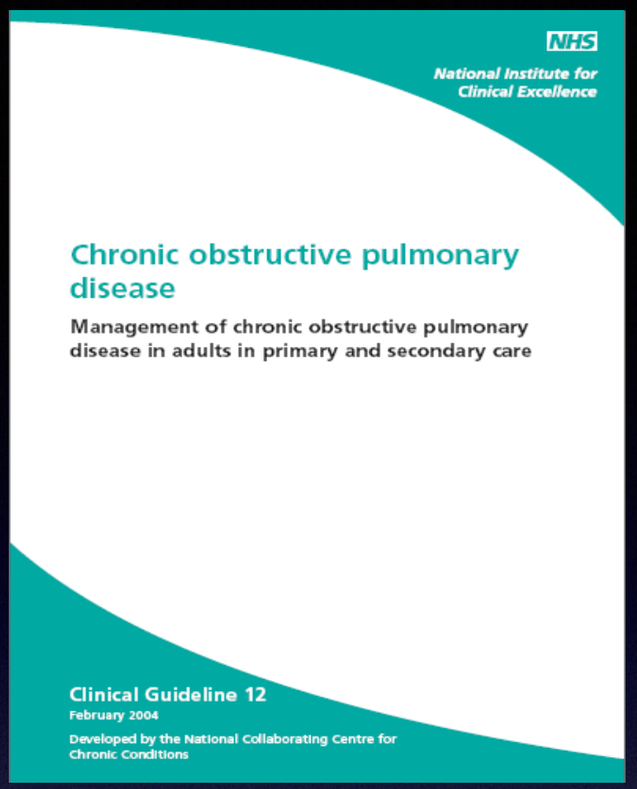
NEW TREATMENTS IN CHRONIC OBSTRUCTIVE LUNG DISEASE

Dr Syed Arshad Husain FRCP, FCCP
Consultant Respiratory Physician
Maidstone Hospital

COPD



- ‘COPD is a disease characterised by airflow limitation’

  => Spirometry is essential to make the diagnosis

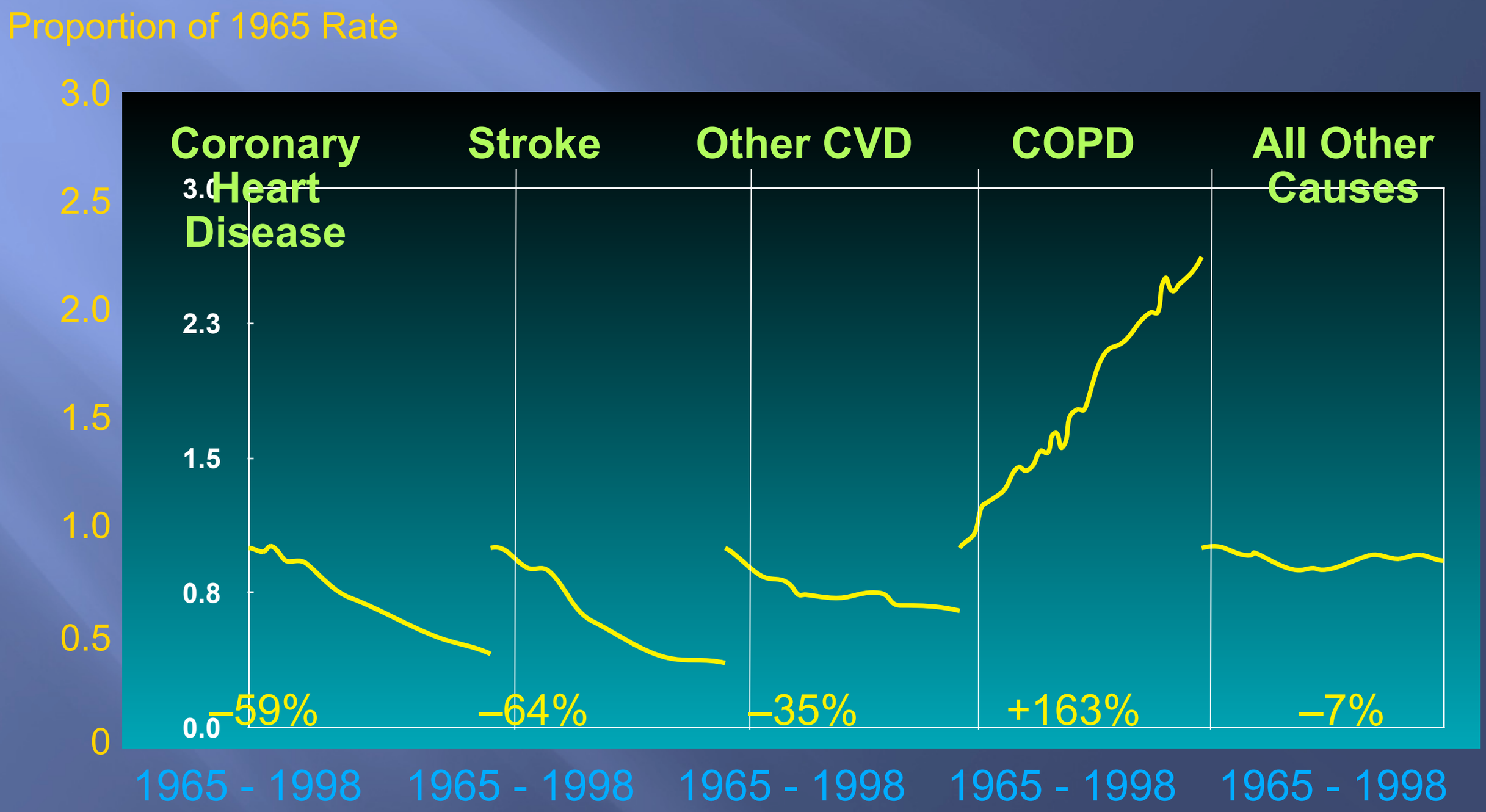
COPD facts

- 2nd most common cause of emergency admission to hospital with ~1/3 of these within a month of discharge1
- 15% admitted to hospital with COPD die within 3 months; 25% die within 1 yr of admission
- Death rates in the UK double the EU average1
- Direct annual cost of COPD to the NHS is over £800 million 1

- Estimated 3 Million people affected in UK 900,000 people in England / Wales are diagnosed as having COPD
- 2 Million still remain undiagnosed
- A total of 32,155 deaths attributed to COPD in 1999 in UK
- Inpatient mortality in 2008 was 7.7%

Percent Change in Age-Adjusted Death Rates, U.S., 1965-1998

COPD will be the third leading cause of death by 2020



ASTHMA

Sensitizing agent

Asthmatic airway inflammation
CD4+ T-lymphocytes
Eosinophils

COPD

Noxious agent

COPD airway inflammation
CD8+ T-lymphocytes
Macrophages
Neutrophils

Airflow limitation

Completely reversible

Not Completely irreversible

Generally over 35-40 years
A smoker or ex-smoker

Presentation with:

1. Cough
2. Excessive sputum production
3. Shortness of breath
4. Dyspnoea is the reason most patients seek medical attention.

1. BTS, 1997; 5. Pauwels, 2001 Slide courtesy A&Z

Pathogenesis of COPD

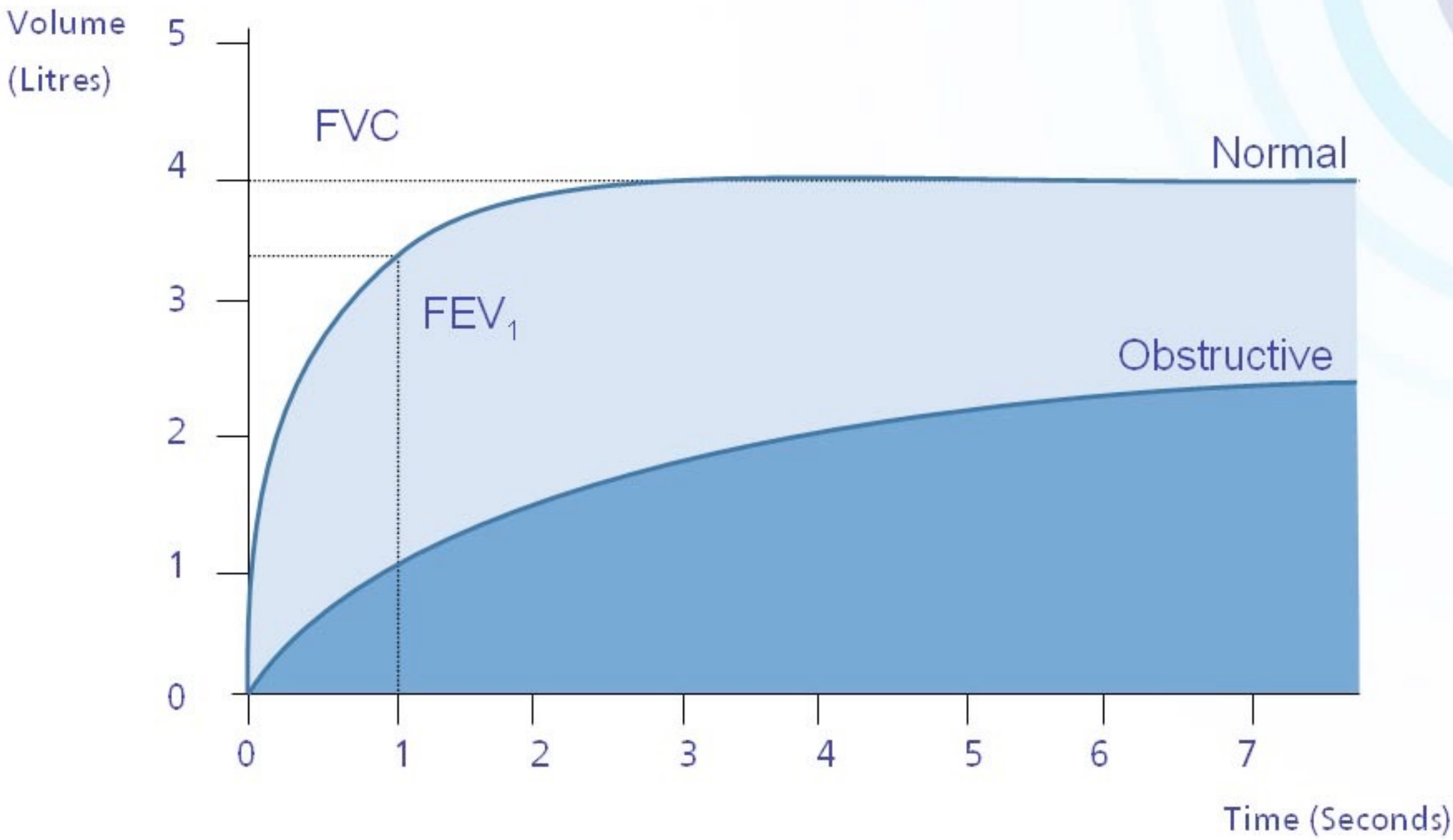
NOXIOUS AGENT
(tobacco smoke, pollutants, occupational agent)

COPD

Assessing severity of COPD MRC SCALE

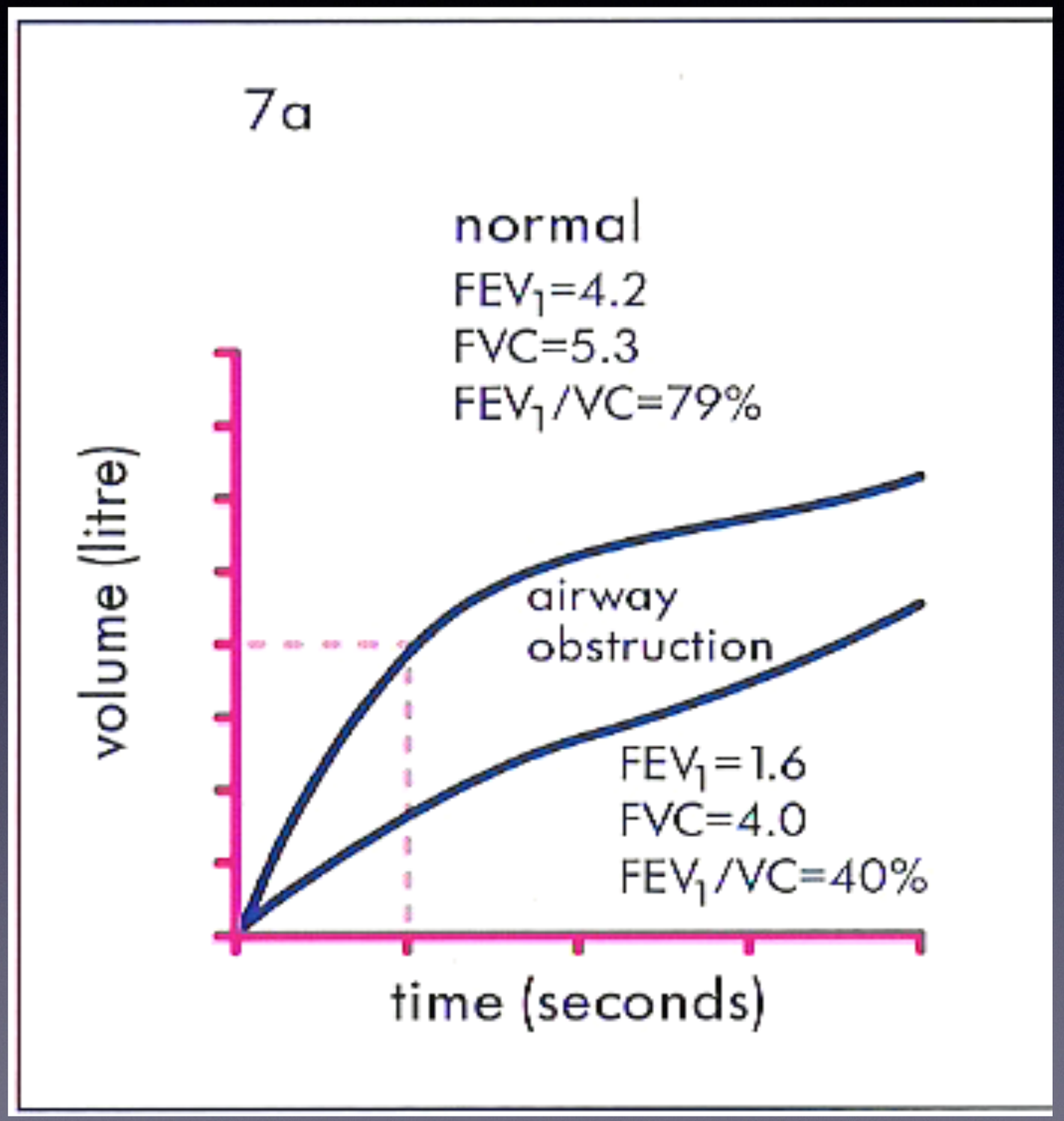
Grade	Degree of breathlessness related to activities
1	Not troubled by breathlessness except on strenuous exercise
2	Short of breath when hurrying or walking up a slight hill
3	Walks slower than contemporaries on the level because of breathlessness, or has to stop for breath when walking at own pace
4	Stops for breath after walking about 100m or after a few minutes on the level
5	Too breathless to leave the house, or breathless when dressing or undressing

SPIROMETRY CONTINUED

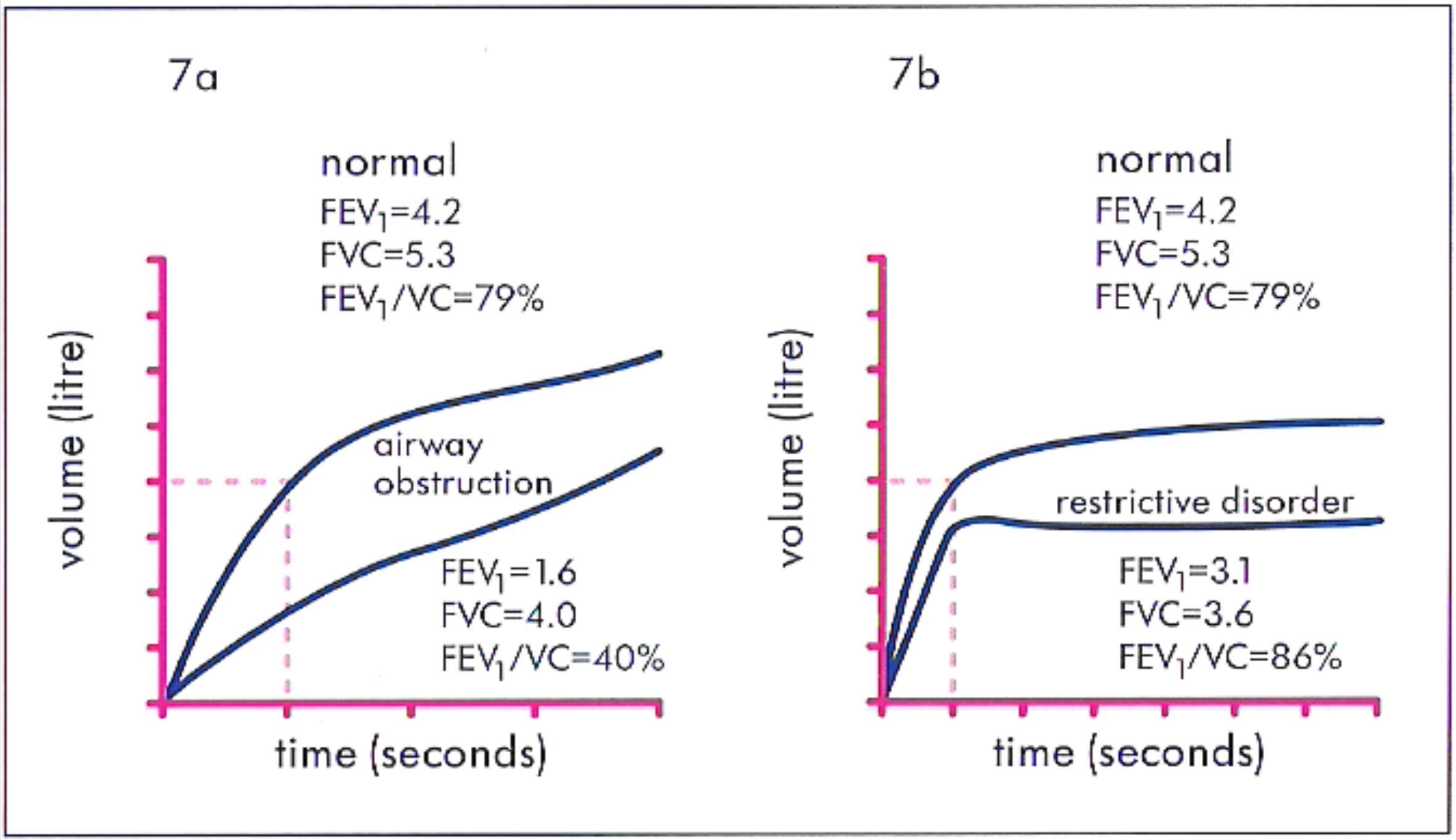


Diagnosis of COPD on spirometric grounds

- $FEV_1/FVC < 70\%$
- $FEV_1 < 80\%$

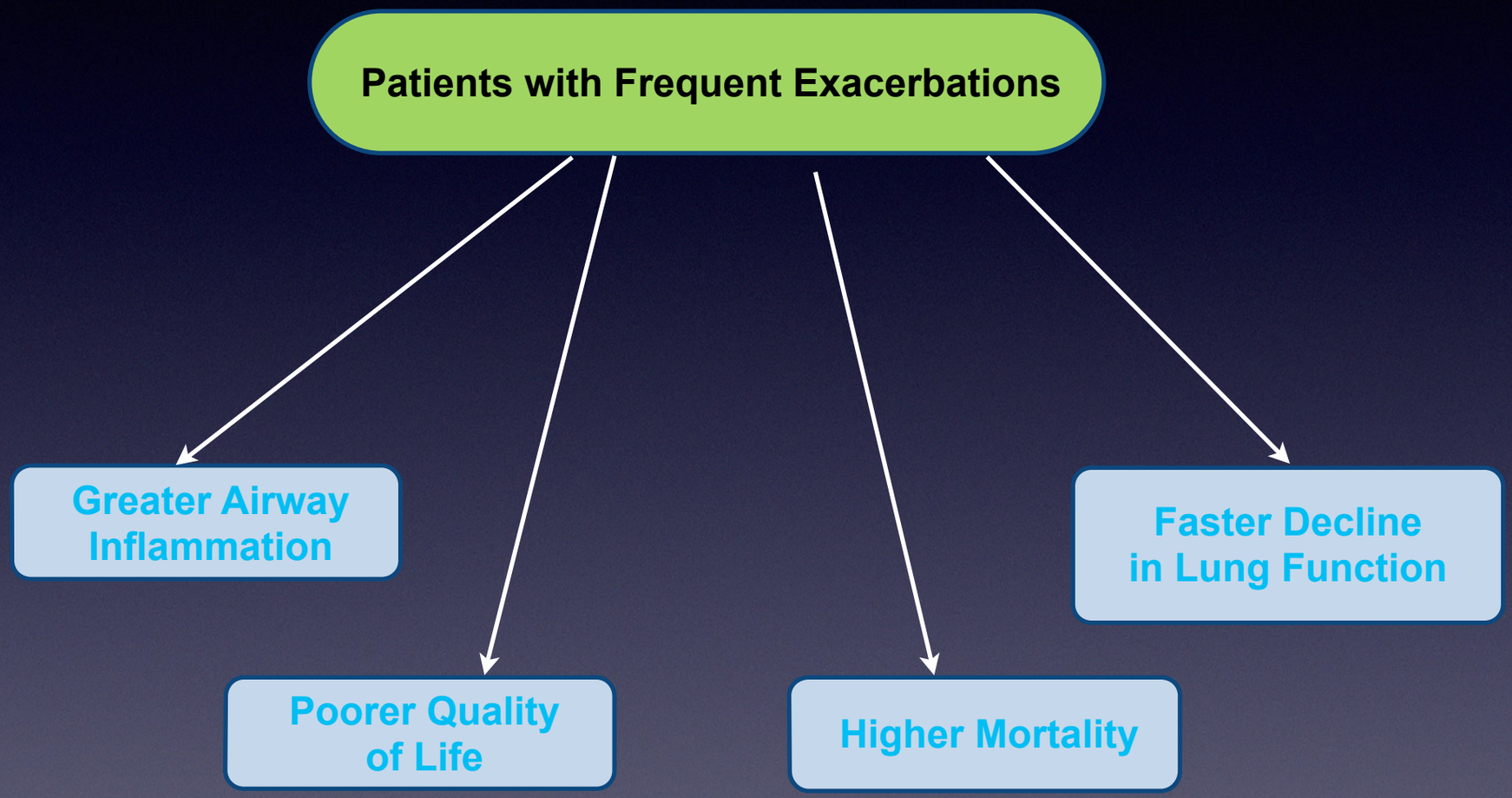


Basic spirometry



Disease Trajectory of patients with COPD exacerbations

Impact of Exacerbations on COPD



COPD severity classification

		NICE 04 / 10	ATS/ ERS	GOLD
Post Bronchodilator FEV1/FVC	FEV1% predicted	severity	severity	severity
<0.7	=or>80%	Mild	Mild	Stage 1– Mild
<0.7	50-79%	Mild / Moderate	Moderate	Stage 2- Moderate
<0.7	30-49%	Moderate / Severe	Severe	Stage 3- Severe
<0.7	<30%	Severe / Very Severe	Very Severe	Stage 4-Very Severe

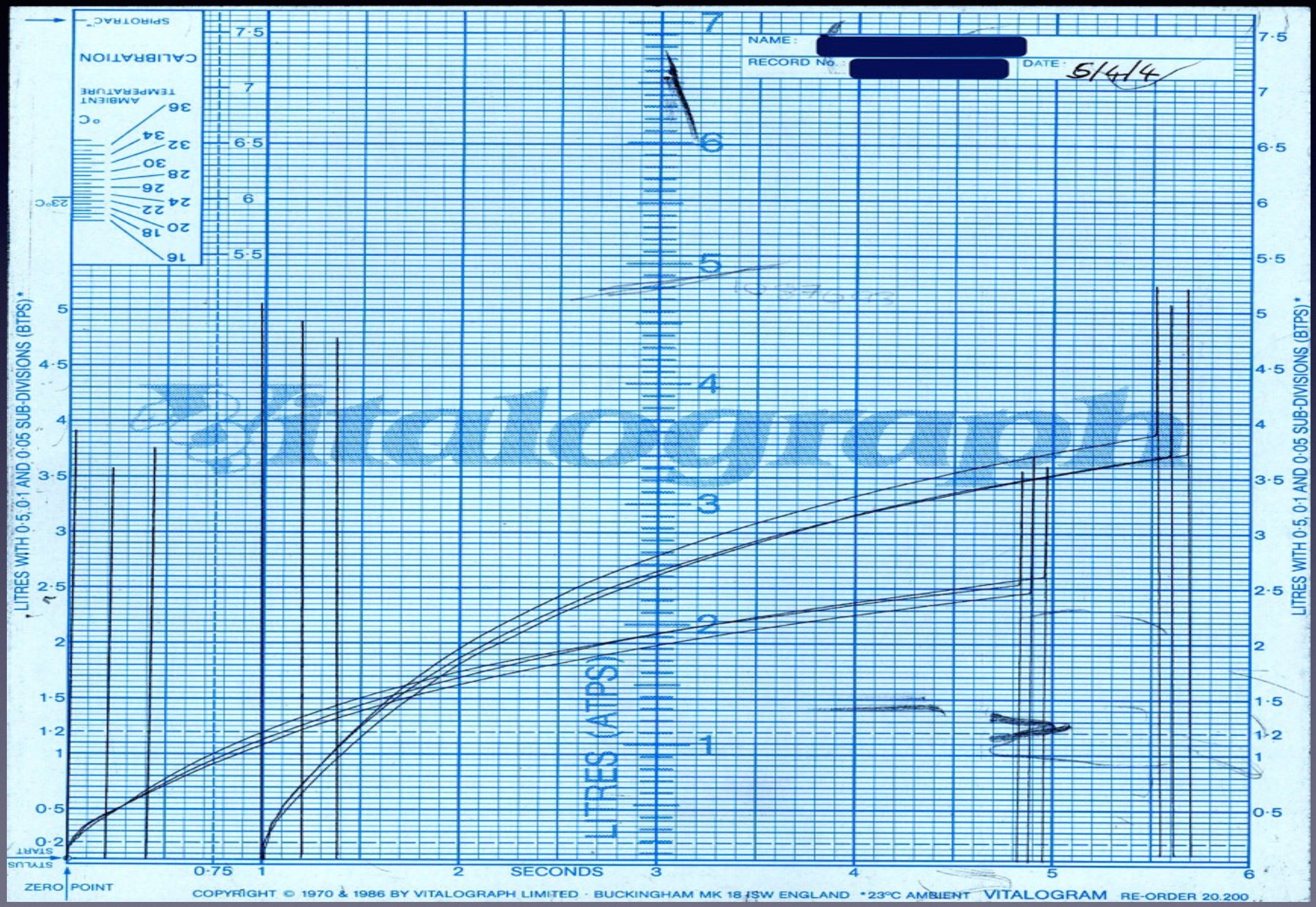
Disability is poorly reflected in FEV1

- Degree of airflow obstruction
- Frequency of Exacerbation
- Poor prognostic factors
- MRC Breathlessness
- PaO2
- Cor-Pulmonale

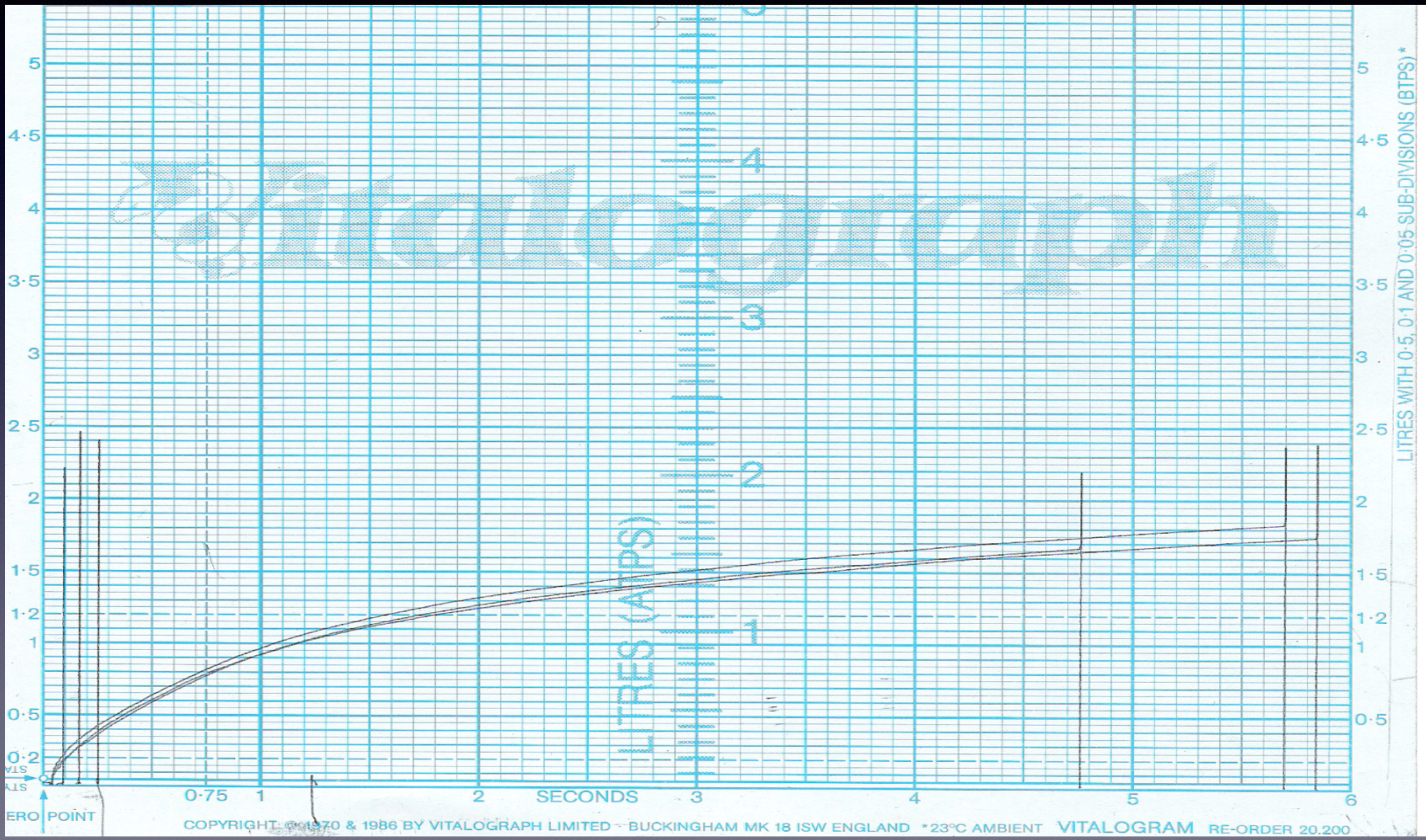
BODE Index

- BMI
- Airways Obstruction
- Dypnsoea
- Exercise tolerance

Spirometry


SPIROTRAC
CALIBRATION
AMBIENT TEMPERATURE
°C
NAME:
RECORD No.
DATE: 5/4/14
LITRES WITH 0·5, 0·1 AND 0·05 SUB-DIVISIONS (BTPS)*
LITRES (ATPS)
SECONDS
0·75
ZERO POINT
START
STYLUS
COPYRIGHT © 1970 & 1986 BY VITALOGRAPH LIMITED · BUCKINGHAM MK 18 1SW ENGLAND *23°C AMBIENT
VITALOGRAM
RE-ORDER 20.200

Mr SH


LITRES (ATPS)
SECONDS
0·75
1
2
3
4
5
6
5
4·5
4
3·5
3
2·5
2
1·5
1·2
1
0·5
0·2
0
ERO POINT
LITRES WITH 0·5, 0·1 AND 0·05 SUB-DIVISIONS (BTPS)*
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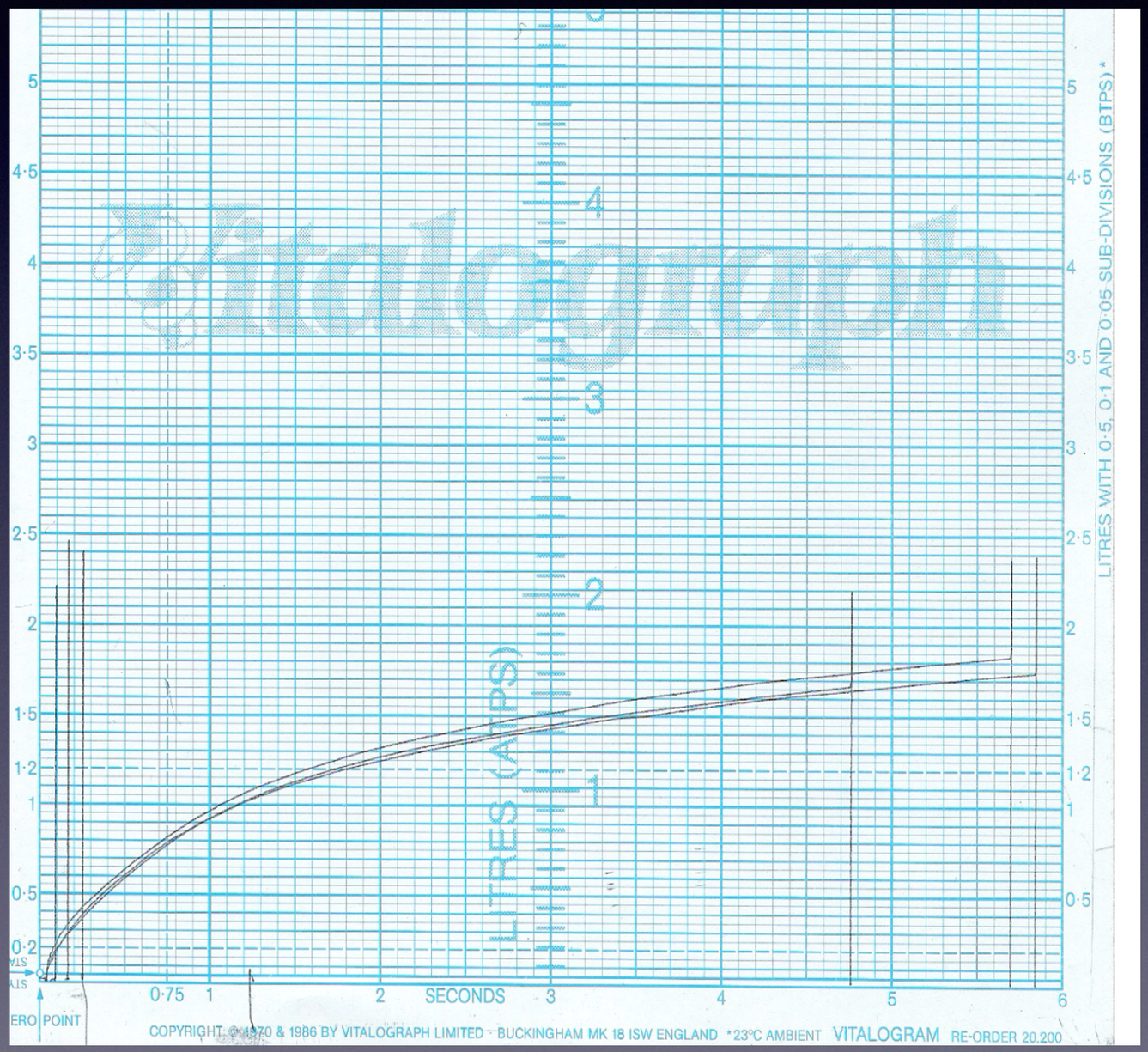
Mr SH



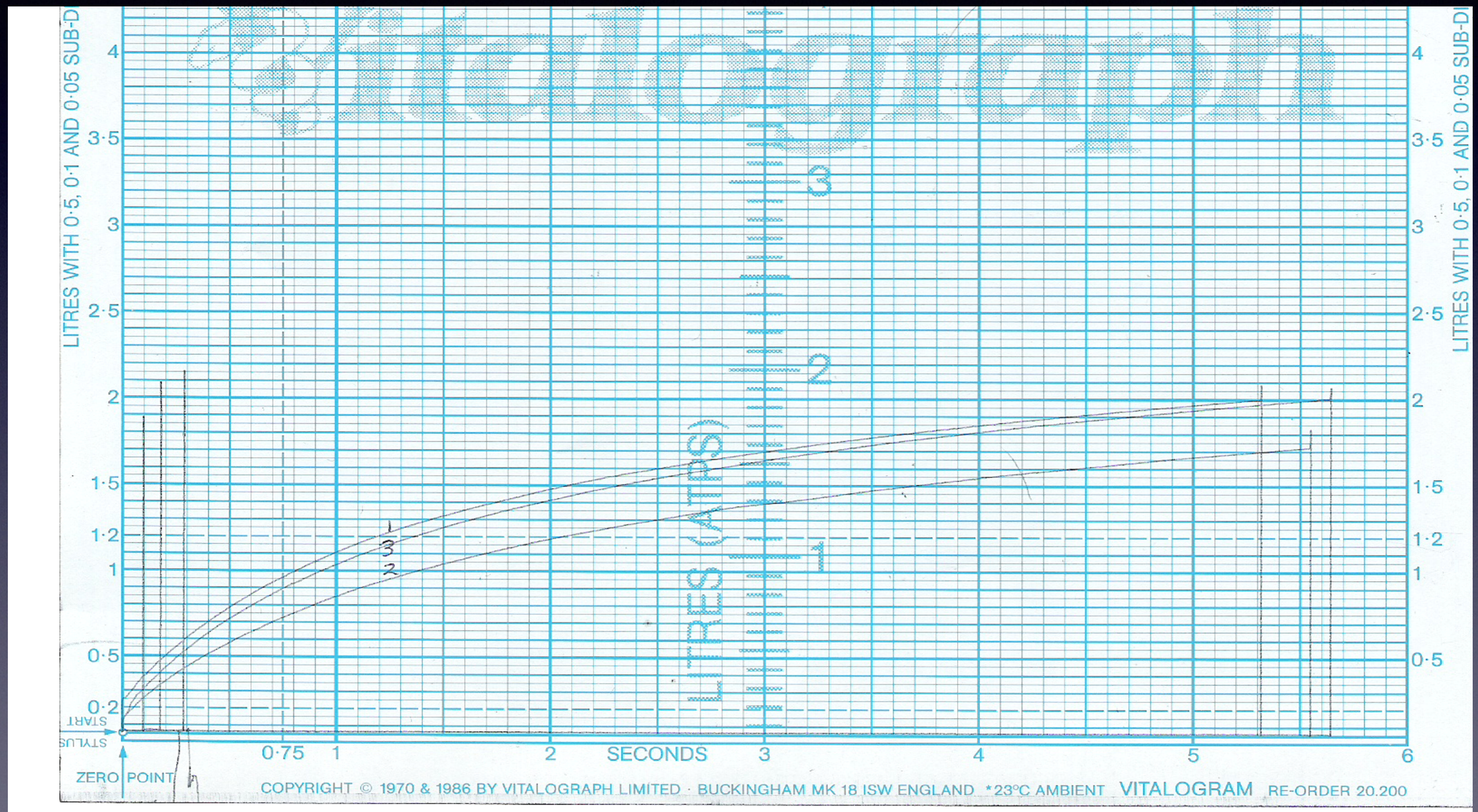
Predicted FEV1 2.0 litres
Predicted FVC 2.4 litres

Actual FEV1 0.9 litres
Actual FVC 1.8 litres

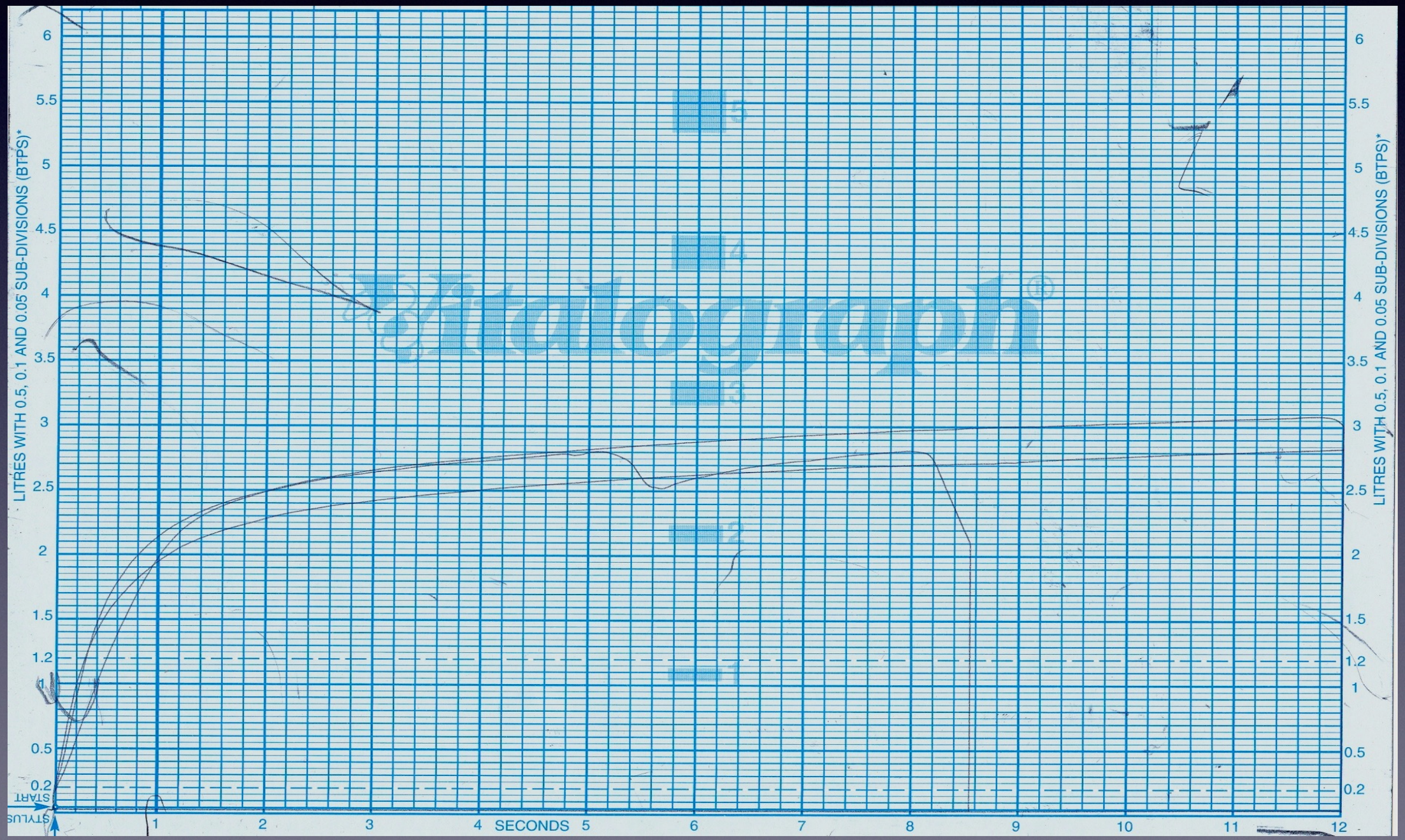
(FEV1 45% predicted)

(FEV1/FVC ratio 50%)

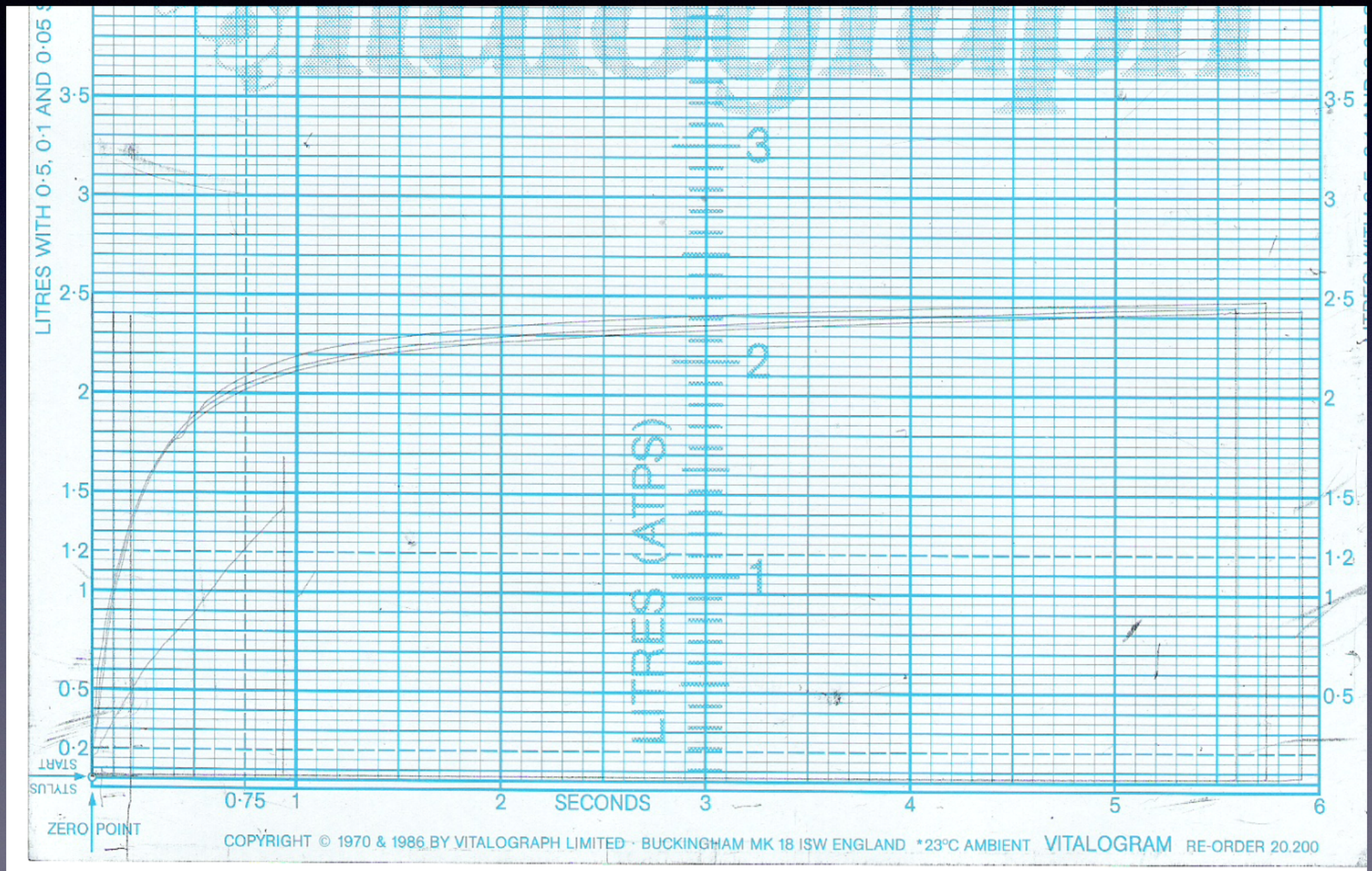
Common Pitfalls



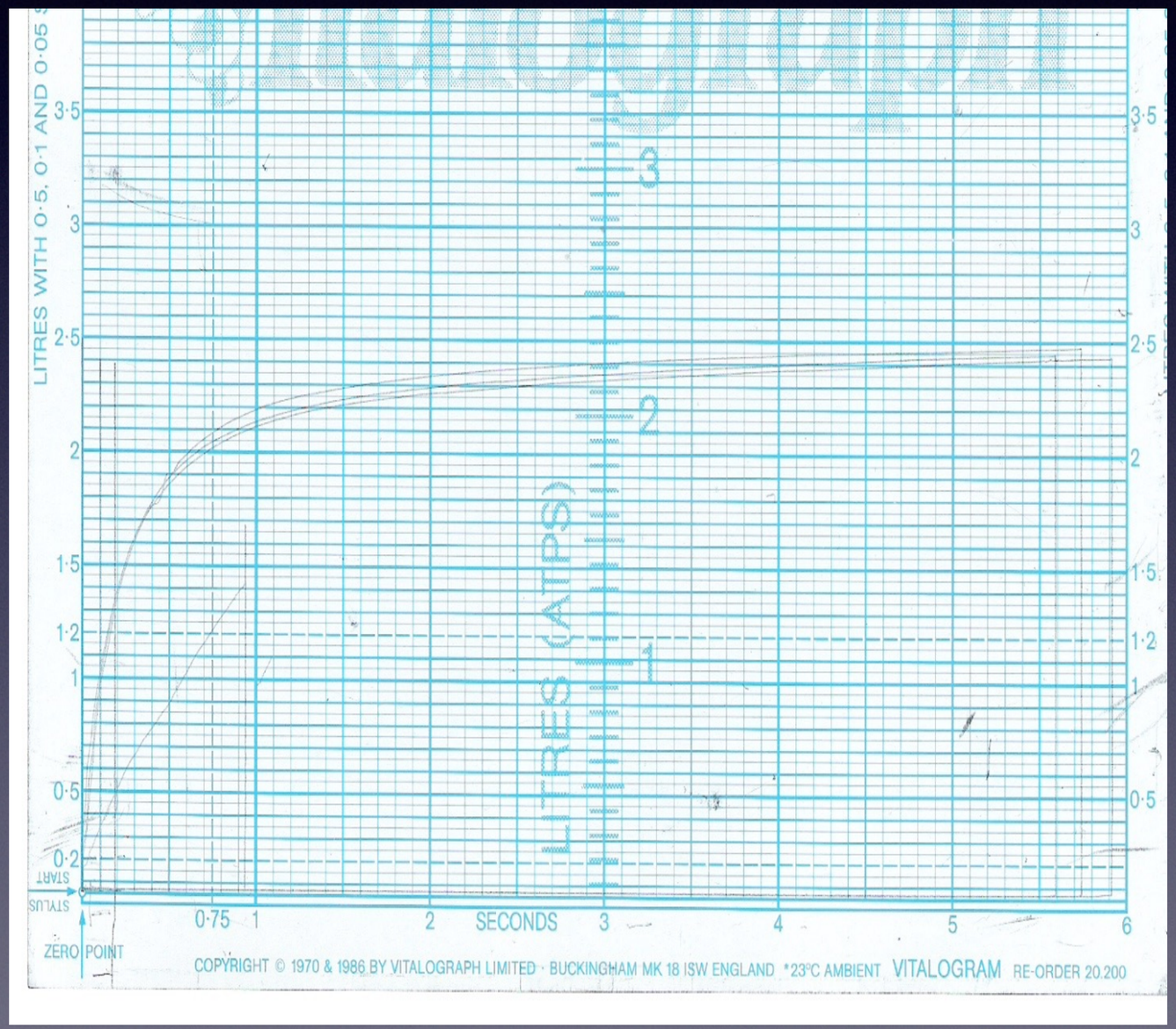
Common Pitfalls



Mr JJ


LITRES WITH 0·5, 0·1 AND 0·05
3·5
3
2·5
2
1·5
1·2
1
0·5
0·2
START
STYLUS
ZERO POINT
0·75
1
2
SECONDS
3
4
5
6
FREE (AIR) VOLUME
COPYRIGHT © 1970 & 1986 BY VITALOGRAPH LIMITED · BUCKINGHAM MK 18 ISW ENGLAND *23°C AMBIENT
VITALOGRAM
RE-ORDER 20.200

Mr JJ



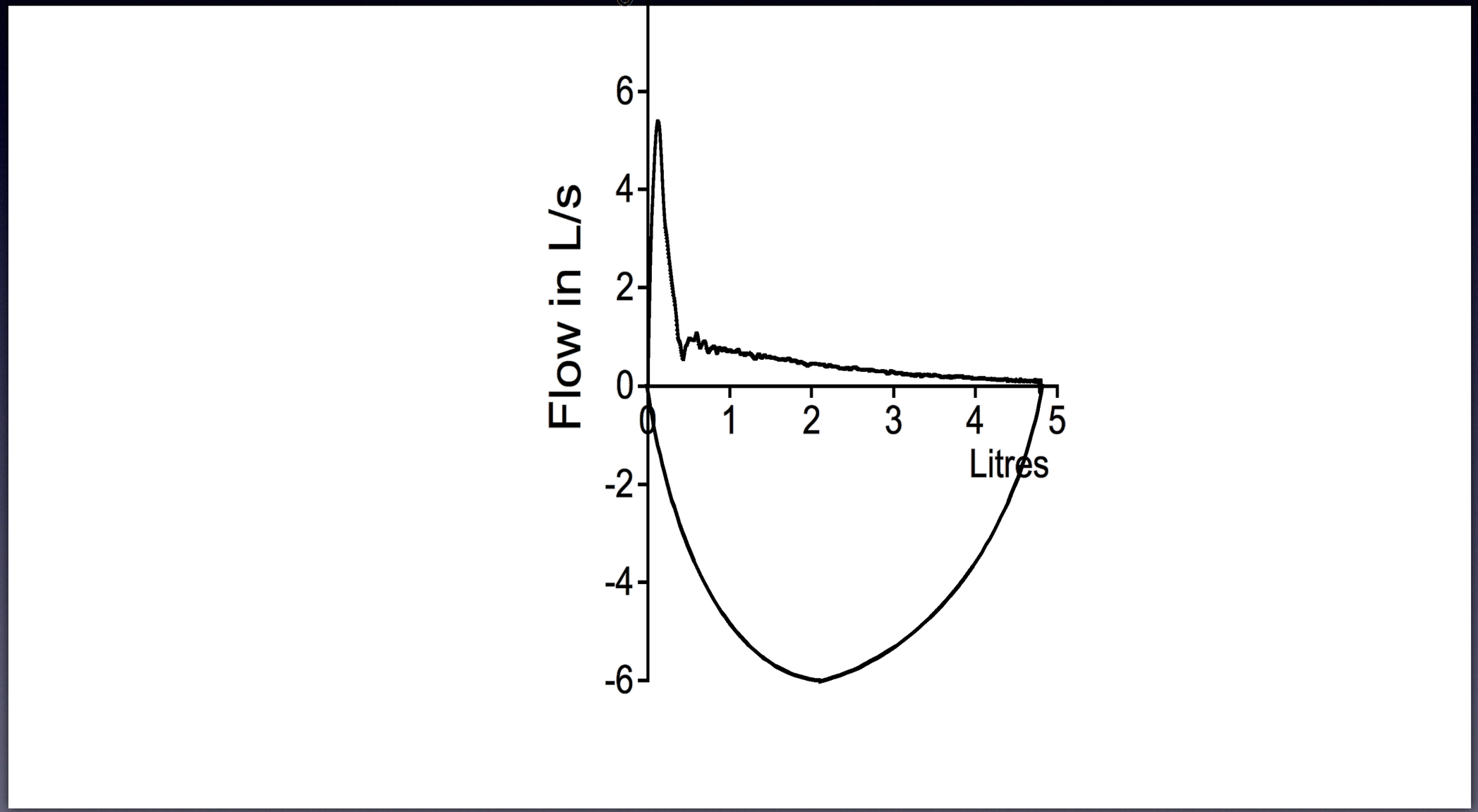
Predicted FEV1 3.0 litres
Predicted FVC 3.8 litres

Actual FEV1 2.2 litres
Actual FVC 2.4 litres

FEV1/FVC ratio 92%

Emphysema - Flow/Volume loop

pressure dependent airways collapse



BREATHLESSNESS AND EXERCISE LIMITATION

Stop therapy if ineffective

- Use short-acting bronchodilator prn ($beta_2$-agonist or anticholinergic)
- If still symptomatic try combined therapy with a short-acting $beta_2$-agonist and a short-acting anticholinergic
- If still symptomatic use a long-acting bronchodilator ($beta_2$-agonist or anticholinergic)
- In moderate or severe COPD:
  If still symptomatic consider a trial of a combination of a long-acting $beta_2$-agonist and inhaled corticosteroid. Discontinue if no benefit after 4 weeks
- If still symptomatic consider adding theophylline

- Offer pulmonary rehabilitation to all patients who consider themselves functionally disabled (usually MRC grade 3 and above)

- Consider referral for surgery: bullectomy, LVRS, transplantation

Algorithm 2a:

Breathlessness & exercise limitation

SABA or SAMA PRN

FEV1>50%

Exacerbations or persistent SOB

LABA

LAMA Discontinue SAMA

LAMA preferred over regular SAMA

FEV1<50%

LABA +ICS in a combination inh

Consider LABA+ LAMA if ICS not tolerated

LAMA Discontinue SAMA

LAMA over 4times a day SAMA

Persistent exacerbations or SOB

LABA+ICS in a combination inhaler

Consider LABA & LAMA if ICS declined or not tolerated

LAMA+ LABA +ICS in a combination inhaler

Ref: COPD NICE Guidelines Jun 2010

Bronchodilators:

- Methylxanthines: Phosphodiesterase inhibitors increases intracellular c AMP within Smooth muscles weary of Toxicity & S/E

- Aminophylline
- Theophylline

Bronchodilators:

- Anticholinergics: Block Muscuranic receptors fuctional in COPD (Acts by Inhibiting resting bronchomotor tone)
  - Short acting(SAMA): Ipratropium
  - Long acting(LAMA): Tiotropium, Oxitropium, Umeclidinium Bromide, Eclira Genuair, Glycopyronium

Bronchodilators:

- Beta Agonists: Increase c AMP within many cells promote smooth muscle relaxation and bronchodilatation
  - Short Acting (SABA): Salbutamol, Terbutaline
  - Long Acting (LABA): Salmetrol, Efometrol, Indacatrol

Anti-inflammatory agents

- Corticosteroids: Reduce inflammation of bronchial mucosa, inhibit Phospholipase A2 and block inflammatory mediators
  - Prednisolone
  - ICS (Fluticasone, Beclomethasone, Budenoside)
- Combination Inhalers (LABA+ICS)
  - Seretide (Salmetrol / Fluticasone)
  - Symbicort (Efometrol / Budenoside)
  - Relvar Ellipta(Fluticasone Furoate / Vilanterol)
  - Fostair(Beclometasone / Formoterol fumarate)

ICS / LABA Combinations in Asthma at step 3 / 4

- Seretide-Fluticasone / Salmetrol 250
- Symbicort -Budesonide / Formoterol fumarate 200/6, 400/12 1-2 Puff bd
- Fostair-Beclometasone / Formoterol fumarate 100/6 2Puff BD
- Relvar Ellipta-Fluticasone Furoate / Vilanterol 92/22mcg 184/22 mcg OD

For COPD

Relvar Ellipta

Relvar delivers sustained 24-hour improvement in lung function compared with an established ICS/LABA Lung function data Quality of life data Compared with ICS alone

Improved reduction in exacerbations

More symptom-free and rescue-free days
Improvement in lung function

COPD New range Inhalers

Anoro® Ellipta®
(umeclidinium bromide/
vilanterol)

Relvar® Ellipta®
(fluticasone furoate/
vilanterol)

Incruse® Ellipta®
(umeclidinium bromide)

Relvar® Ellipta® (FF/VI) 92/22mcg

INDICATIONS:

COPD: Symptomatic treatment of adult patients with COPD with FEV1<70% and an exacerbation history despite regular bronchodilator therapy (92/22mcg only)

ASTHMA: Regular treatment of asthma patients >12 years uncontrolled on ICS & as needed SABA (92/22mcg & 184/22mcg)

Seretide Accuhaler

- 500 mcg

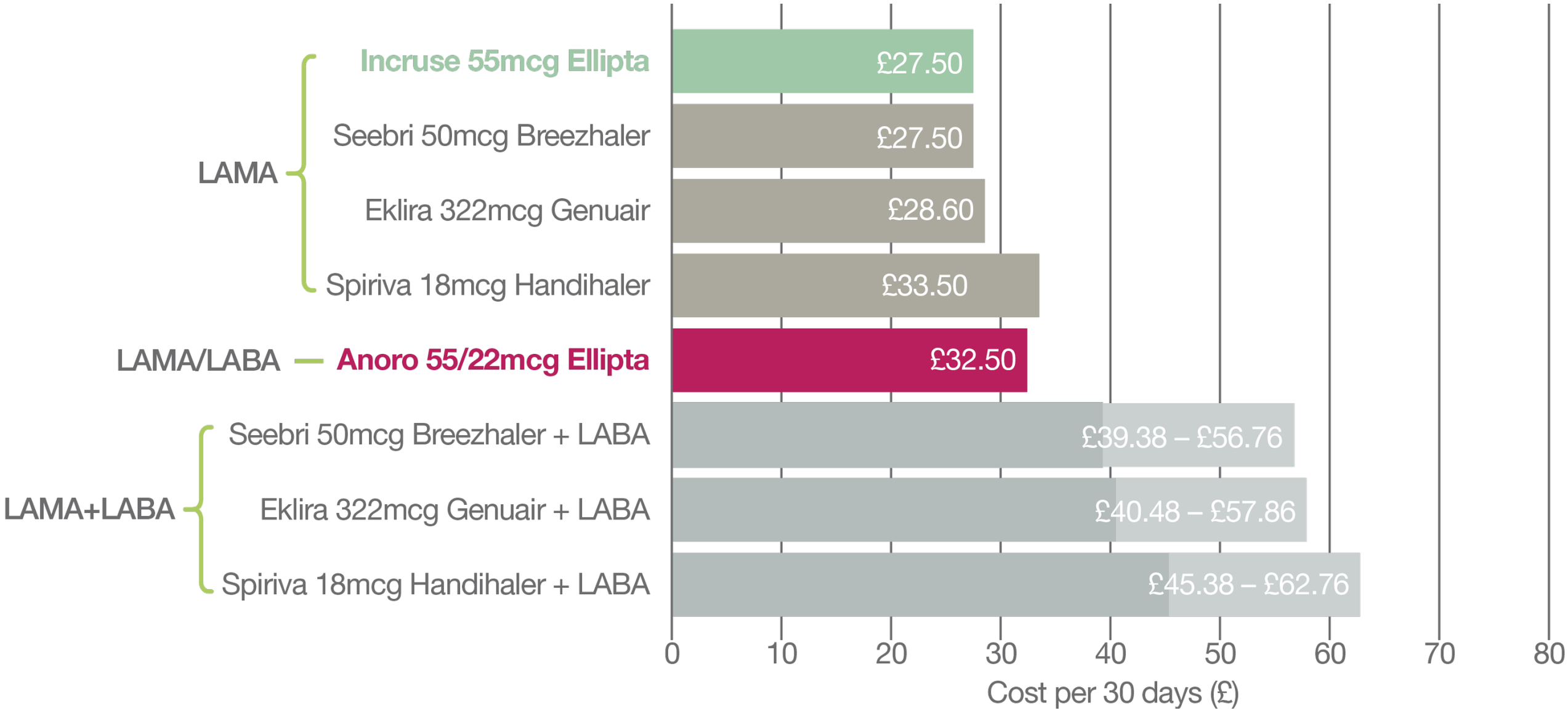
HANDIHALER

- Long-acting anticholinergic
- Stop combivent, use salbutamol
- Once daily
- Aids compliance

DRY POWDER INHALERS

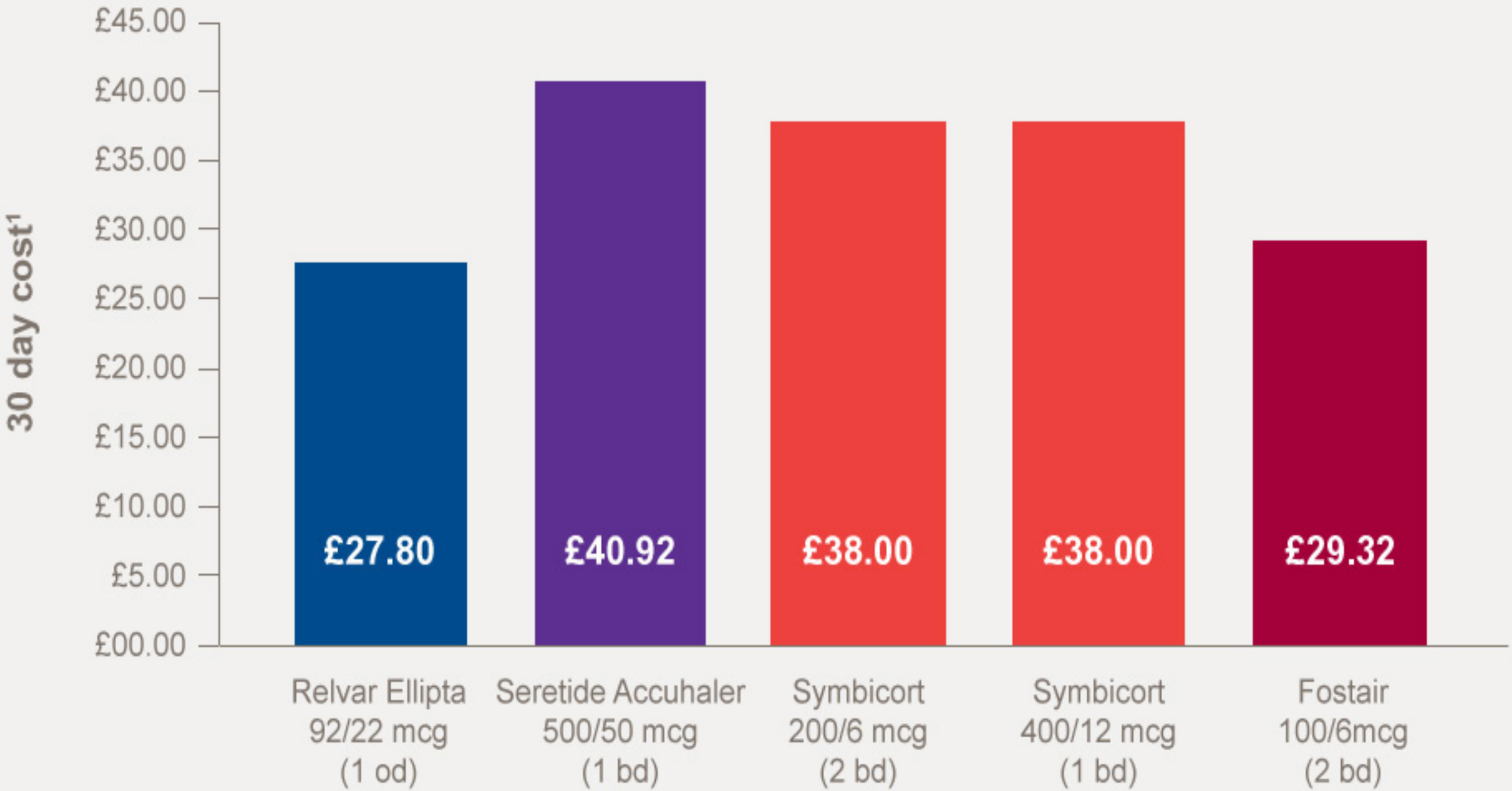
Bronchodilators cost comparison

30-day treatment cost comparison of Incruse® Ellipta® & Anoro® Ellipta® vs. other LAMAs & LABAs*



– *The price of Spiriva® HandiHaler® (18mcg) and Spiriva® Respimat® (2.5mcg) are both £33.50[1]

– Reference: 1. eMIMS Acessed July 2014.



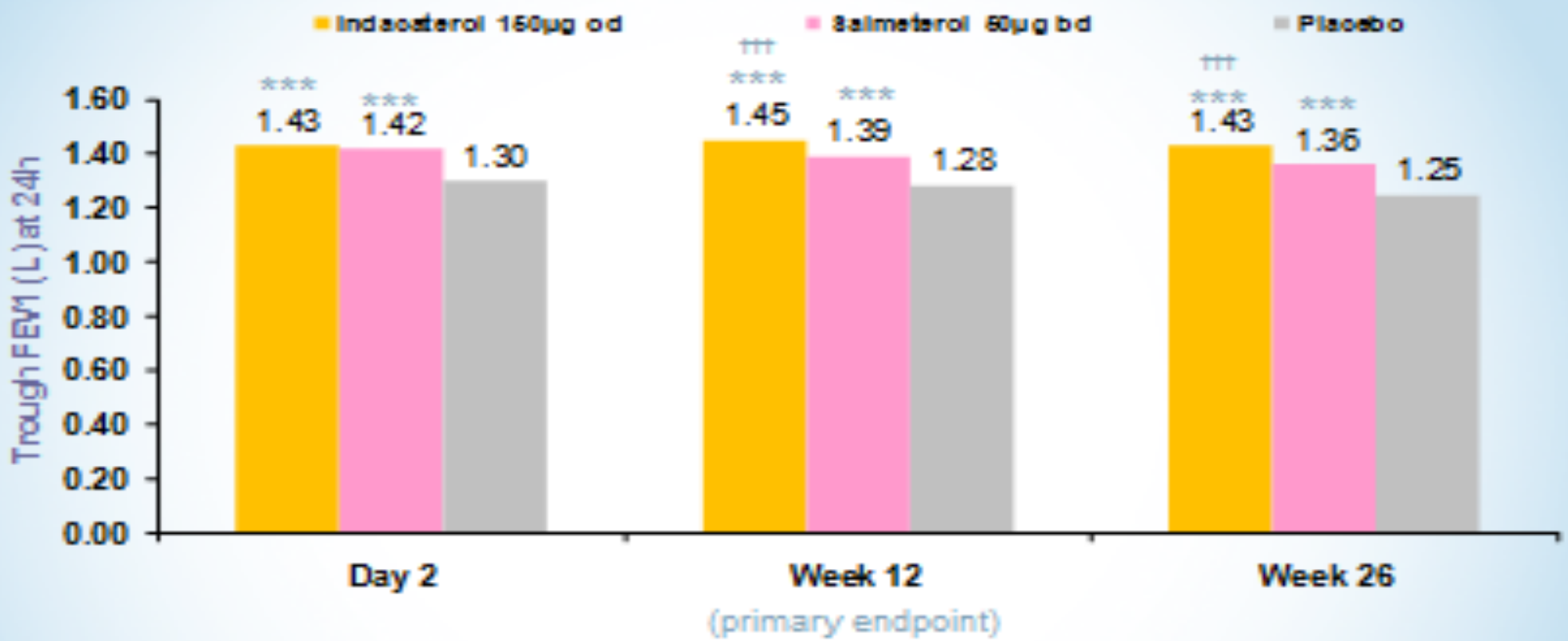
– Reference: 1. eMIMS Acessed July 2014.

Indacaterol in COPD

- Indacaterol is a Long-Acting Beta2 Agonist (LABA) indicated for maintenance bronchodilator treatment of airflow obstruction in adult patients with chronic obstructive pulmonary disease (COPD)
- The recommended dose is one 150 microgram capsule once a day, using the Indacaterol (Onbrez Breezhaler) inhaler.
  The dose should only be increased on medical advice
- One 300 microgram capsule once a day, using the Indacaterol inhaler has been shown to provide additional clinical benefit with regard to breathlessness, particularly for patients with severe COPD
  The maximum dose is 300 microgram once daily

INLIGHT2
Indacaterol vs Salmetrol

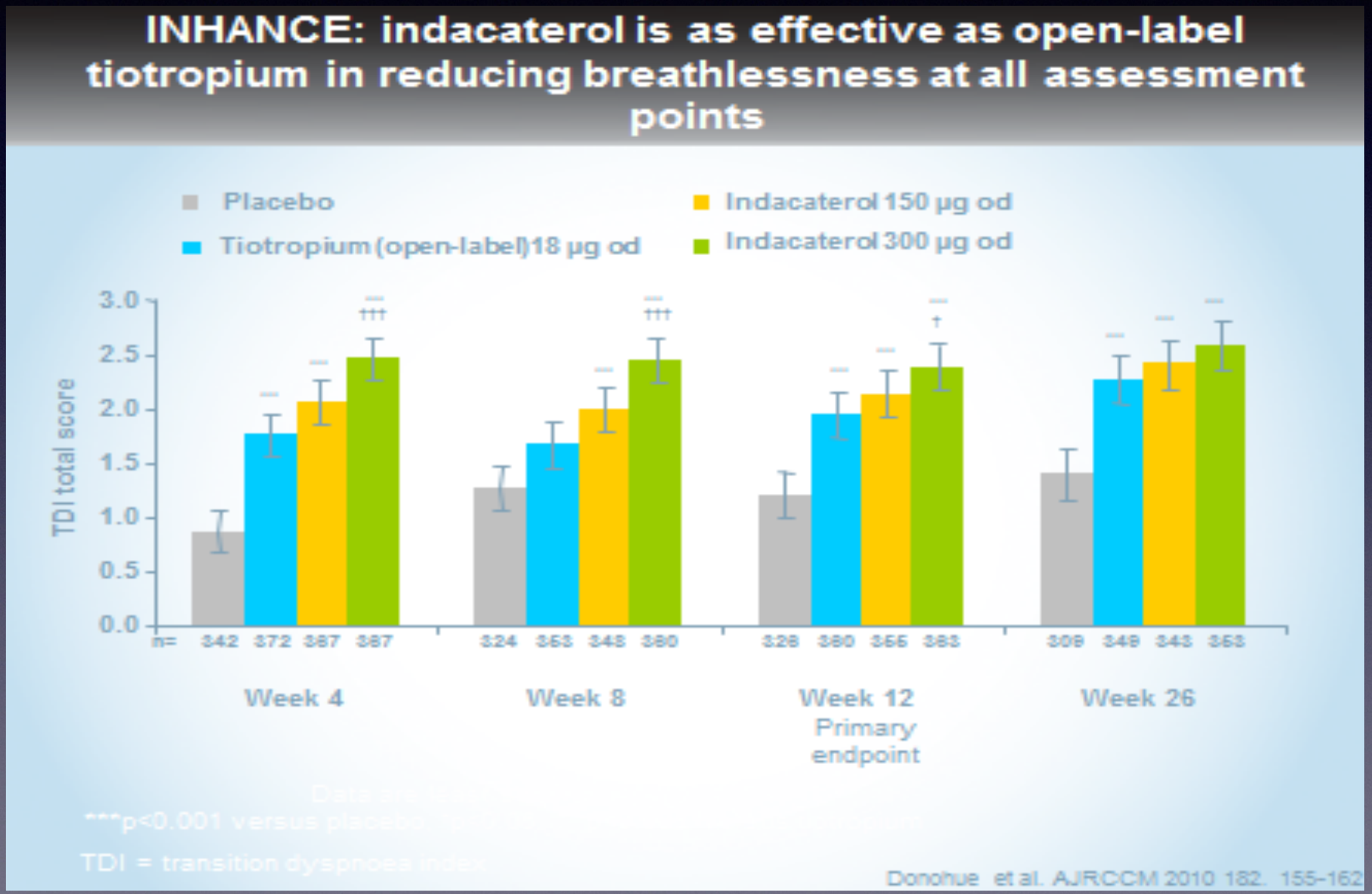
Statistically significant sustained improvement in trough FEV1 vs salmeterol at 6 months



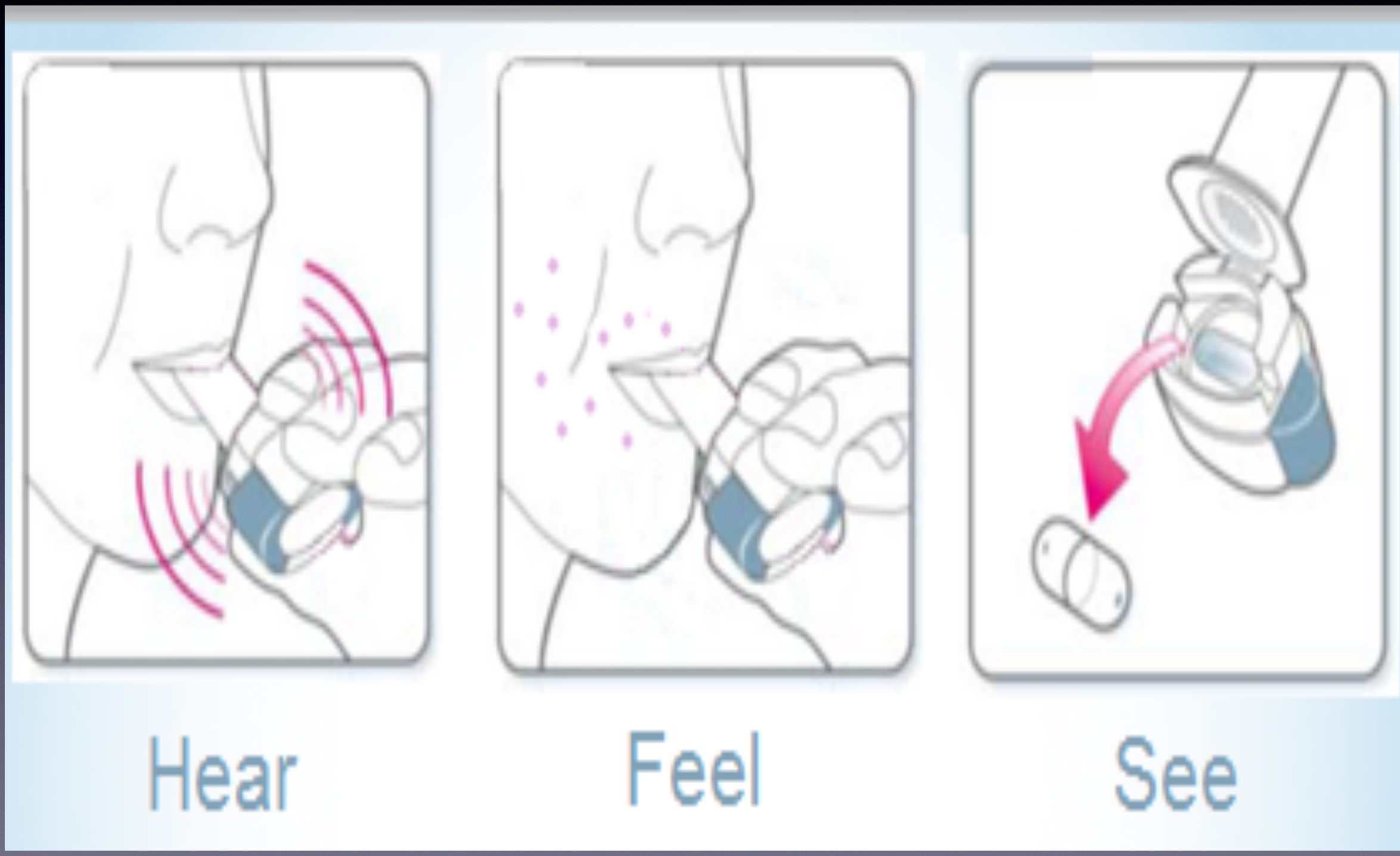
Data are least squares means
Treatment differences: ***p<0.001 vs placebo;†††p<0.001 vs salmeterol

Kornmann O et al. Eur Respir J 2011, 37, 273-279.

Inhance Study Results



Usage of Indacaterol Breezehaler



Ultibrobreeze haler

- Gycopyronium/Indecaterol

The TORCH Study

Calverley PMA, et al. N Engl J Med 2007;356:775–89

- Comparing combination with salmeterol alone over three years:

	Salmeterol 50mcg only	Salmeterol + fluticasone (50/500mcg)	P value
All-cause mortality (primary endpoint)	**13.5%**	**12.6%**	**0.48 NS**
Moderate/severe exacerbations	0.97/yr	0.85/yr	0.002
Exacerbations requiring hospitalisation	0.16/yr	0.16/yr	0.79 NS
Pneumonia	13.3% (0.04/yr)	19.6% (0.07/yr)	<0.001

- NNT to prevent one moderate to severe exacerbation in one year is 8 (combination vs. salmeterol alone)

UPLIFT:Objective

- Describe the effects of long-term treatment with tiotropium in patients in GOLD stage II* (Mild NICE†), from the UPLIFT trial[1].

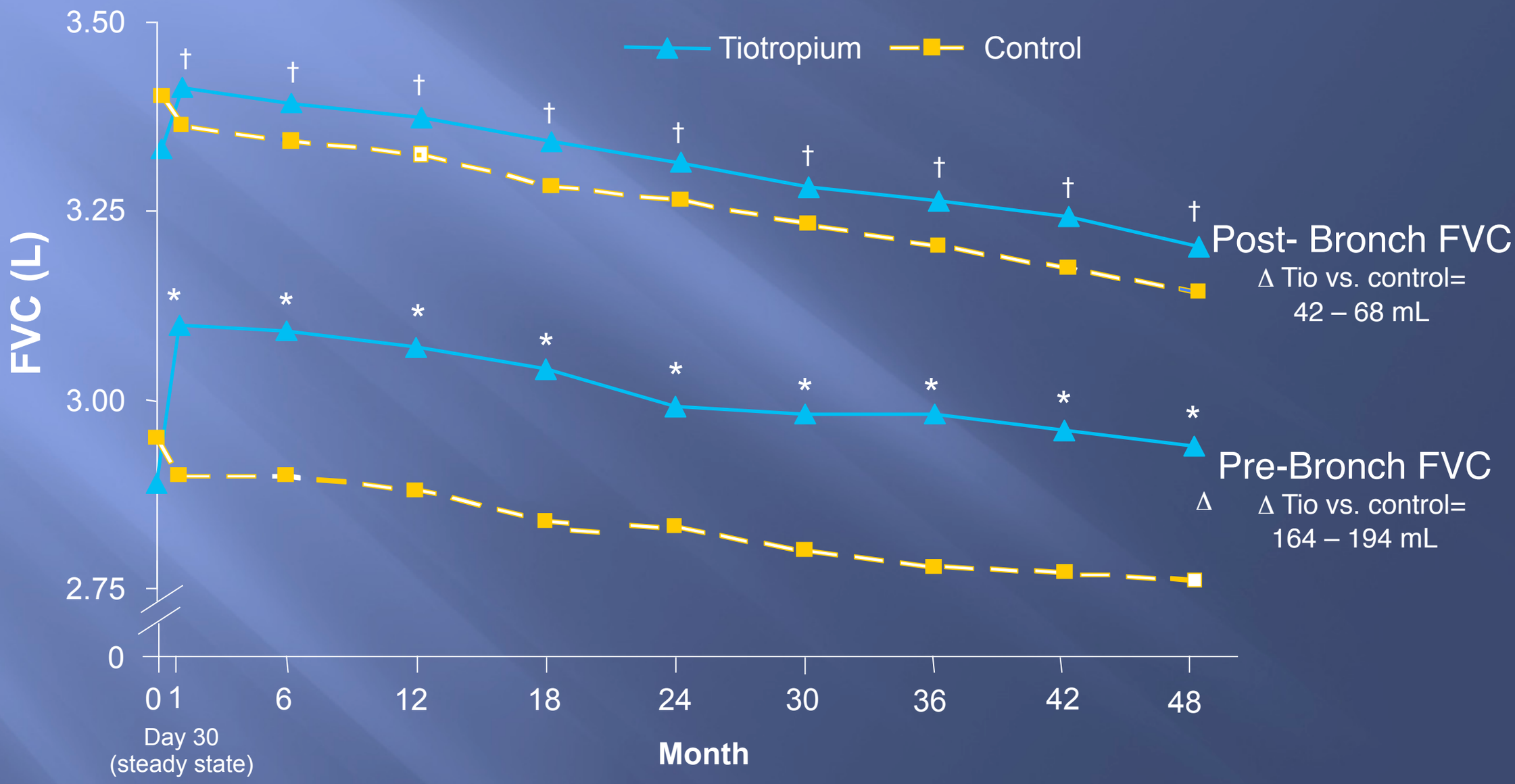
*The analyses by GOLD stage II were pre-specified before database lock.

†FEV ≥ 50% comparable to NICE Mild COPD and GOLD stage II

Ref 1: Effect of tiotropium on outcomes in patients with moderate chronic obstructive pulmonary disease (UPLIFT): a pre-specified subgroup analysis of a randomised controlled trial. Decramer M, et al. The Lancet 2009; 374: 1171-1178

UPLIFT Mild* COPD subgroup[1]: FVC

***FEV ≥ 50% comparable to NICE Mild COPD and GOLD stage II**



*P<0.0001 vs. control. Repeated measure ANOVA was used to estimate means. Estimated means are adjusted for baseline measurements. Patients with ≥3 acceptable PFTs after day 30 were included in the analysis.
Tiotropium: Month 0 n = 1196, Month 48 n = 925; Control: Month 0 n = 1142, Month 48 n = 859

Ref 1: Effect of tiotropium on outcomes in patients with moderate chronic obstructive pulmonary disease (UPLIFT): a pre-specified subgroup analysis of a randomised controlled trial. Decramer M, et al. The Lancet 2009; 374: 1171-1178

Conclusion: UPLIFT Mild* COPD subgroup[1]

**FEV ≥ 50% comparable to NICE Mild COPD and GOLD stage II*

Compared to placebo (control group):

- Tiotropium maintained significant improvements in
  - lung function (including post-bronchodilator rate of decline in FEV_1)
  - health-related quality of life and
  - reduced exacerbations

over 4 years in patients with GOLD Stage II disease.

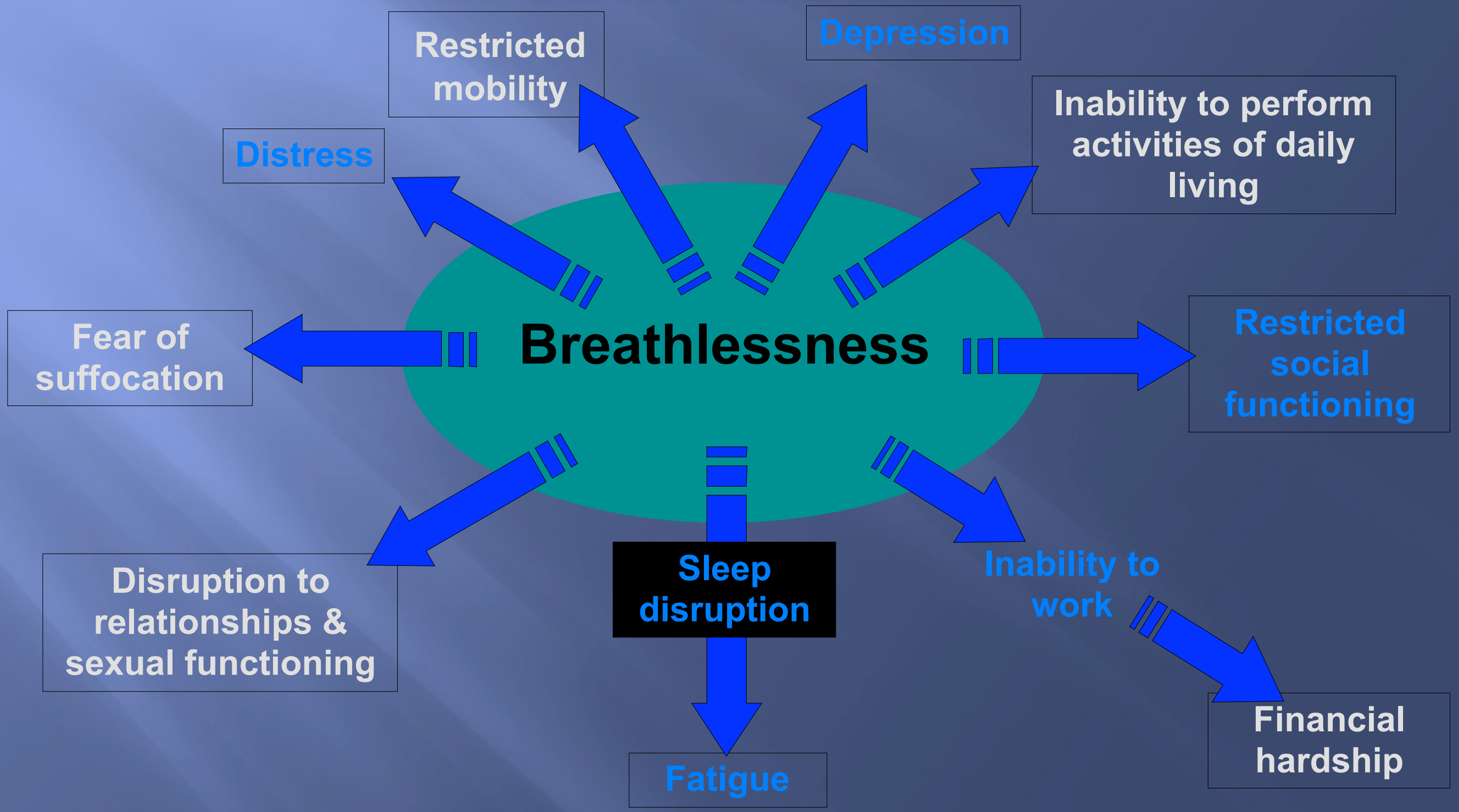
- This subgroup analysis data from the UPLIFT trial provides a rational basis for earlier treatment in patients with COPD.

Ref 1: Effect of tiotropium on outcomes in patients with moderate chronic obstructive pulmonary disease (UPLIFT): a pre-specified subgroup analysis of a randomised controlled trial. Decramer M, et al. The Lancet 2009; 374: 1171-1178

Other Medications

- LTOT in cor-pulmonale
- Diuretics in cor-pulmonale
- Mucolytic Therapy (Mucodyne) for chronic productive cough
- Antidepressants
- Morphine related compounds (Benzodiazepines & Anxiolytics)
- Osteoporosis protection (Alendronates etc)
- CNS stimulants (Doxapram)
- Dietary advice on BMI measurements

Patient's Experience of Breathlessness



The Patient

End of life Issues and Palliation

- Diazepam
- Morphine
- Midazolam

Opioids

- Reduce response to hypercapnia & hypoxia
- Reduce respiratory effort
- Reduce tidal volume & respiratory rate
- Reduce perception of breathlessness

Table - Effect of commonly used medications on important clinical outcomes

	FEV1	Lung volume	Dyspnoea	HRQoL	AE	Exercise endurance	Disease modifier by FEV1	Mortality	Side-effects
Short-acting β-agonist	Yes (A)	Yes (B)	Yes (A)	NA	NA	Yes (B)	NA	NA	Some
Ipratropium bromide	Yes (A)	Yes (B)	Yes (A)	No (B)	Yes (B)	Yes (B)	No	NA	Some
Long acting β-agonists	Yes (A)	Yes (A)	Yes (A)	Yes (A)	Yes (A)	Yes (B)	No	NA	Minimal
Tiotropium	Yes (A)	Yes (A)	Yes (A)	Yes (A)	Yes (A)	Yes (B)	NA	NA	Minimal
Inhaled corticosteroids	Yes (A)	NA	Yes (B)	Yes (A)	Yes (A)	NA	No	NA	Some
Theophylline	Yes (A)	Yes (B)	Yes (A)	Yes (B)	NA	Yes (B)	NA	NA	Importa

FEV1: forced expiratory volume in one second; HRQoL: health-related quality of life; AE: exacerbation of COPD; NA: evidence not available.

Types of Home Oxygen therapy

- LTOT
- SBOT
- Ambulatory Oxygen

Benefits of oxygen

- Reduce mortality
- Prevent progression of pulmonary HTN
- Reduce polycythaemia
- Increase exercise tolerance
- Improvement in QOL & QOS
- Reduced cost to healthcare

Evidence

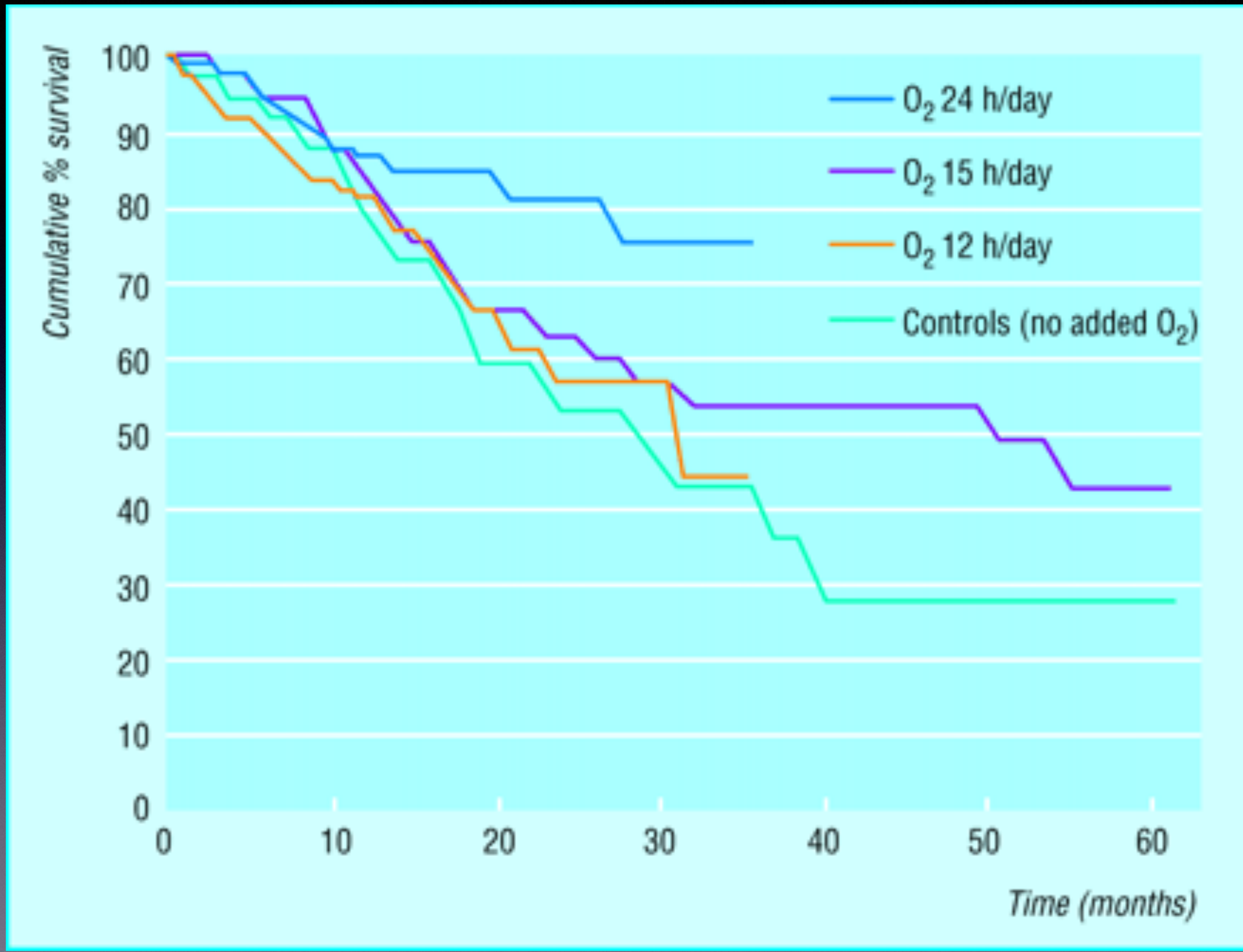
- MRC study 1981
- 87 patients
- Treatment group: 15 hrs / day O2
- Control group: no O2
- North American trial 1980

LTOT

- In England and Wales only can be prescribed by a Medical practitioner
- ABG when clinically stable and on optimal medical treatment, 2 occasions three weeks apart
- COPD patients with PaO2 < 7.3kPa (55mmHg), with or without hypercapnia, and FEV1 < 1.5L <40% predicted should receive LTOT

LTOT

- PaO2 : 7.3 – 8.0 kPa (55-60Kpa) and pulmonary hypertension, peripheral oedema or nocturnal hypoxaemia, LTOT should be considered
- Must be used for >15 hours per day (MRC study 5 year survival 25% to 41%)
- Aim is to have a kPa >8.0 without unacceptable hypercapnia


Cumulative % survival
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
Time (months)
O_2 24 h/day
O_2 15 h/day
O_2 12 h/day
Controls (no added O_2)

Concentrators for better QOL

OPERATING INSTRUCTIONS
1. READ PATIENT MANUAL.
2. ATTACH OXYGEN ACCESSORIES TO OXYGEN OUTLET.
3. INSERT POWER CORD INTO ELECTRICAL OUTLET.
4. PUSH IN POWER SWITCH TO START. AN AUDIBLE 5 SEC. TEST ALARM MUST SOUND.
5. SET FLOWMETER TO PRESCRIBED LPM.

TO TURN UNIT OFF, PUSH IN POWER SWITCH.

IMPORTANT
AIR INTAKE FILTER MUST BE WASHED WEEKLY.

IN THE EVENT OF ALARM OR PATIENT DISCOMFORT CONTACT YOUR EQUIPMENT PROVIDER.

OXYGEN MONITOR

IF AMBER LIGHT IS ON FOR MORE THAN 15 MINUTES, CONTACT YOUR EQUIPMENT PROVIDER IMMEDIATELY.

852377

NEWLIFE elite

AIRSEP

Allied Respiratory

CALL THIS NUMBER FOR ALL YOUR OXYGEN NEEDS
0500 823 773

For Further Information
www.alliedrespiratory.com

Always Read Instructions
No Smoking No Naked Flames
Never Use Oil Or Grease
Keep Filter Clean
Do Not Open Concentrator
Adjust Flowrate as Prescribed
Only Clean With a Damp Cloth
Always Turn Off After Use
Off

N5017504

InFlux

Cylinders for better QOL

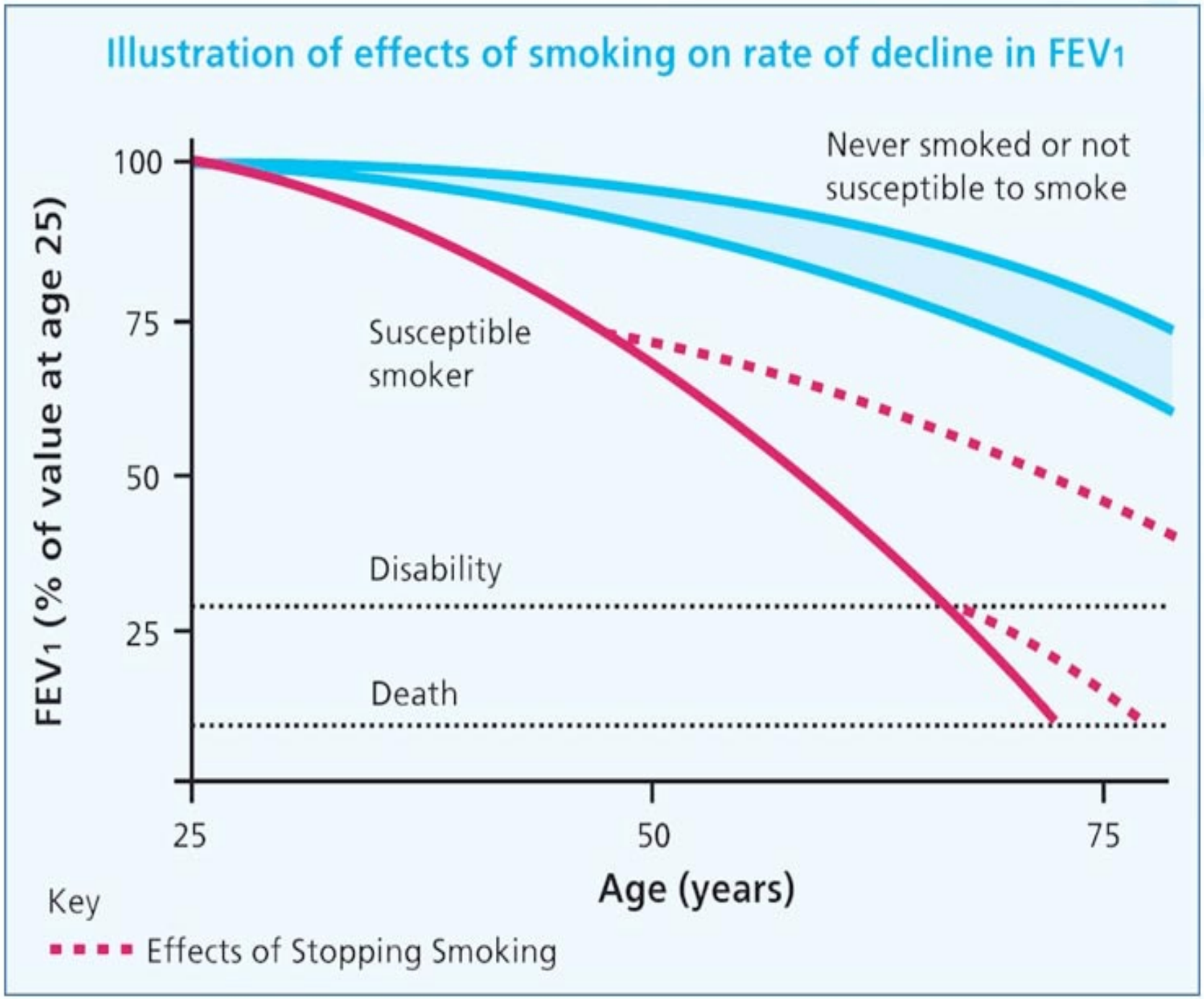
Liquid oxygen Dewar & better QOL

Conclusions

- Vital part of management of severe COPD
  - Proven to improve survival
- Must be prescribed appropriately
  - Potentially hazardous
  - Expensive

The solution?

- The Fletcher-Peto Diagram



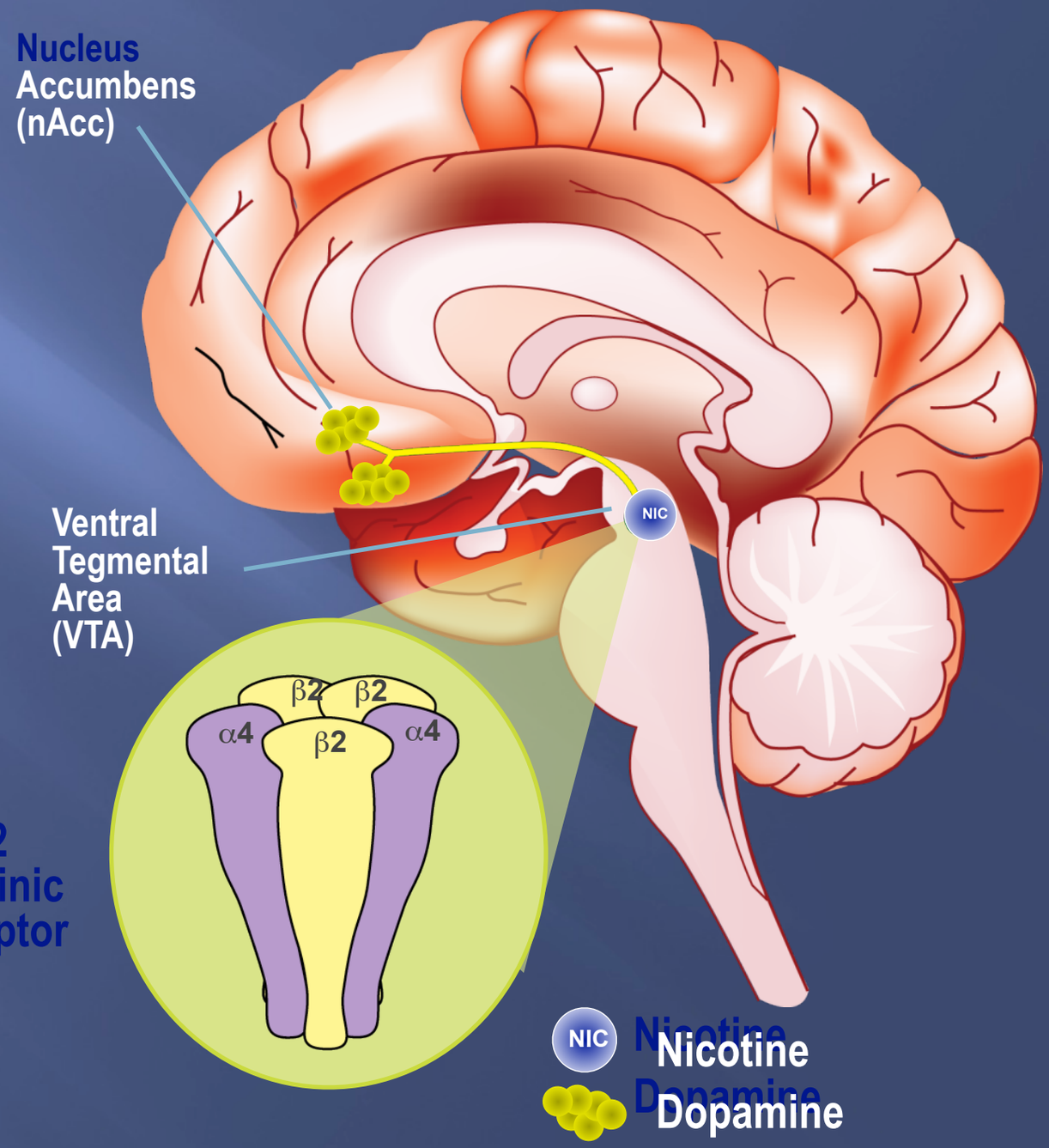
Smoking Cessation

- Patients should be offered-
  - NRT
  - Bupropion or
  - Varenicline

  who want to give up smoking

MECHANISM OF ACTION OF NICOTINE IN THE BRAIN

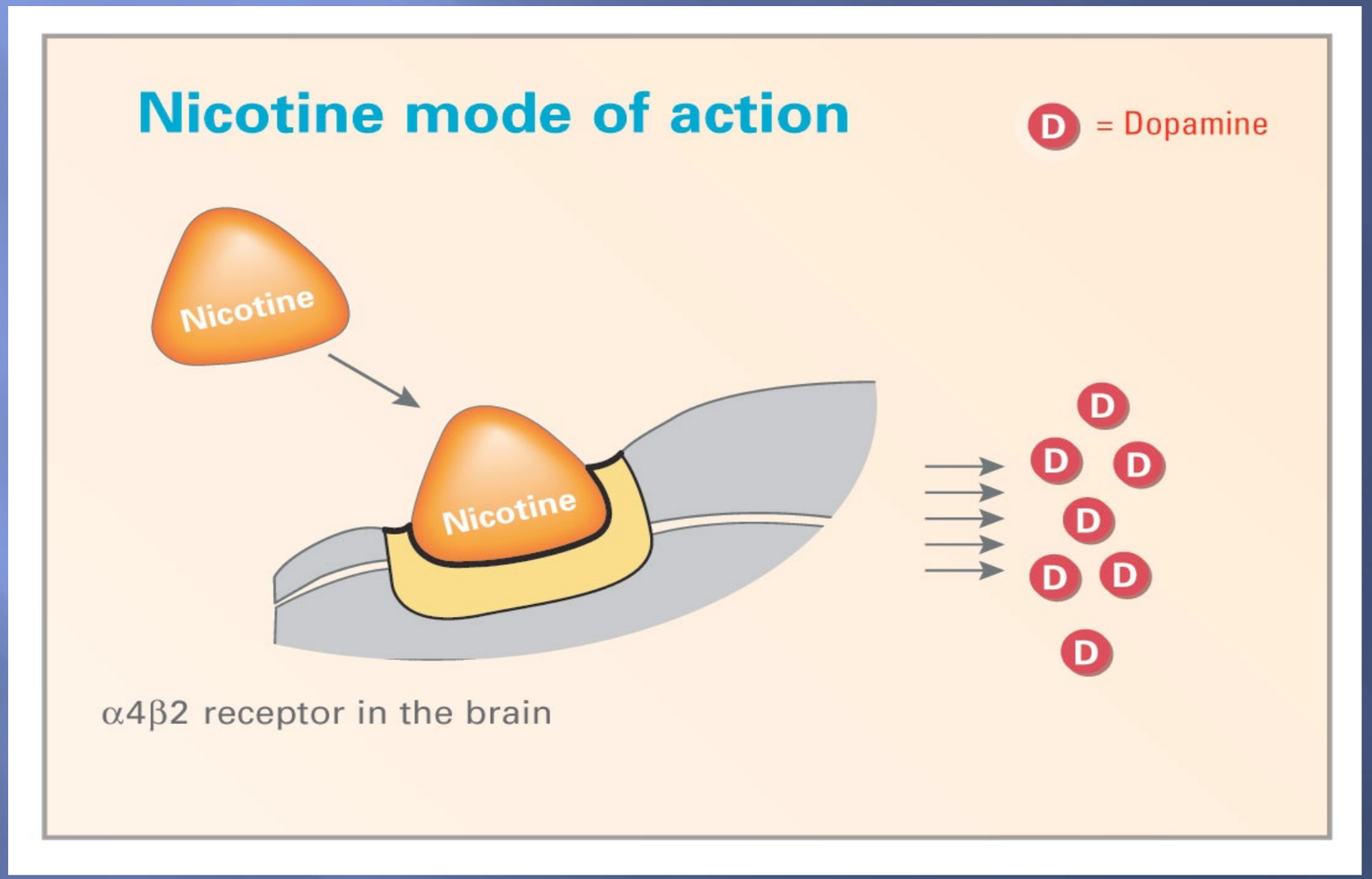
- Nicotine binds to α4β2 nicotinic acetylcholine receptor stimulating dopamine release[1-3]
- This results in the satisfaction associated with smoking[1-3]
- A drop in nicotine levels leads to craving and withdrawal[1,4]



1. Jarvis MJ. BMJ 2004; 328:277-279. 2. Dani JA, Harris RA. Nature Neuroscience 2005; 8:1465-1470. 3. Coe JW *et al.* J Med Chem 2005; 48: 3474-3477. 4. West R, Shiffman S. Smoking cessation. Fast Facts. Indispensable guides to clinical practice. Health Press, Oxford, 2004.

THE α4β2 NICOTINIC RECEPTOR IS KEY IN THE ADDICTION PATHWAY

Nicotine at the α4β2 receptor

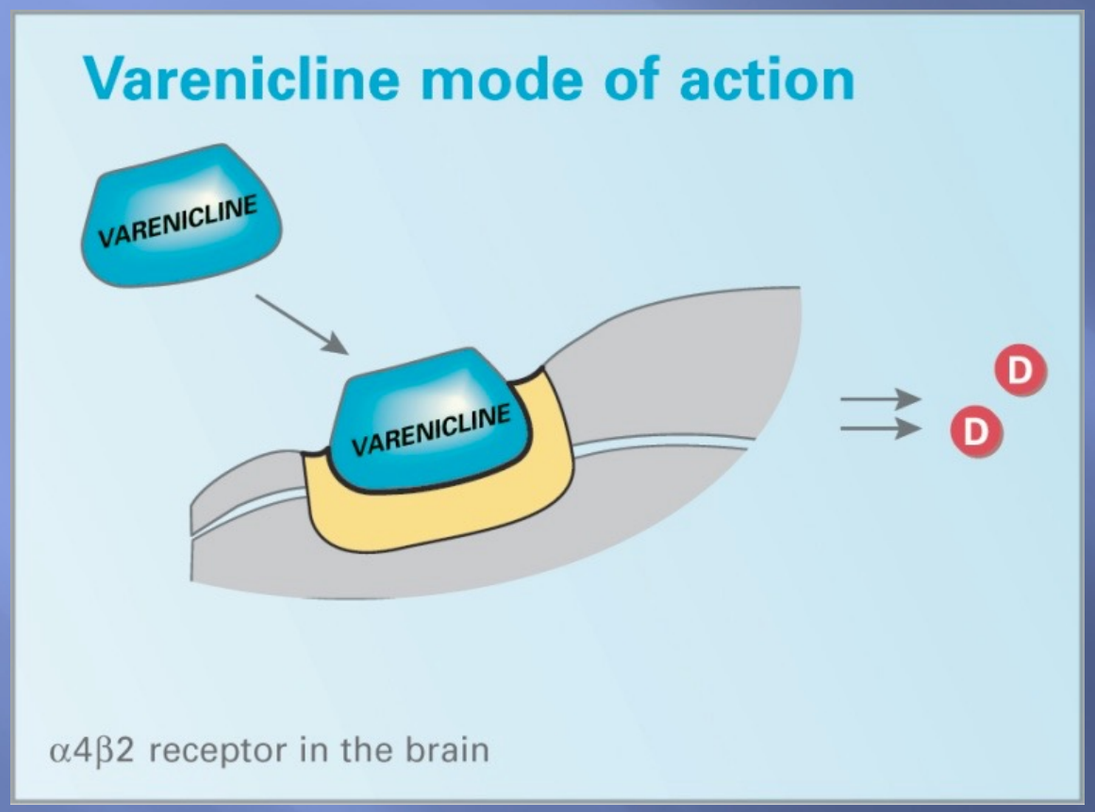


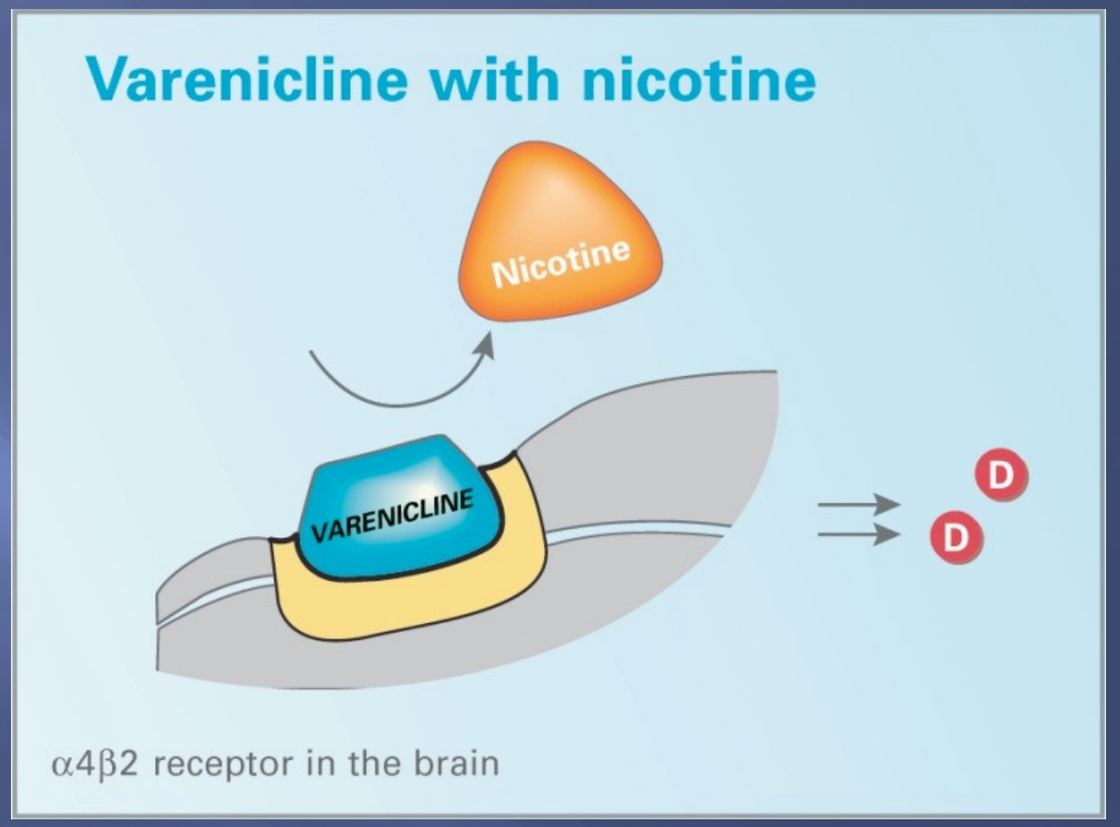
- Nicotine stimulates dopamine release resulting in the satisfaction associated with smoking[1-3]

1. Coe JW *et al.* J Med Chem 2005; 48:3474-3477. 2. Jarvis MJ. BMJ 2004; 328:277-279. 3. Dani JA, Harris RA. Nature Neuroscience 2005; 8:1465-1470.

VARENICLINE: A DUAL MODE OF ACTION AT THE α4β2 NICOTINIC RECEPTOR

Varenicline at the α4β2 receptor





Partial agonist

- Binds with high affinity to the α4β2 receptor, and only partially stimulates dopamine release[1]
- This provides relief from craving and withdrawal symptoms as the nicotine level declines in a quit attempt[1-3]

Antagonist

- Because the receptor is bound by varenicline, it is blocked and cannot be stimulated by nicotine[1]
- This reduces the pleasurable effects of smoking and potentially the risk of full relapse after a 'slip-up'[1-3]

1. Coe JW *et al.* J Med Chem 2005; 48:3474-3477. 2. Gonzales D *et al.* JAMA 2006; 296:47-55. 3. Jorenby DE *et al.* JAMA 2006; 296:56-63.

Myth: Nicotine causes the diseases related to smoking

FACTS: There is no evidence to suggest that nicotine causes cancer

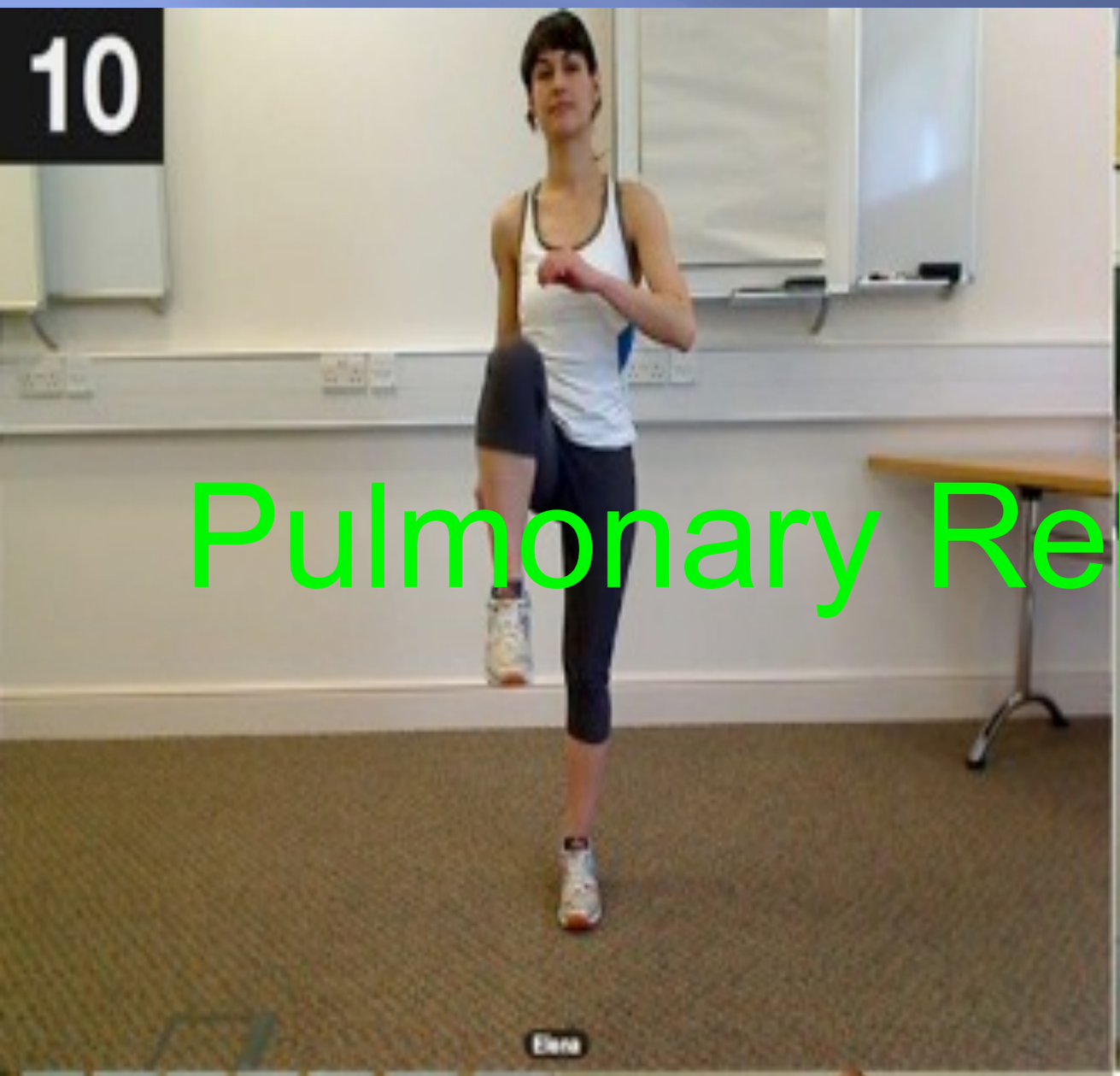
- More than **4,000** other chemicals in cigarette smoke,[1] more than 50 of which are known to cause cancer[2]
- It is the mixture of toxins in cigarette smoke that is responsible for the majority of the harmful effects, not nicotine[1]

1. www.treatobacco.net./English/keyfindings/key_finding_1.html Last accessed on 15.02.08
2. Hoffmann D & Hoffmann I. J Toxicol Environ Health 1997; 50(4):307-364.
3. http://smokeaway.files.wordpress.com/2008/03/cigarette.jpg

CEASE study: Conclusions

- Treatment with 25mg nicotine patch is more effective than 15mg patch
- Increasing treatment duration past twelve weeks does not improve outcome
- 25mg patches are generally well tolerated and have a good safety profile

Pulmonary Rehabilitation



Pulmonary Rehabilitation

- Patients with Grade 3 MRC Scale and above
- Structured graduated training programme where patients learn to control and cope with their symptoms in a better way.
- Unable to walk,Unstable angina, recent M.I are condraindication for referral
- After an exacerbation into the hospital

Pulmonary rehabilitation

- Pulmonary rehabilitation programmes include:
  - exercise training, Education
  - psychosocial/behavioural intervention,
  - nutritional therapy,
  - outcome assessment,

Home Ventilation:

- Patients admitted with pH less than7.3 should be considered for Domiciliary Non invasive ventilation
- COPD with: recurrent (>3) AHRF requiring NIV or intolerance of LTOT (because of CO2 retention) with symptomatic sleep disturbance

Lung Volume Reduction Surgery:

- Breathless with single large Bulla on CT chest & FEV1 >50%-Bullectomy
- Severe COPD breathless with marked restriction of ADL despite maximal medical therapy incl Rehab could be referred for consideration for LVRS
  - FEV1more then 20% pred
  - PaCO2 less then 7.3 kPa
  - TLCo>20%
  - Upper lobe Emhysema predominantly

Lung Transplantation

- FEV1<25% predicted
- Cor-Pulmonale,PaCO2<7.3kPa,elevated PAP
- On LTOT with elevated PaCO2
- 60 Yrs or less DLT
- 65 yrs or more SLT

NEW BRONCHOSCOPIC PROCEDURES IN COPD CARE

Forty-minute wonder op gets damaged lungs working again

THOUSANDS of Britons have breathing difficulties due to emphysema, but a new procedure could help them. Richard Kerswill, 53, a retired school caretaker who lives near Aylesbury in Bucks, took part in a trial of the treatment, as he tells CAROL DAVIS.

THE PATIENT

FOR my job I used to walk miles up and down corridors every day. I did it without any problems, but five years ago I started feeling breathless all the time, as though there were bricks piled on my chest.

Cold air made it worse. One October night, I was out with friends and was struggling for breath. I then just collapsed, which was terrifying. An ambulance took me to A&E where doctors gave me oxygen and an inhaler until I felt better.

They thought it might have been a panic attack, but my partner, Wendy, and I were puzzled — I'd never had one before.

It happened several more times over the next five months, always in cold air — each time, I'd be rushed to hospital by ambulance. I was sent for X-rays, but no one could work out why it was happening.

Then the next time I went to A&E the consultant ordered a CT (computerised tomography) scan. This showed I had advanced emphysema — where the tiny air sacs in your lungs become damaged and the walls between them break down.

The consultant said emphysema also meant my lungs had become less elastic. This was why breathing was much harder.

He blamed smoking. I was devastated, as I'd given up a few years earlier after a 20-year habit.

I was given inhalers to help my airways relax so I could breathe more easily. But it gradually got worse over the next six months. I'd have to pause for breath while walking, and stay indoors when it was cold. And I kept getting lung infections.

The school was great, but I had to take early retirement.

I had regular tests at a specialist hospital — the Royal Brompton in London — the doctors told me about a trial they were running using a new device to make the lungs work better so I could breathe more easily.

They'd put tiny metal coils into my

Are energy snacks any better than chocolate?

DO ENERGY-BOOSTING snacks live up to their promise? Jeanette Crosland, spokesperson for the British Dietetic Association, assesses popular choices. We then rated them out of ten.

TREK BANANA BREAD PROTEIN FLAPJACK

90p from Ocado
Per 50g bar: calories, 208; sugar, 12.4g; protein, 10.2g; sat fat, 3.2g; fibre, 2.1g.

'FOR lasting energy'. This crunchy bar contains 10g of added protein.

EXPERT VERDICT: All food gives you energy, which is essentially calories. But the energy from some calories, eg, carbs, is more readily available. And with nearly 20g of carbs, this bar provides lots of energy — the brain and muscles use carbs as an energy source.

As well as oats there's 10 per cent dried banana, a good energy source. Meanwhile, the high protein content will help keep you fuller longer because it breaks down slowly. The protein is in the form of soya, which may help protect the heart.

But the sugar is the highest of the five bars here. And the total fat content — from vegetable oil — is 9.5g. A typical cereal bar could have just 2g. 4/10

LOVERAW ROSEHIP AND LEMON ORGANIC BAR

£2.75, Planet Organic
Per 48g bar: calories, 234; sugar, 9.8g; protein 7.2g; sat fat, 2.9g; fibre 3.6g.

THIS 'energy bar' contains almonds, dates, sultanas, cashews and brazil nuts, and is free from dairy, gluten, wheat and soy.

EXPERT VERDICT: There's a lot of fat, though it's healthy fat from nuts. Rosehip

areas, so the healthy tissue could work better.

It sounded amazing. I had the operation in July 2011 at the Chelsea & Westminster Hospital in London — it took only 40 minutes. I was sedated but awake while the consultant Dr Pallav Shah fed the coils into my right lung using a flexible tube, which went in through my mouth and down my throat.

I was groggy afterwards, but there was no pain. I stayed in overnight, then just walked to the taxi.

And I couldn't believe the instant difference — the tightness in my chest had eased so I could go shopping with Wendy.

A month later I had the coils implanted in the left lung, too, and felt even better.

Cold air still affects me, but I'd like to see this offered to many more people, because it could save them a lot of misery.

THE SPECIALIST

DR PALLAV SHAH is consultant physician in respiratory medicine at the Royal Brompton and Chelsea & Westminster Hospitals in London.

ABOUT 10 per cent of people over 50 have chronic obstructive pulmonary disease, or COPD. A common form is emphysema, which affects up to 100,000.

Emphysema is mainly caused by smoking. Other causes include coal pollution.

Instead of being like a sponge, containing many tiny air sacs, the inflammation caused by smoking means that the collagen and fibres separating these air sacs are progressively broken down; causing the sacs to form larger pockets.

The sacs are where oxygen and carbon dioxide are taken into the lungs or passed out. But because their surface area is reduced, stale air becomes trapped, causing the lungs to over-inflate over time.

Airways in the lungs also become floppy and less elastic,

ME AND MY OPERATION

LUNG 'REDUCING' SURGERY TO TREAT EMPHYSEMA

so patients feel they cannot breathe — and because the larger, stretched lungs put pressure on the diaphragm, the main breathing muscle, it also becomes less effective.

This is unpleasant and debilitating, and can become life-threatening.

THE first thing patients should do is stop smoking. We can give them inhalers containing short-acting or long-acting bronchodilator drugs, which relax muscles in the lungs and widen airways, and steroids to reduce inflammation. Special exercises can improve overall fitness to help them breathe more easily.

Patients with severe emphysema may also be offered lung volume reduction, to remove damaged parts and allow the healthy parts to inflate properly.

But this is major surgery with a risk of serious complications including respiratory failure, infection or blood clots.

We can also use valves to close off the damaged areas of the lung. But both surgery and valves work when only part of the lung is damaged, and there are other good areas of healthy lung to compensate.

This applies only to 10 to 15 per cent of patients with emphysema because the damage is usually widespread.

But now there is a new treatment, devised in the U.S. in 2007. Known as RePneu lung volume reduction coils, the treatment consists of coils made of nitinol (an alloy of nickel and titanium which doesn't corrode) up to 150 mm long (twice the size of a paperclip).

A sheath initially keeps them straight, but when released, they spring into coils.

When inside the lungs, the spring gathers up and compresses the diseased tissue. This tightens the healthy areas, so they can function better — like pinching the end of a partly deflated balloon to make it firmer.

As we are not removing any tissue, this procedure is suitable for cases of widespread damage.

We have completed the device's first randomised controlled trial, Reset, and are recruiting for a second.

The trial has had good results, with most of the 50 patients seeing significant improvement in exercise capacity, lung function and quality of life. The procedure carries some risks, including bleeding and risk of a punctured lung (this happens in 3 to 4 per cent of cases), which we would then have to re-inflate with a tube into the chest. There is a 0.1 per cent risk of mortality.

The procedure takes 30 to 40 minutes under sedation. First, we put a local anaesthetic into the throat. Using X-rays to guide us, we then put a bronchoscope (a telescope that allows us to visualise the airways) into the lungs, via the mouth and down the throat.

We then feed ten to 12 coils into the diseased areas — there are different sized coils, depending on the size of the patient. They will stay there indefinitely.

We hope this will one day offer another treatment option which could improve the quality of life for thousands of patients and possibly help with other lung conditions, too.

ANY DRAWBACKS?

'RISKS of this procedure include a collapsed lung, which can happen in patients with COPD anyway — you then need to put a tube in through the ribs to release trapped air,' says Anthony De Soyza, senior lecturer at the University of Newcastle and honorary consultant physician at the Freeman Hospital in Newcastle.

'There's also a small risk of infection from the bronchoscope in the lungs, and a theoretical risk of damage to blood vessels. But these coils have a soft end and there is a reduced blood supply to damaged sections of lungs anyway.

'Although the Reset trial was small, patients had a dramatic improvement in their quality of life, and much better than we achieve with inhalers.'

■ *THE procedure is only available on the NHS as part of the Renew trial at Royal Brompton Hospital and the Chelsea & Westminster, London. Patients can be referred by their GP. To find out more, visit rbht.nhs.uk/research.*

DID YOU KNOW?

THE average Briton waits three years and eight months between visits to the dentist because they are worried about the cost, while 9 per cent admit to never going to the dentist, according to a survey from *vouchercodespro.co.uk*

just 0.8mg. You could get what you need from an orange. **7/10**

BOUNCE ENERGY BALLS, PEANUT

£1.79, hollandandbarrett.com
Per 49g ball: calories, 210; sugar, 12g; protein, 14g; sat fat, 1.5g; fibre 2g.

THESE 'natural energy balls' are paste-like, with added crunch from peanuts.

EXPERT VERDICT: While this will give you energy, so will a chocolate bar. It's twice the price, yet has just a little more nutrition. However, nuts contain healthier fats than saturated fat in chocolate. And this bar is also high in protein, so will keep you fuller longer. 5/10

9BAR, PUMPKIN

99p, hollandandbarrett.com
Per 50g bar: calories, 255; sugar, 11.7g; protein, 10.8g; sat fat, 3.3g; fibre, 3.2g.

'GREAT tasting, nutritious mixed seed energy bar!' — contains pumpkin seeds, sunflower, sesame, poppy and hemp.

EXPERT VERDICT: This almost replaces a meal in energy terms. But as with all bars, it's a lot of calories for a person leading a sedentary life. And while the seeds are a source of omega-3 fatty acids, beneficial for the heart, this bar has added sugar as well — two teaspoons in one bar. 7/10

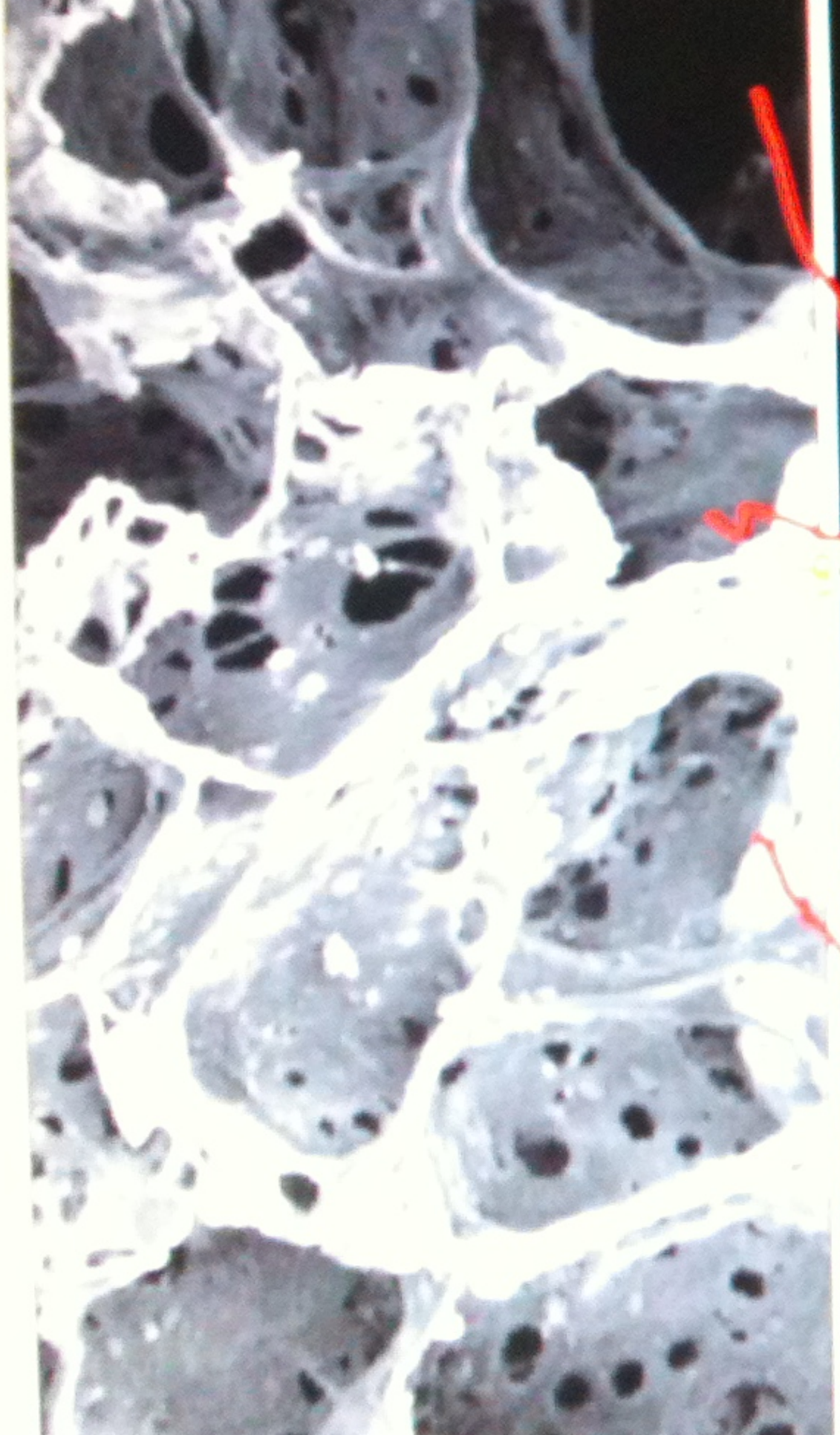
PULSIN MAPLE AND WHEY CRISP PROTEIN SNACK

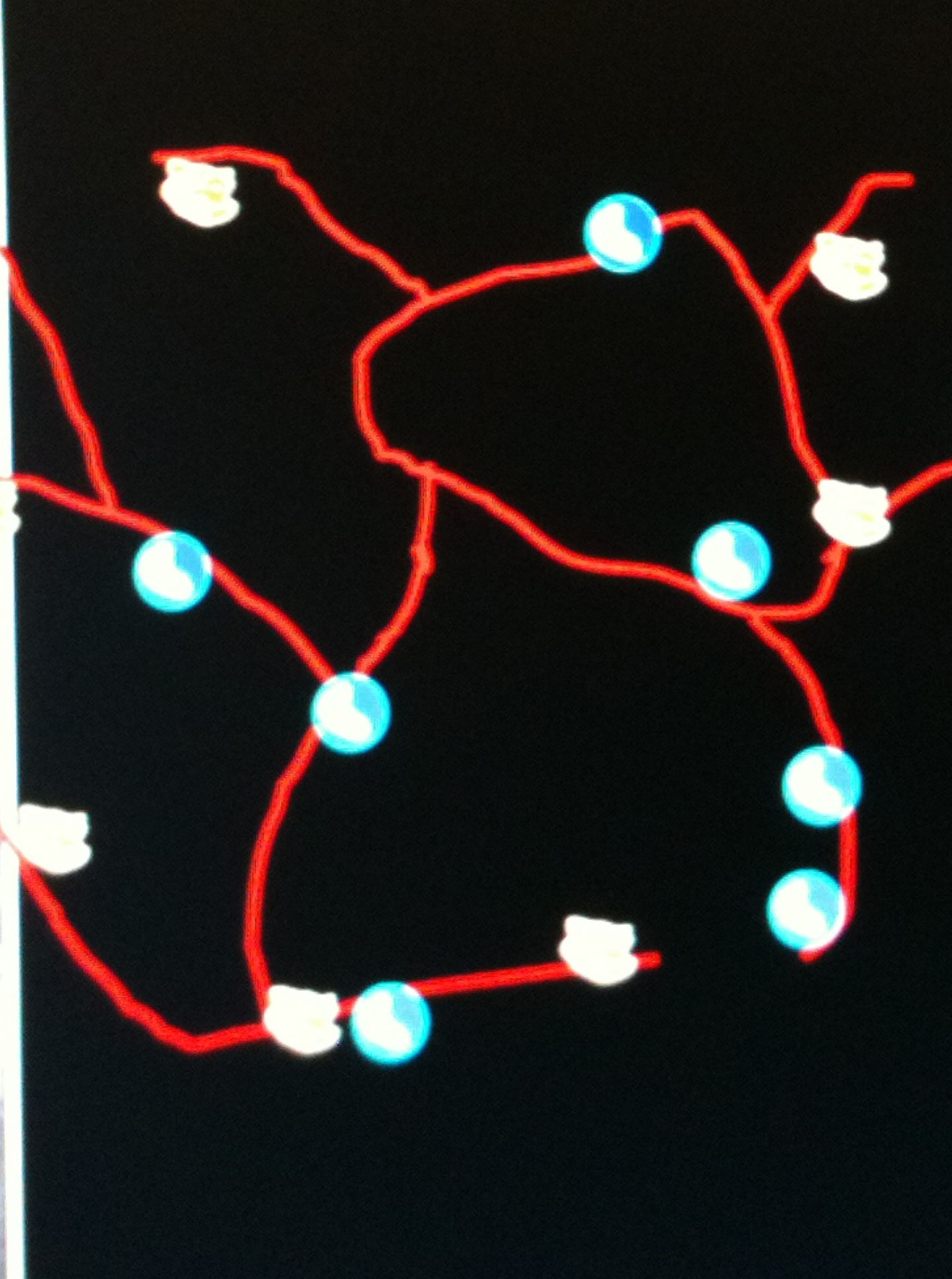
£1.59, Ocado.com;
Per 50g bar: calories, 209; sugar, 9.1g; protein, 15g; sat fat, 1.9g; fibre, 4g.

THE 'perfect post-exercise snack or meal replacement' offers 'sustained energy release', with a crispy bite.

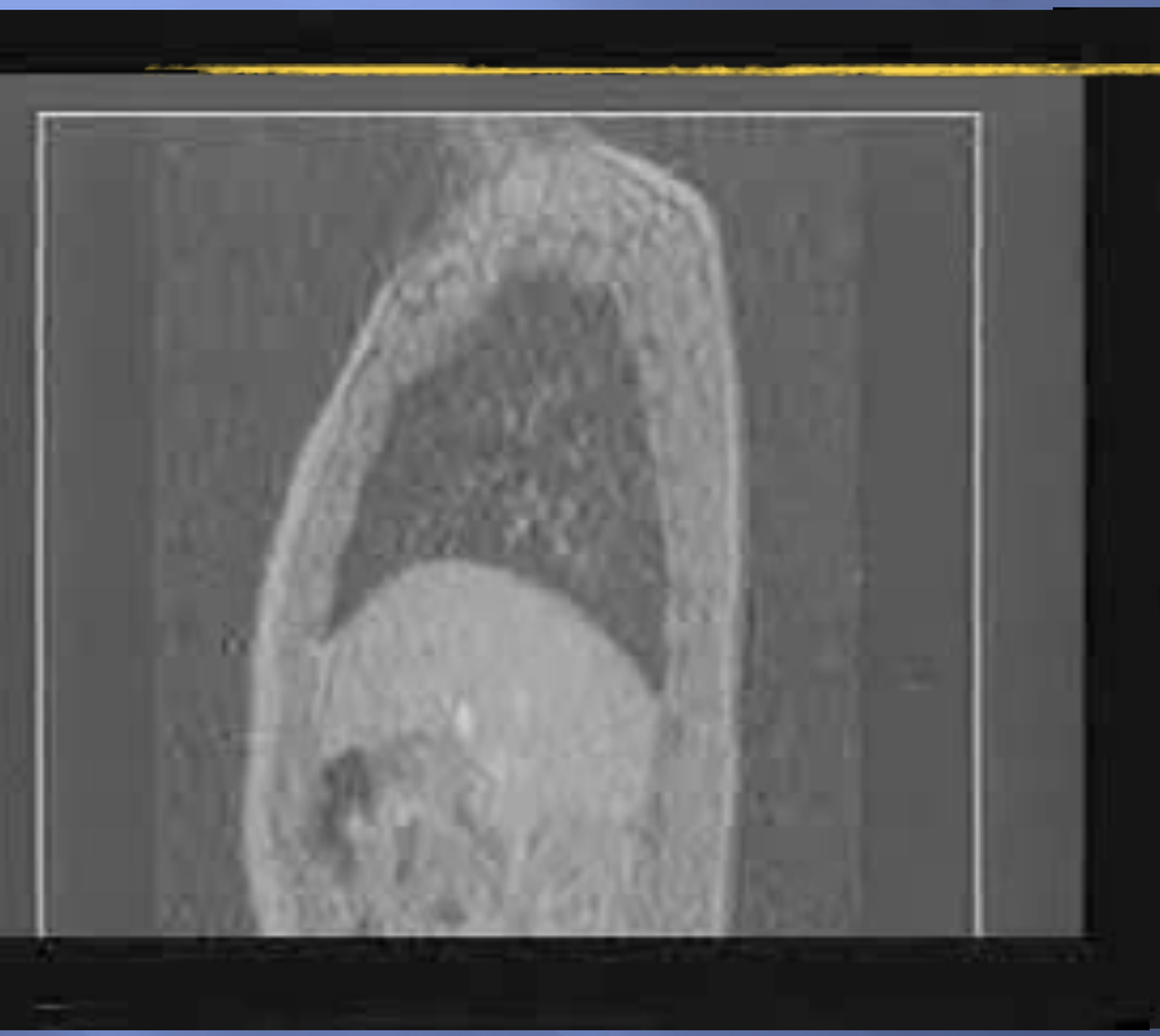
EXPERT VERDICT: This claims to have a low glycaemic index, which means it releases its energy slowly. It is also high in protein, which is good for repairing muscles after workouts. Whey — a milk protein — may aid recovery faster than other protein sources. The protein makes it more filling than the other bars. 6/10

DIANA PILKINGTON

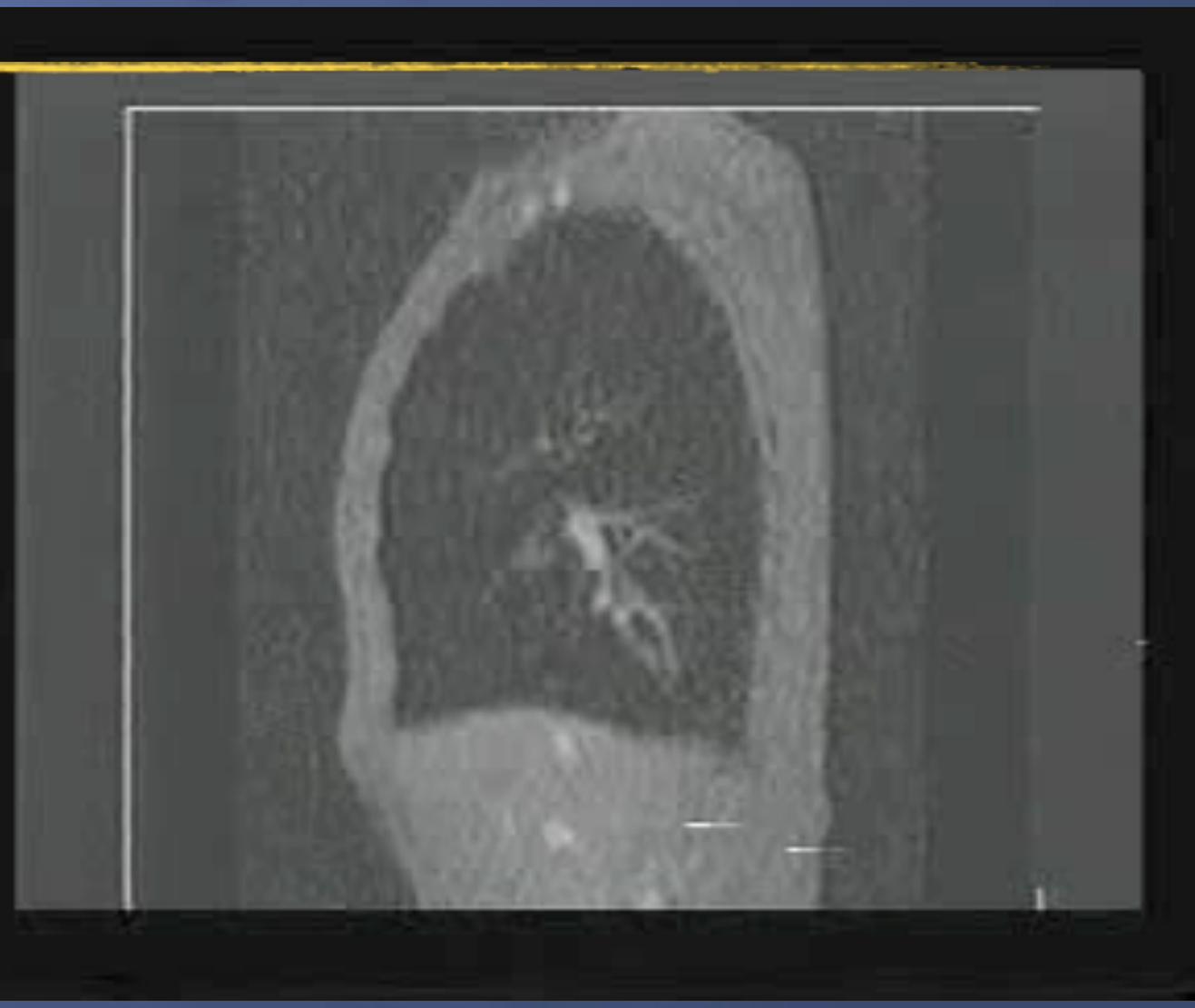




The history: Surgery works!



Normal



Severe COPD

Clips provided by Dr H. Date, Okayama University, Japan

BLVR for Emphysema

BLVRC

- FEV1=15-45%
- Gold 3-4
- RV>180
- Little or No collateral ventilation or CHARTIS V SYSTEM

123456789

RUL
0

RML
0

RLL
0

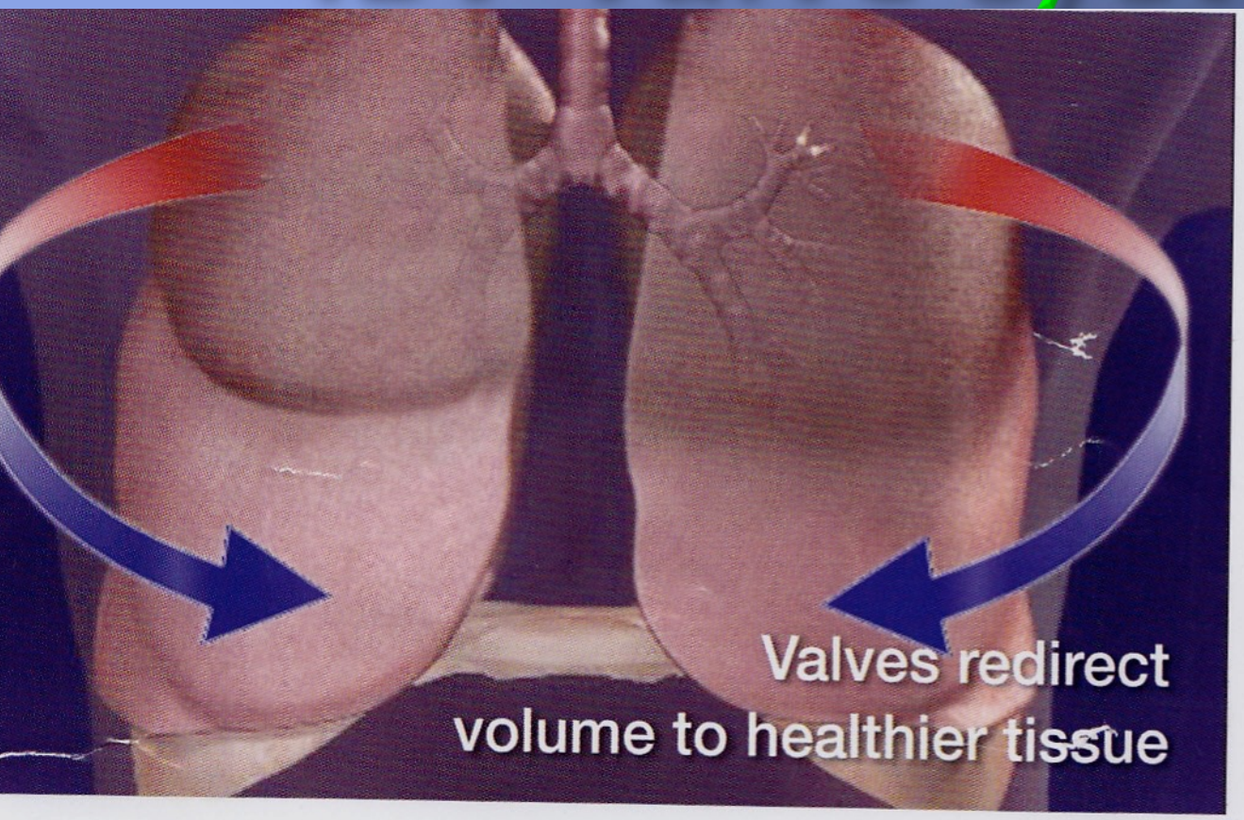
LUL
0

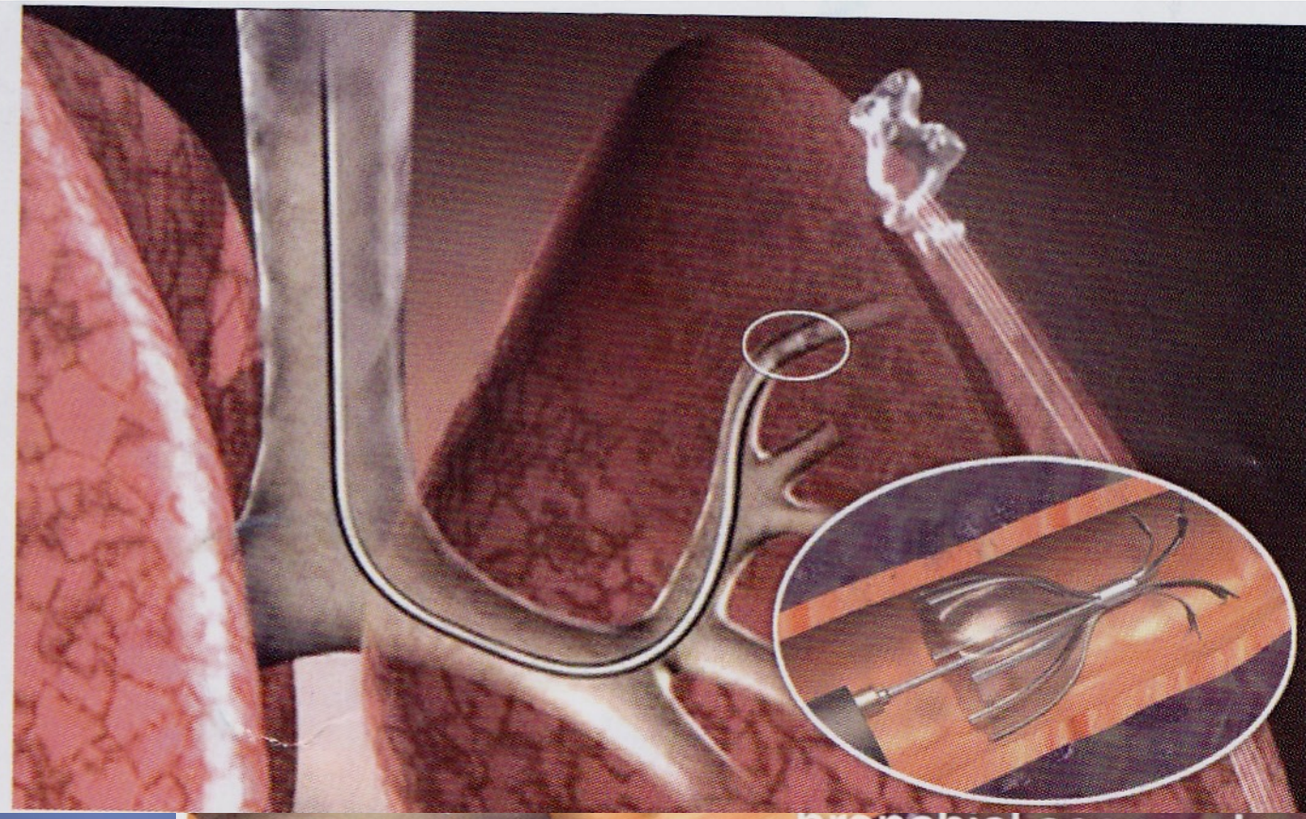
LLL
0

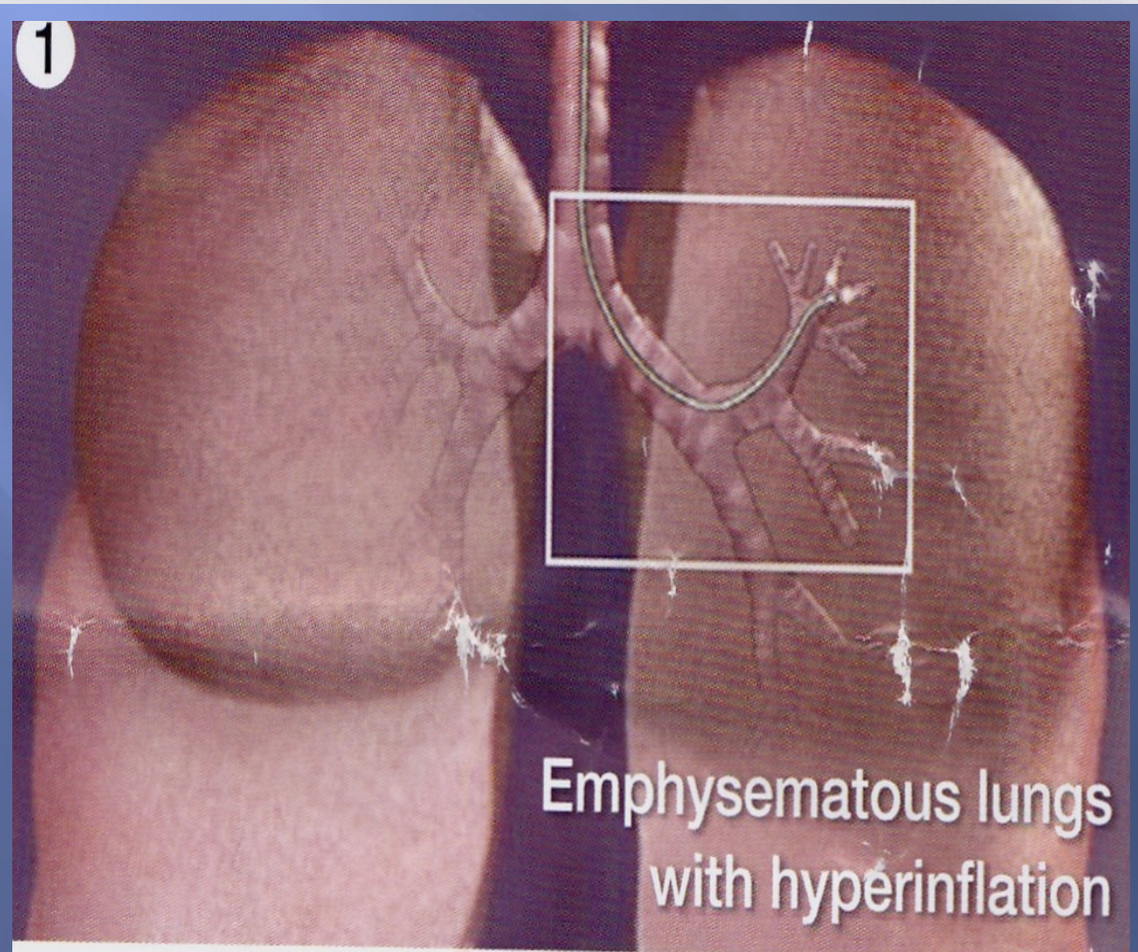
HOME

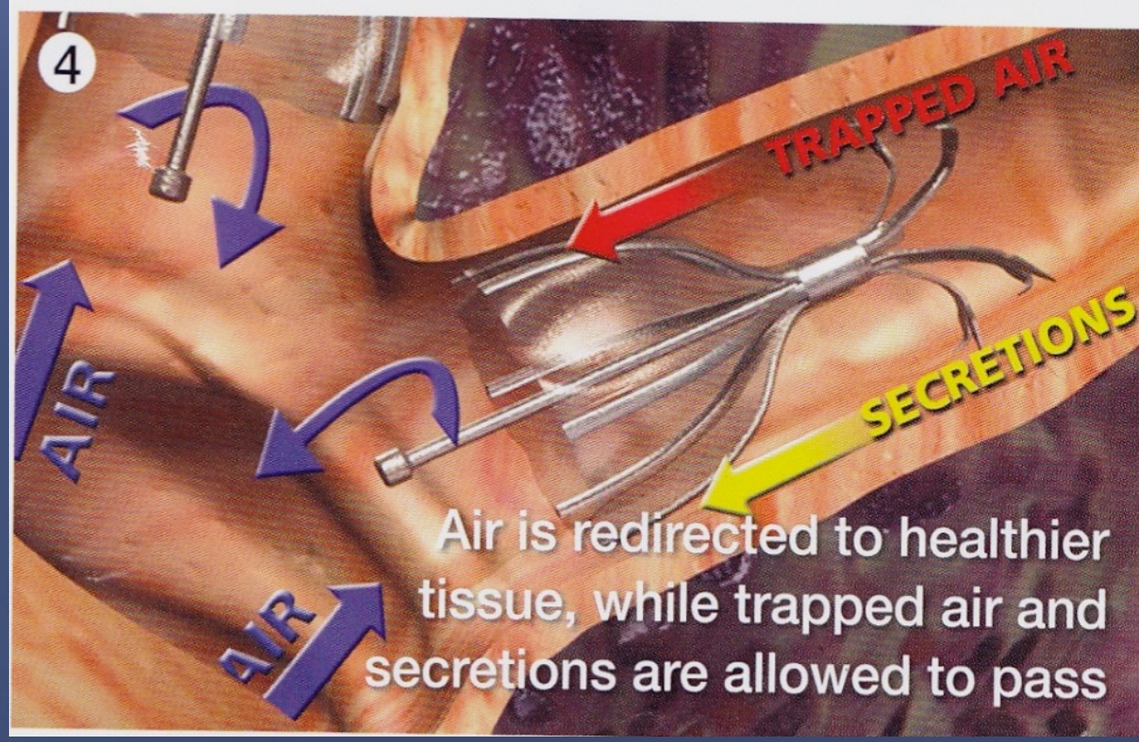
SELECT

IBV Valve system in Ephysema

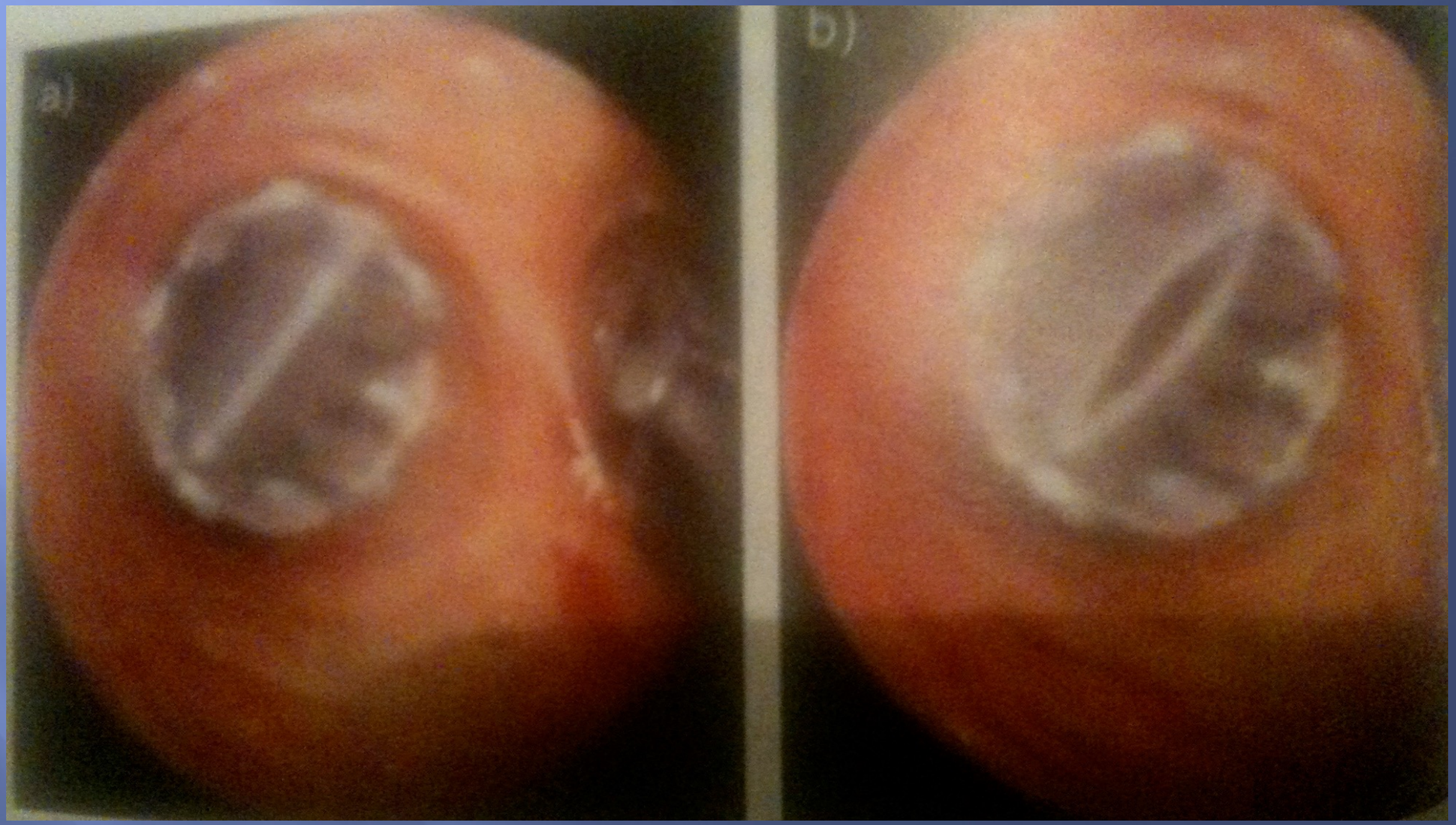








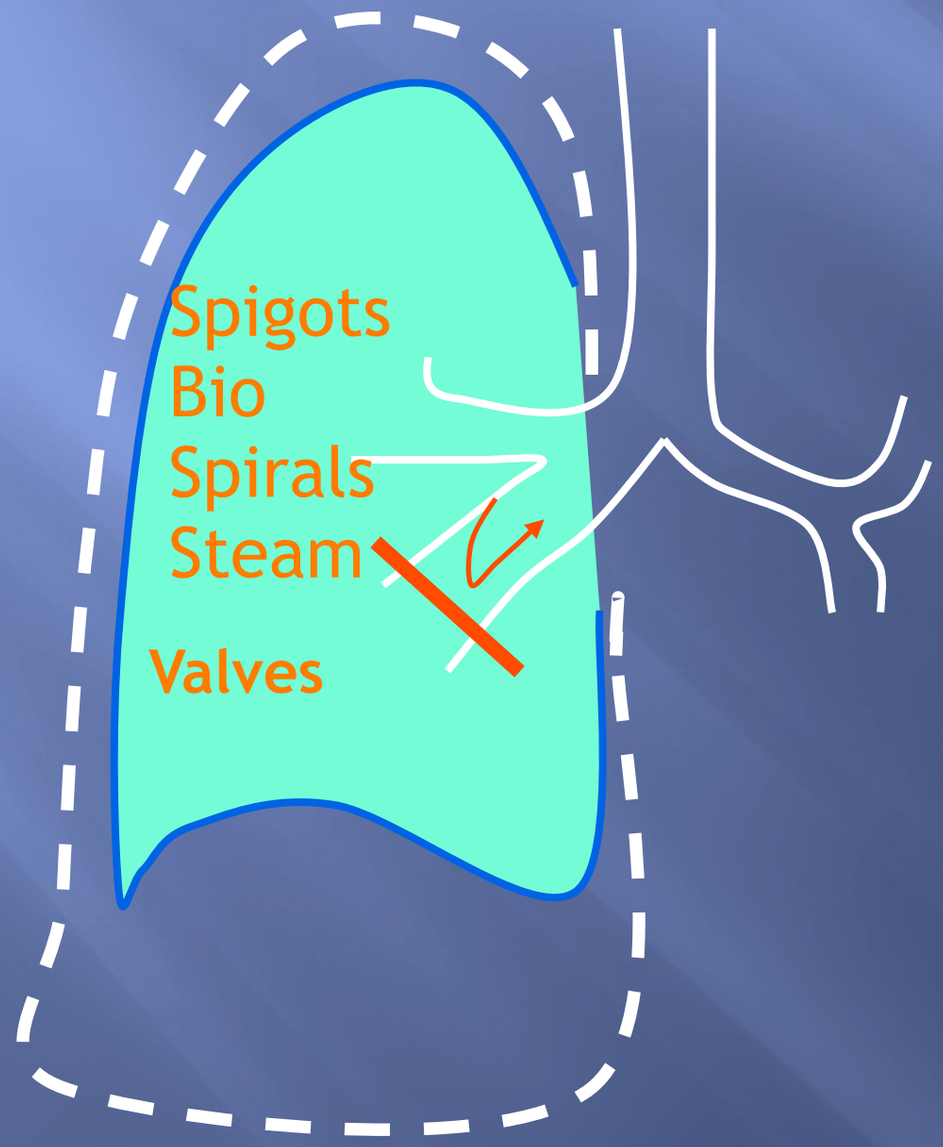
BLVR for Emphysema

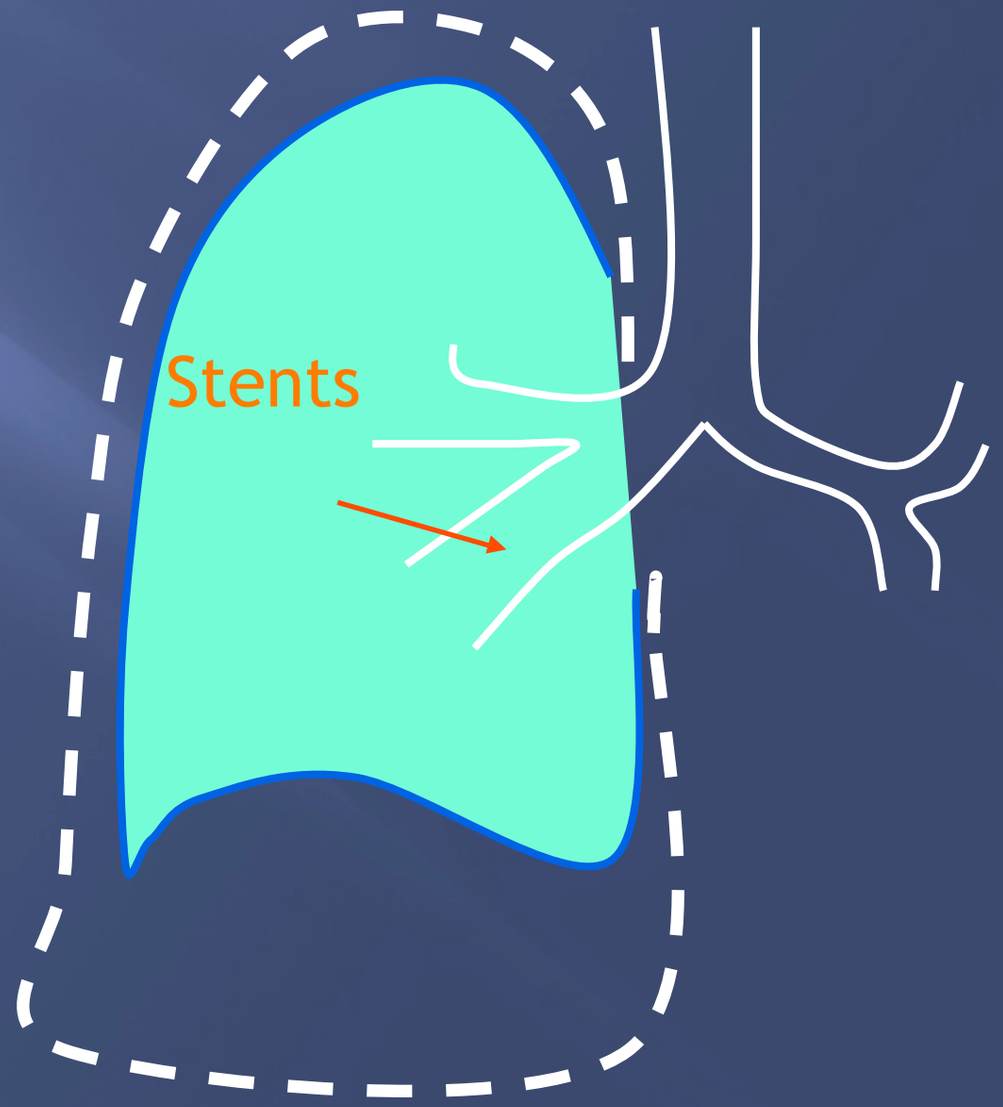


Bronchoscopic Lung Volume Reduction Techniques

Slides courtesy of Dr T.Toma

Closing airways *vs.* *By-passing* airways



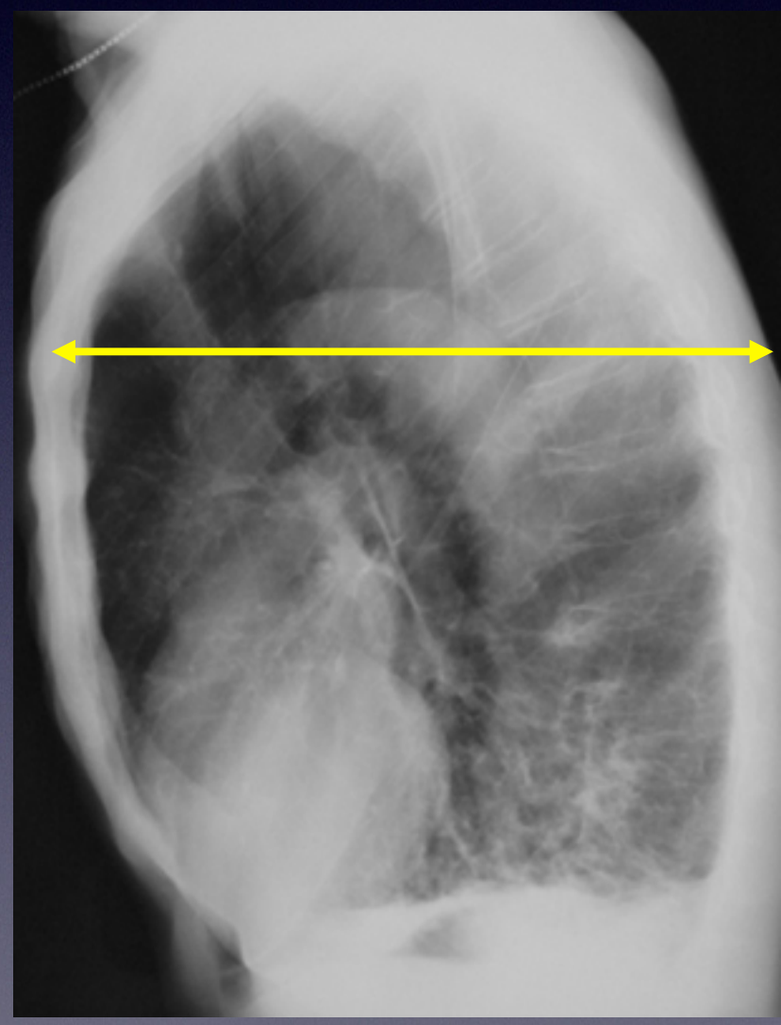


Patient Selection for Coil placements

- **Severe, Stable, Symptomatic**
  - **Severe:** GOLD III / IV
  - **Stable:** no recent hospitalizations for COPD exacerbation
  - **Symptomatic:** worsening dyspnea despite optimal medical management

Patient Baseline Profile

- low FEV1 <45% predicted
- high RV >175% predicted
- Dyspnea: mMRC 2-4
- No contra-indications for bronchoscopic intervention
- Visual evidence of parenchymal structure (0-5 scale)



LVCR

- Nitonol Coils small shape memory nitinol implants designed to gather and compress diseased tissue retension the diseased airway network and mechanically increase the elastic recoil in the Emphysematous lung.
- The retensioning effect of the coils may also tether small airways open, helping to prevent collapse of the airways during exhalation

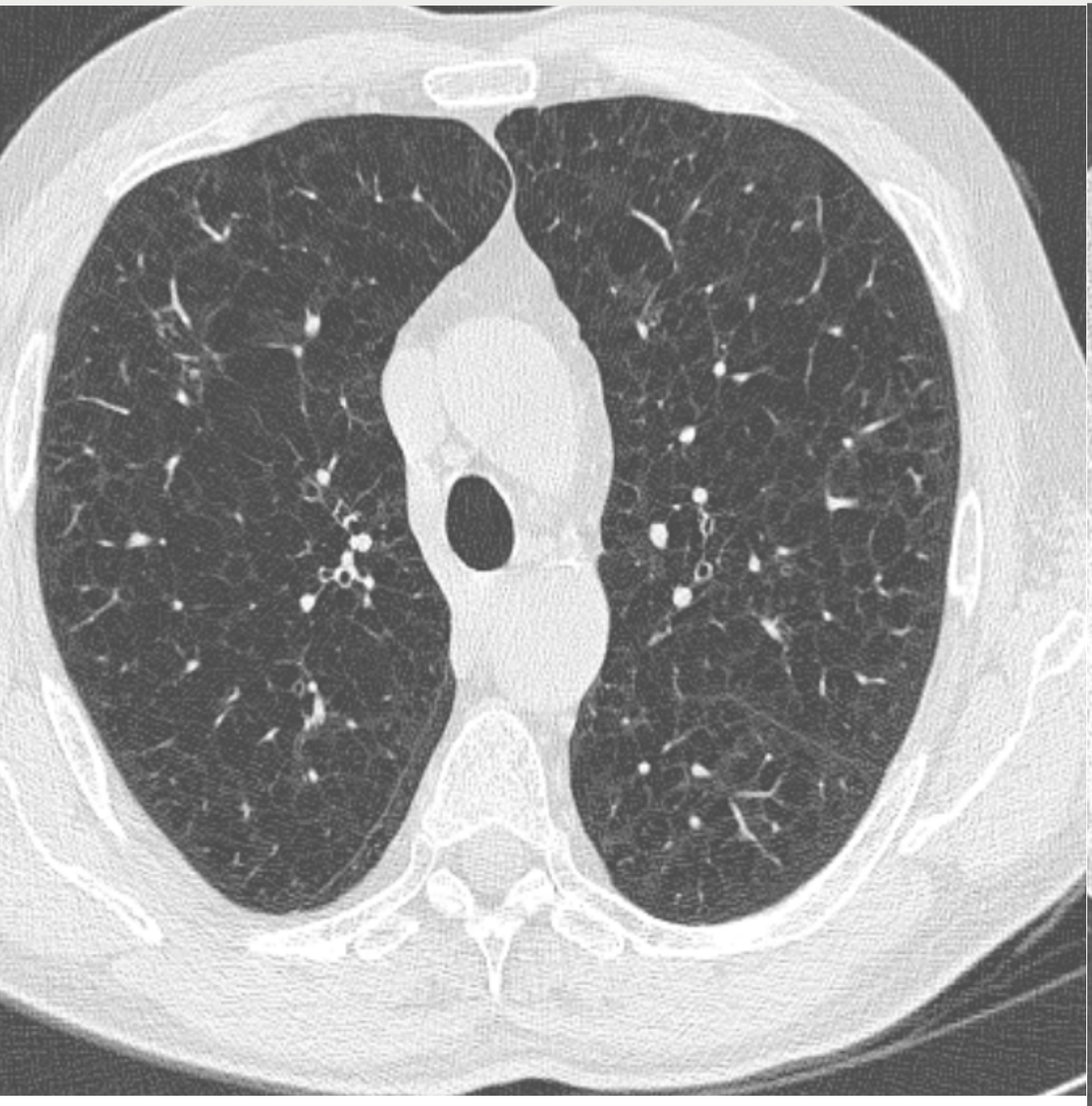
LVCR

- Airways tethering is a key benefit designed to prevent air trapping and hyperinflation is fundamental and exclusive element of coils design
- improve exercise capacity lung functions and quality of life

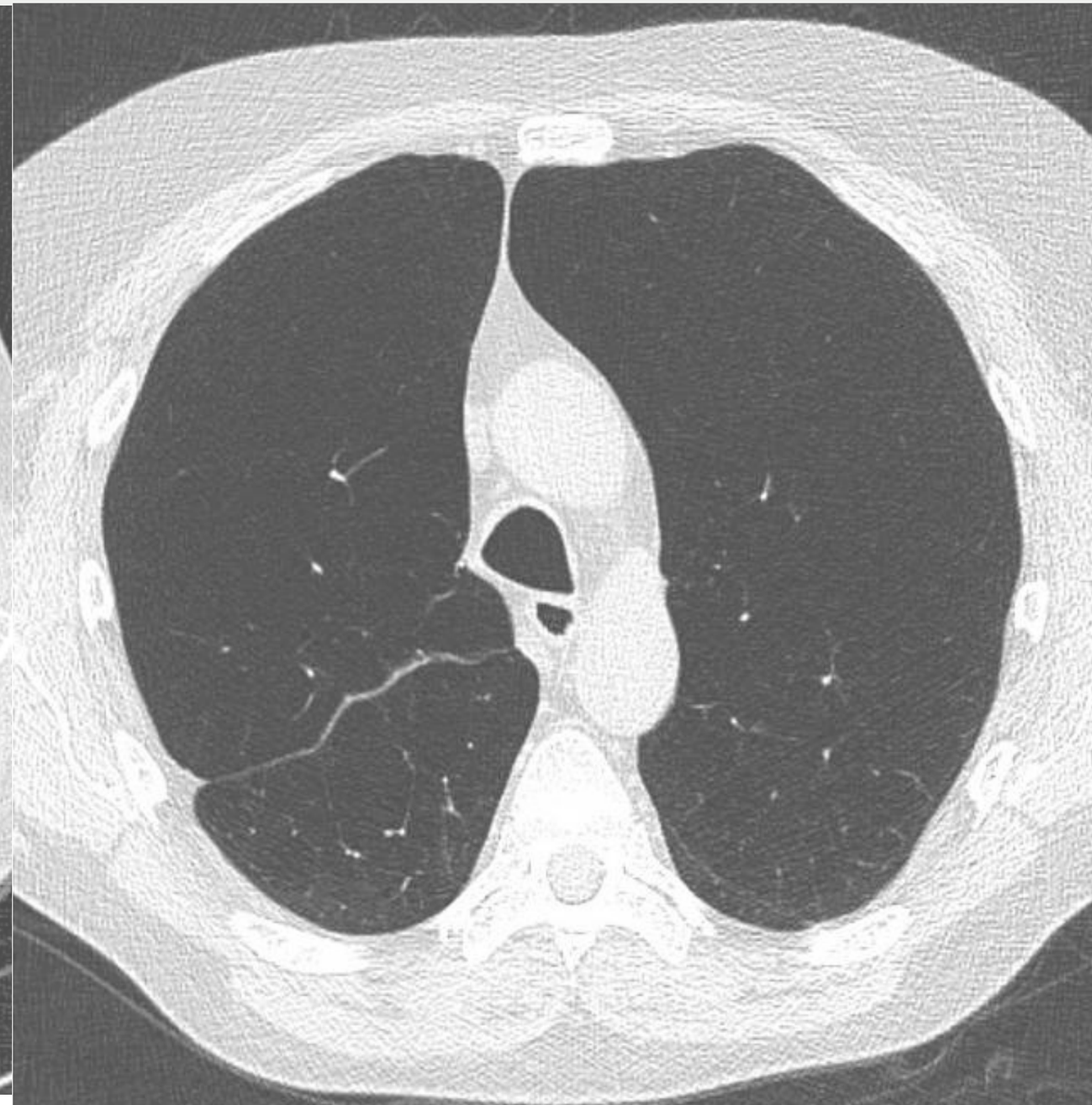
Patient Selection

CT visualization of tissue sufficiency

Sufficient structural tissue

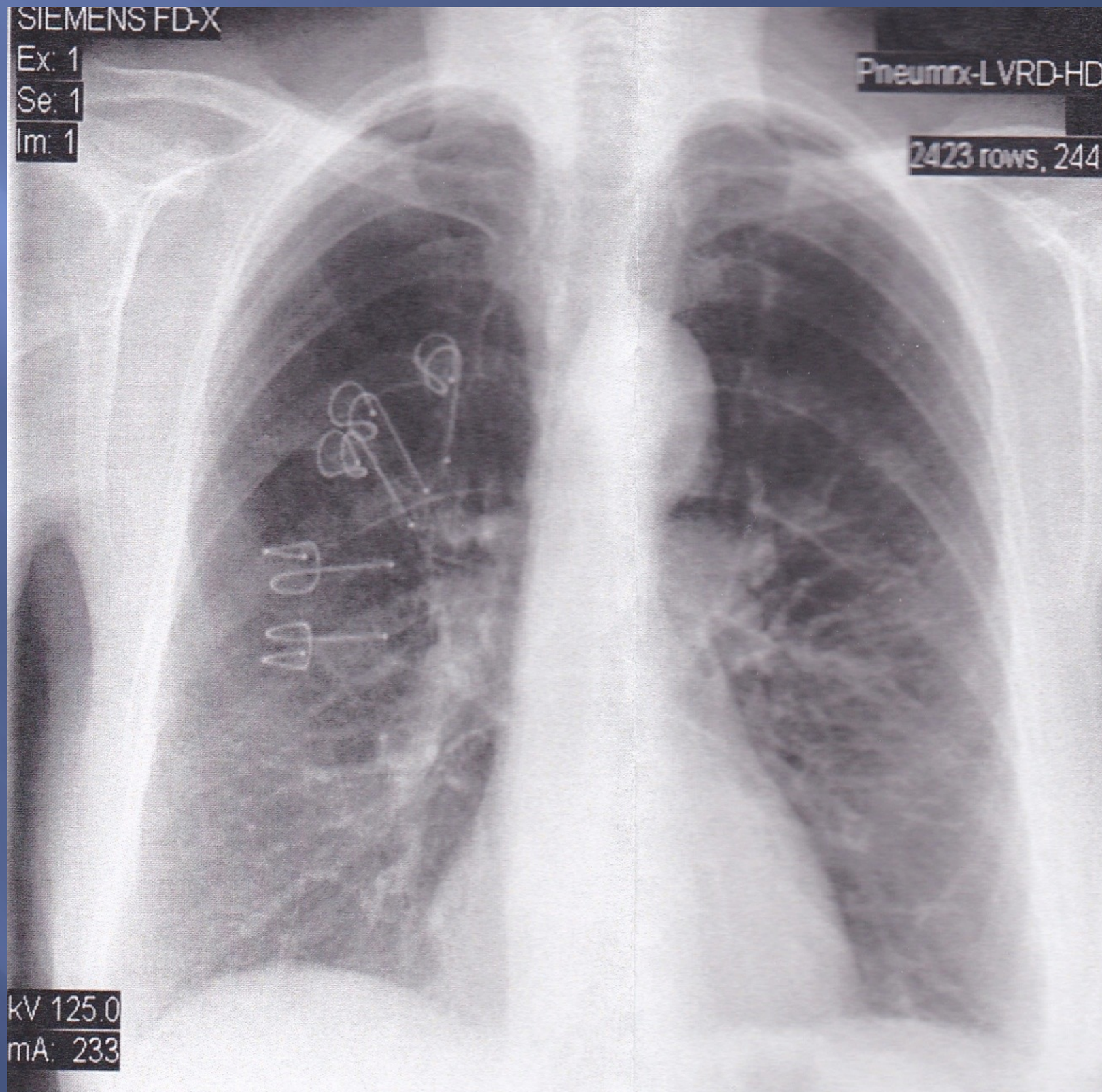


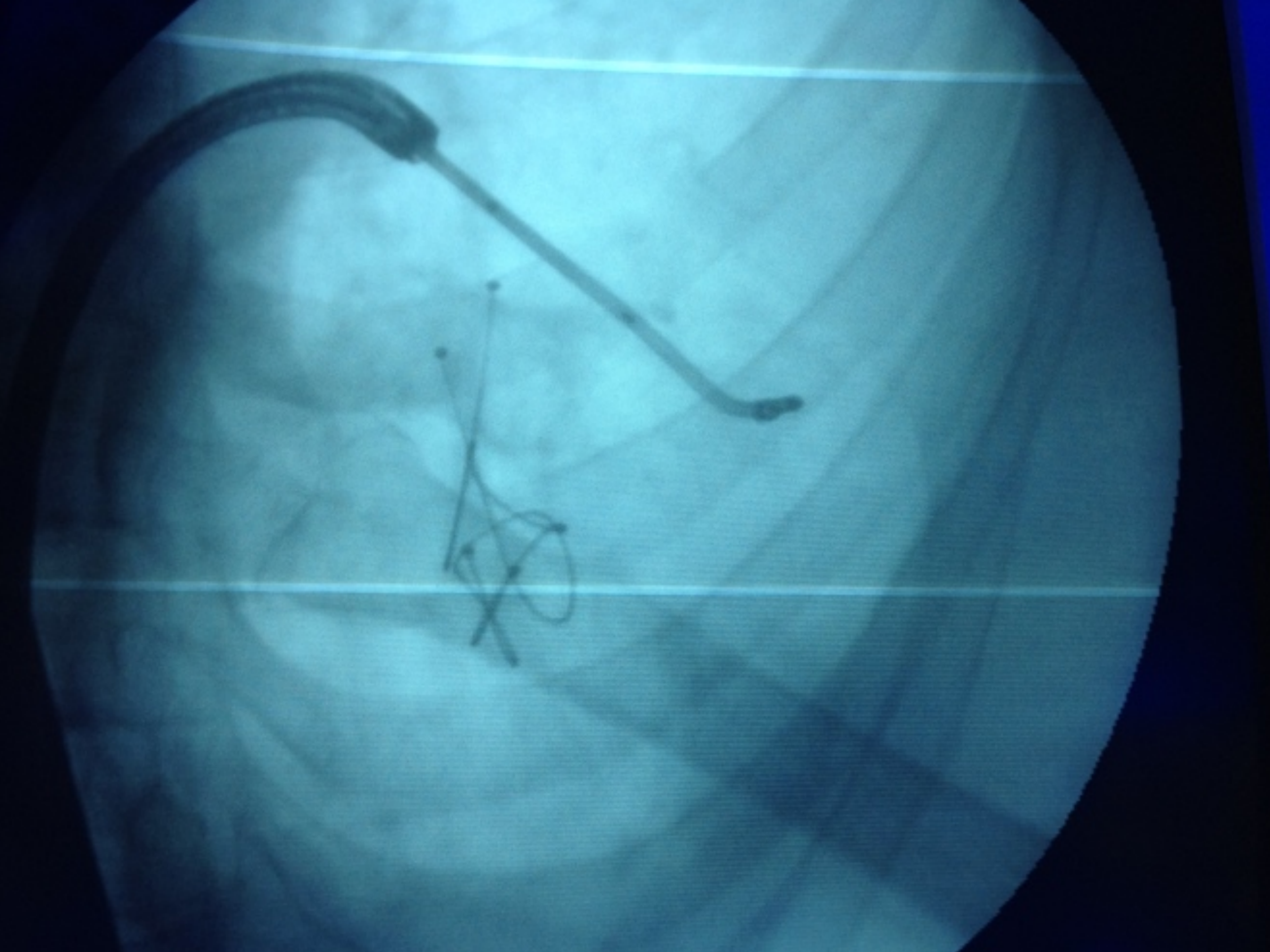
Insufficient structural tissue



Lung volume reduction coils in Emphysema

New Bronchoscopic treatment





LVRC Long-term data

- Follow-up of the patients treated with LVR-coils in our pilot studies showed that the coil treatment is **safe** with no late pneumothoraces, coil migrations or unexpected adverse events.
- Clinical benefit gradually declines over time; at 3 years post-treatment, around 50% of the patients maintained improvement in 6MWD, SGRQ and mMRC.

DOI: 10.1111/resp.12435 Respirology (2014)

Lung volume reduction coil treatment for patients with severe emphysema: a European multicentre trial

- **Results** Sixty patients (60.9 ± 7.5 years, forced expiratory volume in 1 s (FEV_1) 30.2 ± 6.3% pred) were bronchoscopically treated with coils (55 bilateral, 5 unilateral), with a median of 10 (range 5–15) coils per lobe. Post hoc analyses showed significant responses for SGRQ (St George's Resp Qnaire), 6MWD (6 min walking distance) and RV in patients with both heterogeneous and homogeneous emphysema.
- **Conclusions** LVR coil treatment results in significant clinical improvements in patients with severe emphysema, with a good safety profile and sustained results for up to 1 year.
- Deslee et al, Thorax (2014)

“Last Request: Please Don’t Smoke”
My step-father asked
me to take this picture of him after he regained consciousness in ICU. He lost the fight with lung disease (Asbestosis, COPD, and Pnuemonia)
Friday morning. I will be away for a little while

THANK YOU


THANK
YOU