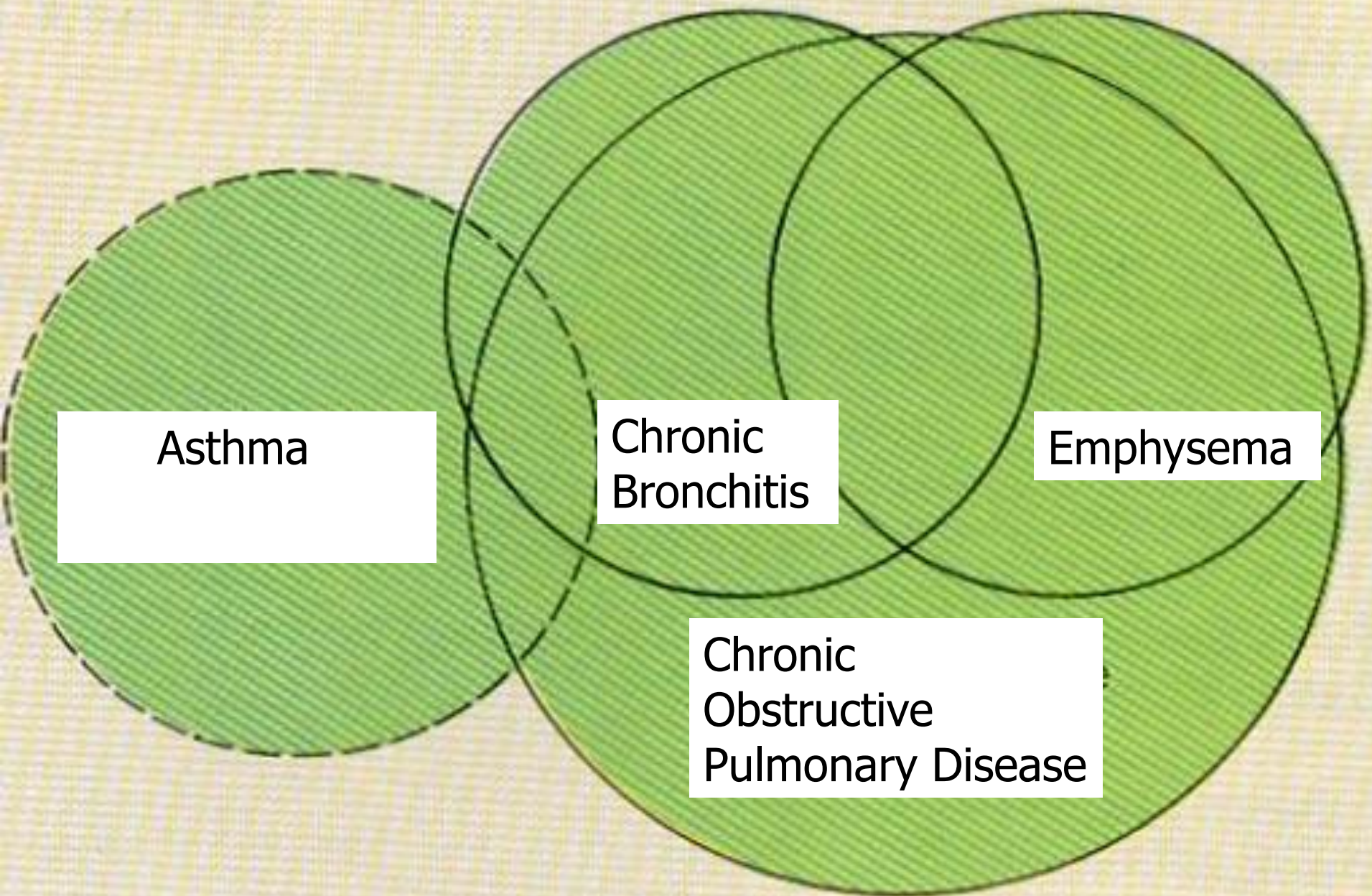
1. Normal
2. Able to walk and keep up with people of similar age on the level, but not on hills or stairs.
3. Able to walk for 1.5Km on the level at own pace, but unable to keep up with people of similar age
4. Able to walk 100m on the level
5. Breathless at rest or on minimal effort

# Differentiating Asthma from COPD: Why bother?

# Differentiating Asthma from COPD: Why bother?

Because:

- The aetiology is different
- The pathology is different
- The natural history is different,
- Whilst “drug” treatments are increasingly similar (other than for anticholinergic agents) the other aspects of management are very dissimilar (eg Self management plans in asthma, oxygen therapy, pulmonary rehab and detection of depression in COPD)



Asthma

Chronic  
Bronchitis

Emphysema

Chronic  
Obstructive  
Pulmonary Disease

So how do we make the differentiation?

# Differentiation of Asthma from COPD

## COPD:

- Onset in mid life
- Symptoms slowly progressive
- Long Smoking History
- Dyspnoea during exercise
- Largely irreversible airflow limitation

## ASTHMA:

- Onset early in life
- Symptoms vary from day to day
- Symptoms at night/early morning
- May have associated allergic disease
- May have family history of asthma
- Largely reversible airflow limitation

# The Diagnosis of asthma

(in other than the very young) is made by :

- History taking and by
- Seeing if the patient fulfils the diagnostic definition of asthma

## History suggests asthma

Symptoms include, cough, wheezing, chest tightness and breathlessness

- Onset early in life
- Symptoms vary form day to day
- Symptoms at night/early morning
- May have associated allergic disease
- May have family history of asthma
- Largely reversible airflow



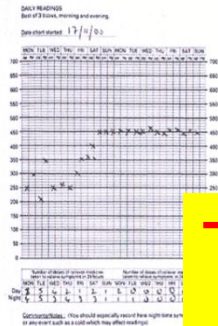
## Carry out a confirmatory diagnostic test

The diagnostic definition of asthma

“Generalised narrowing of the airways which varies over short periods of time either spontaneously or as a result of treatment” may be fulfilled by:

1

Demonstrating variability with time, often most easily done by home peak flow monitoring



2

Assessing the response of spirometry to inhaled bronchodilators (15% change and at least 200mls increase in FEV1)

LUNG FUNCTION TEST REPORT

NHS Trust  
Charing Cross Hospital  
CARDIOLOGY AND RESPIRATORY UNIT  
Lung Function Laboratory 2<sup>nd</sup> Floor North Wing  
76, 750 (664) 7500

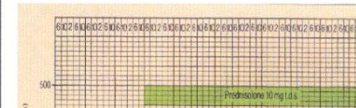
Height: 173.6 cm  
Age: 52 Yrs  
Sex: M  
Weight: 75.3 kg  
First Name: Test Date: 2/19/2003  
Height/Weight: 11.6 gm/dl

ARWAYS (Spirometry)	Measured Result	Result Post Bronchodilator	Predicted Normal Mean (SD)	Range
FEV1	2.00	2.44	3.04 (1.02)	> 2.79
FVC	2.34	3.56	4.07 (1.28)	> 3.62
FEV1/FVC	0.85	0.67	1.14	0.83-0.91
Tidal Volume (L)	1.58	1.37	4.26 (2.82)	> 2.95

Flow Volume Loop - Pre FEV1 Graphic - Pre

3

Assessing response to a trial of inhaled or oral steroids (If the latter 30mg /day for a minimum of 2 weeks.) Look for 20% increase in Peak Flow or 15% change and at least 200mls in FEV1



4

Positive exercise test. Exercise by 6 minutes free running recording Peak Flow (or FEV1) pre, and at 2 minute intervals for 20 minutes after. May induce bronchoconstriction and bronchodilators should be available. Any fall is abnormal; more than 15% diagnostic.



To some extent a diagnosis of COPD is made by excluding asthma



Diagnosis of Asthma confirmed



## Copy of actual referral letter:

*Dear Dr.*

*I would be grateful for your assessment of this 61 year old woman who is of an anxious personality and has required sedatives, antidepressants and beta-blockers in the past. Over the last few months, she has become increasingly short of breath and wheezy on occasions. She stopped smoking 20 years ago having previously smoked approximately 20 a day for 20 years, but otherwise had no respiratory problems.*

*On examination she is overweight, weighing 13 stone and giving her body mass index of 34 as her height is 5'1½". She is not anaemic and her chest has usually been clear with a mild wheeze on occasions and poor expansion. Her predicted peak flow is about 350 but recently, when she was feeling particularly short of breath, a reducing course of steroids over a week did not bring her peak flow above 240. At present, she has a Beclomethasone 100 mcg. inhaler which she takes 2 puffs b.d. and a Ventolin inhaler p.r.n. but I am very unsure as to the reversibility of her respiratory problem and would value your assessment. Her chest x-ray was reported as normal. Many thanks for seeing her."*

## Discussion 1:

1. Note how the GP has carefully thought about other causes of breathlessness (such as anaemia) and mentions her BMI.
2. She stopped smoking 20 years ago and has only recently become short of breath and wheezy. This makes COPD an unlikely diagnosis.
3. Her reduced peak flow does not respond to the steroids (albeit a rather short course) and therefore asthma is an unlikely cause for her recent onset symptoms.
4. The wheeze was monophonic and only present on the right and whilst the chest x-ray was indeed normal, they proceeded to bronchoscopy – this showed an extensive bronchial carcinoma in the right lower lobe extending up into the lower end of the trachea.

## Discussion 2:

**Moral:** Recent onset respiratory symptoms in smokers or ex smokers should always raise the question of a carcinoma and you should never be reassured by a normal chest x-ray.

## Discussion 3

- This is obviously an unusual case and an unusual presentation but it's introduced here to ensure that people don't rush into thinking of the diagnosis of asthma and COPD without going through the logical progression of considering other causes of breathlessness, and thinking carefully about whether any airway obstruction is localised, or generalised.

Airways diseases	Small lung disorders (also known as “restrictive disorders”)
<b>Localised obstruction</b>	<b>Due to disease <i>within</i> the lungs</b>
<ul style="list-style-type: none"> <li>Sleep apnoea</li> <li>Laryngeal carcinoma</li> <li>Thyroid enlargement</li> <li>Vocal cord dysfunction</li> <li>Relapsing Polychondritis</li> <li>Tumours</li> <li>Post tracheostomy stenosis</li> <li>Foreign bodies</li> <li>Bronchopulmonary dysplasia</li> </ul>	<ul style="list-style-type: none"> <li>Sarcoidosis</li> <li>Asbestosis</li> <li>Extrinsic Allergic Alveolitis</li> <li>Fibrosing Alveolitis</li> <li>Eosinophilic pneumonia</li> </ul>
<b>Generalised obstruction</b>	<b>Due to disease <i>outside</i> the lung</b>
<ul style="list-style-type: none"> <li>Asthma</li> <li>C.O.P.D.</li> <li>Bronchiectasis</li> <li>Cystic Fibrosis</li> <li>Obliterative Bronchiolitis</li> </ul>	<ul style="list-style-type: none"> <li>Pleural effusions</li> <li>Pneumothorax</li> <li>Scoliosis</li> <li>Respiratory muscle weakness</li> <li>Obesity</li> </ul>

Infections	Pulmonary vascular disorders
<ul style="list-style-type: none"> <li>Tuberculosis</li> <li>Infective bronchitis</li> <li>Pneumonia</li> <li>Empyema</li> </ul>	<ul style="list-style-type: none"> <li>Pulmonary emboli</li> <li>Pulmonary hypertension</li> </ul>

# Think!

**Cough, breathlessness, wheeze and obstructive spirometry may reflect either:**

- Generalised narrowing of all of the medium or small sized airways or:
- Localised obstruction of a larger more central airway

***Is the wheeze monophonic or polyphonic?***

***Is the wheeze unilateral?***

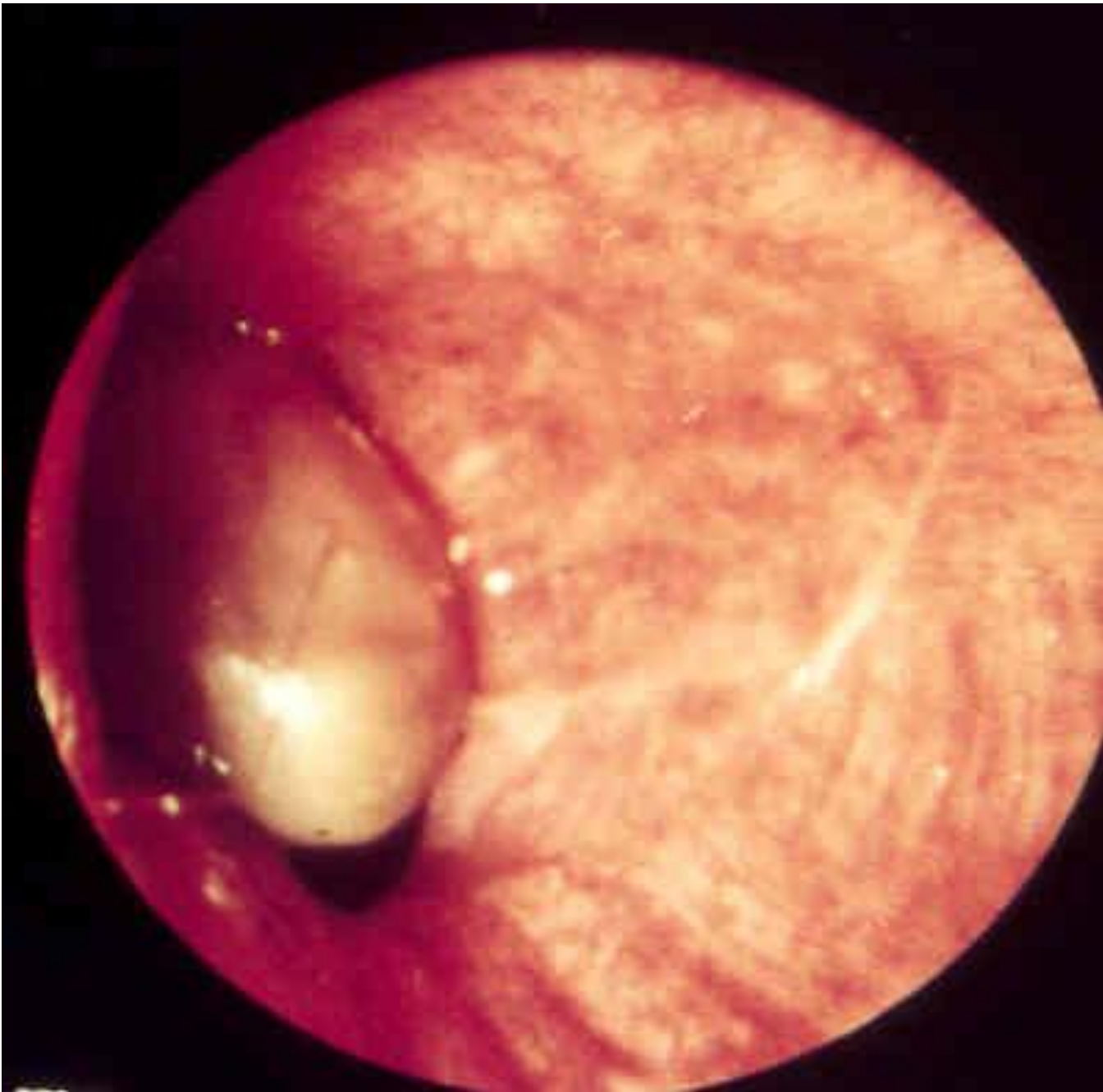
***Is there stridor?***

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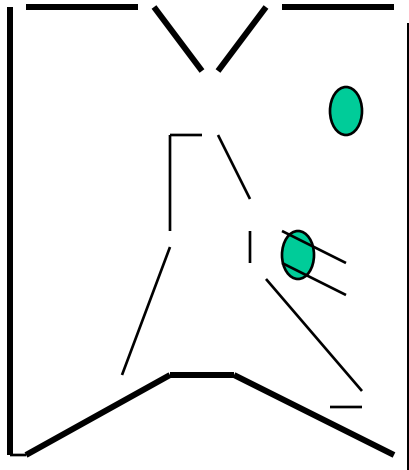
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# Lung Cancer: Possible presentations

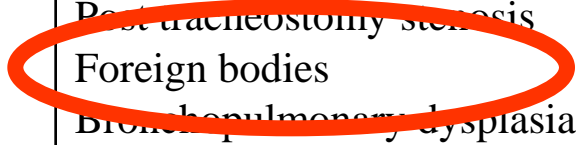


- **Symptoms due to Primary Lesion**
- Cough
- Change in character of longstanding cough
- Haemoptysis
- Breathlessness
- Distal Infection
- Lobar Collapse

Are there other causes of localised obstruction?

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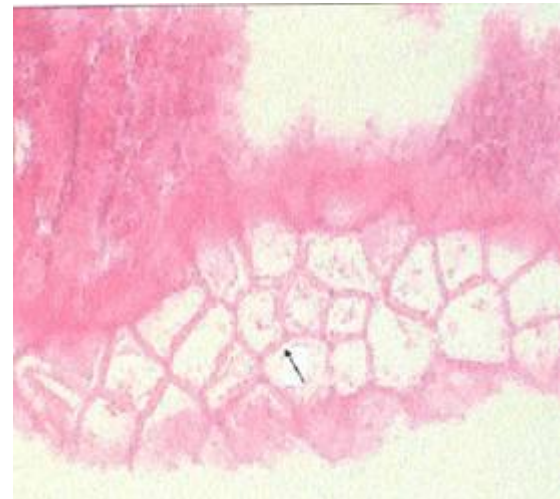
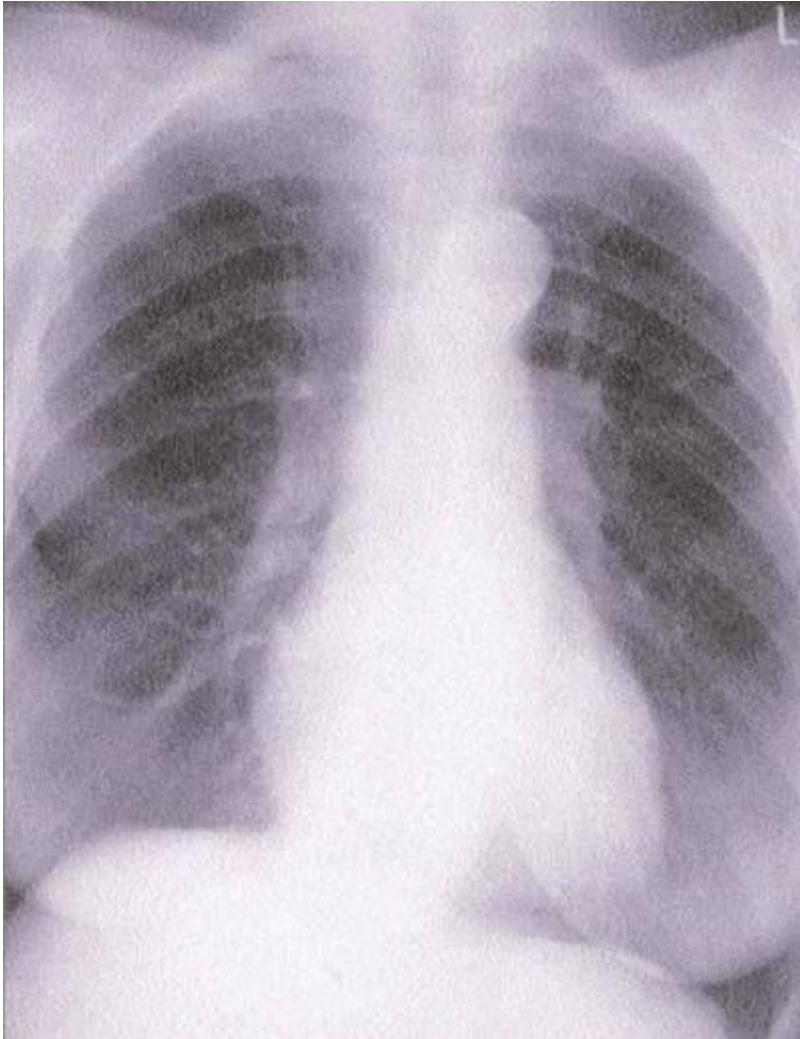
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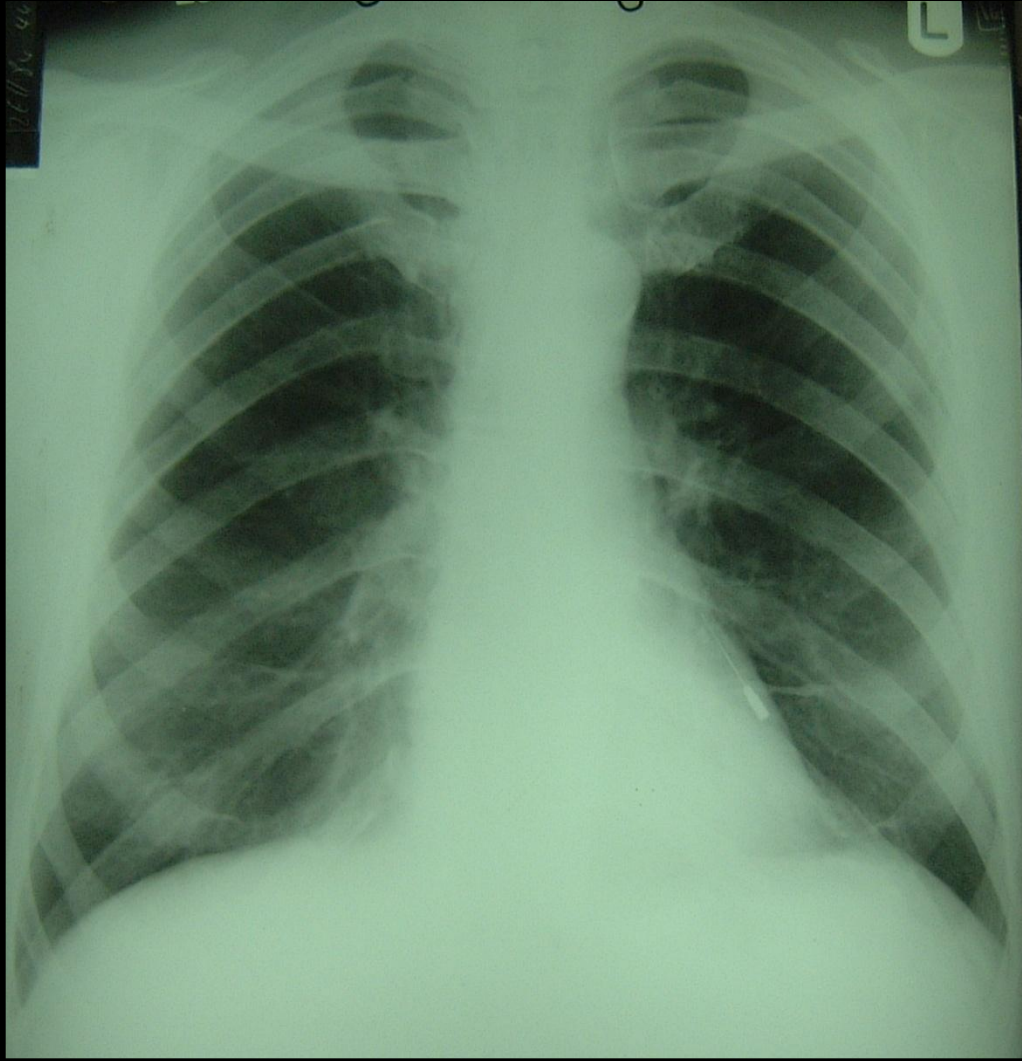
# Foreign body inhalation: Who is at risk?

- Under 2s
- The Elderly
- Those with bulbar disease
- The edentulous
- Alcoholics
- Epileptics
- Anyone unconscious for any reason (eg GA, RTC) or after upper airway local anaesthesia

# 6 months breathlessness and a left sided monophonic wheeze









# Foreign body inhalation

- May present with new onset cough, breathlessness, stridor or distal chest infection
- Always ask about what was happening at the time symptoms began
- May be present with a normal chest radiograph
- Does not always go down the right side!
- Is not excluded by ENT examination

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# Multiple tracheal strictures





## Conclusions:

- Remember that the symptoms of lung disease are shared with disorders of other systems
- If you are sure that you are dealing with lung disease differentiate infections from pulmonary emboli, and small lung disorders from airway disorders
- If the patient has features of airway obstruction differentiate localised obstruction from a generalised disorder,
- Asthma and COPD only rarely occur together and should be differentiated

# Guidelines in abundance; usually disease specific



- TB
- Pneumonia
- Asthma
- Lung Cancer
- Pneumonia
- Sleep apnoea
- Fitness to fly
- COPD
- DPLD
- Pleural Conditions
- Mesothelioma
- Bronchoscopy
- Smoking Cessation, etc

[www.brit-thoracic.org.uk](http://www.brit-thoracic.org.uk)

Thank you