CHRONIC OBSTRUCTIVE LUNG DISEASE UPDATES 2019

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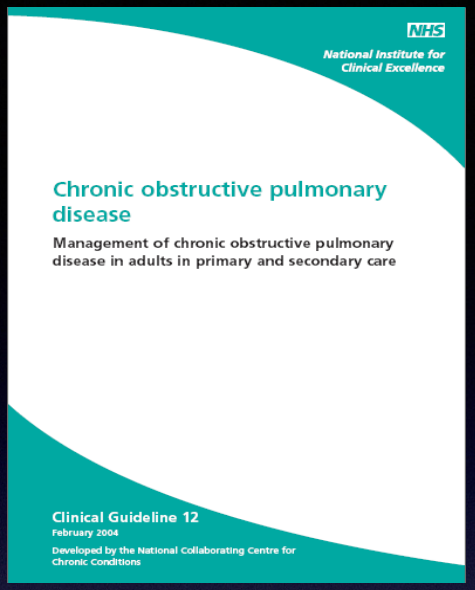
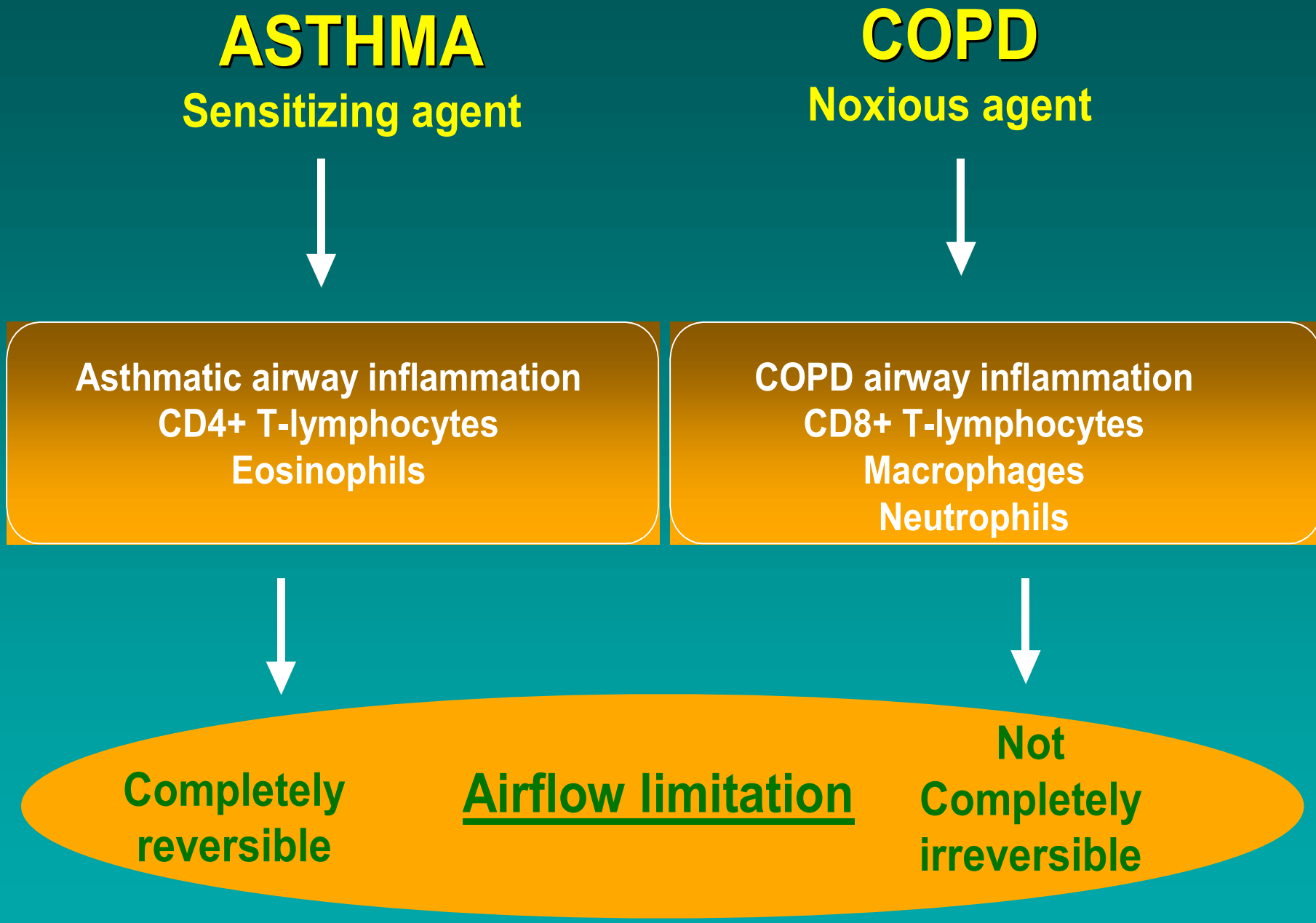
COPD



- 'COPD is a disease characterised by airflow limitation'

=> Spirometry is essential to make the diagnosis

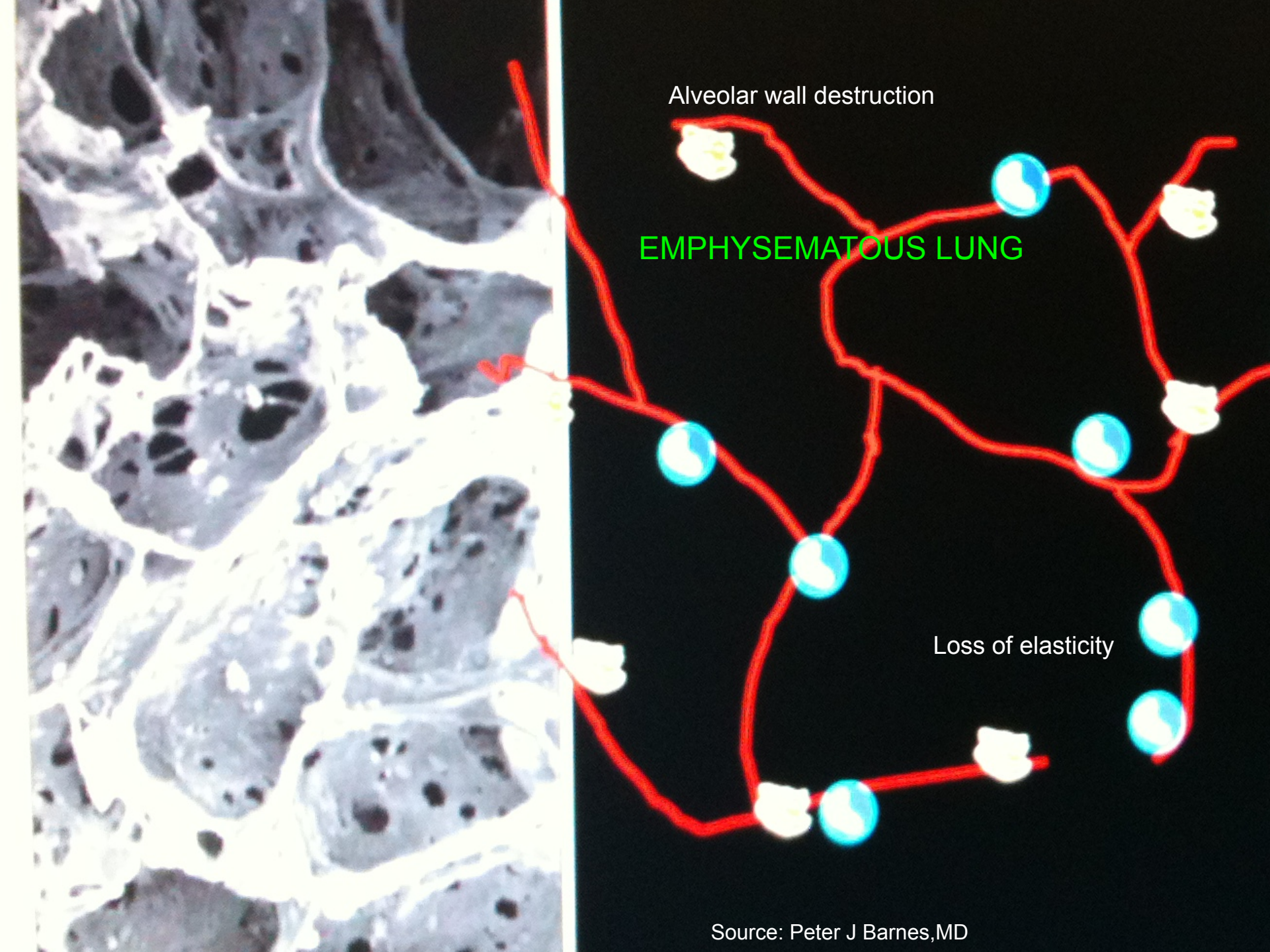

ASTHMA
Sensitizing agent
COPD
Noxious agent
Asthmatic airway inflammation
CD4+ T-lymphocytes
Eosinophils
COPD airway inflammation
CD8+ T-lymphocytes
Macrophages
Neutrophils
Completely reversible
Airflow limitation
Not Completely irreversible

COPD

is a preventable and
treatable disease characterized by airflow limitation - not fully reversible.
The airflow limitation is usually progressive and associated with an inflammatory response of the lungs to noxious particles or gases, primarily caused by cigarette smoking.

Pathogenesis of COPD

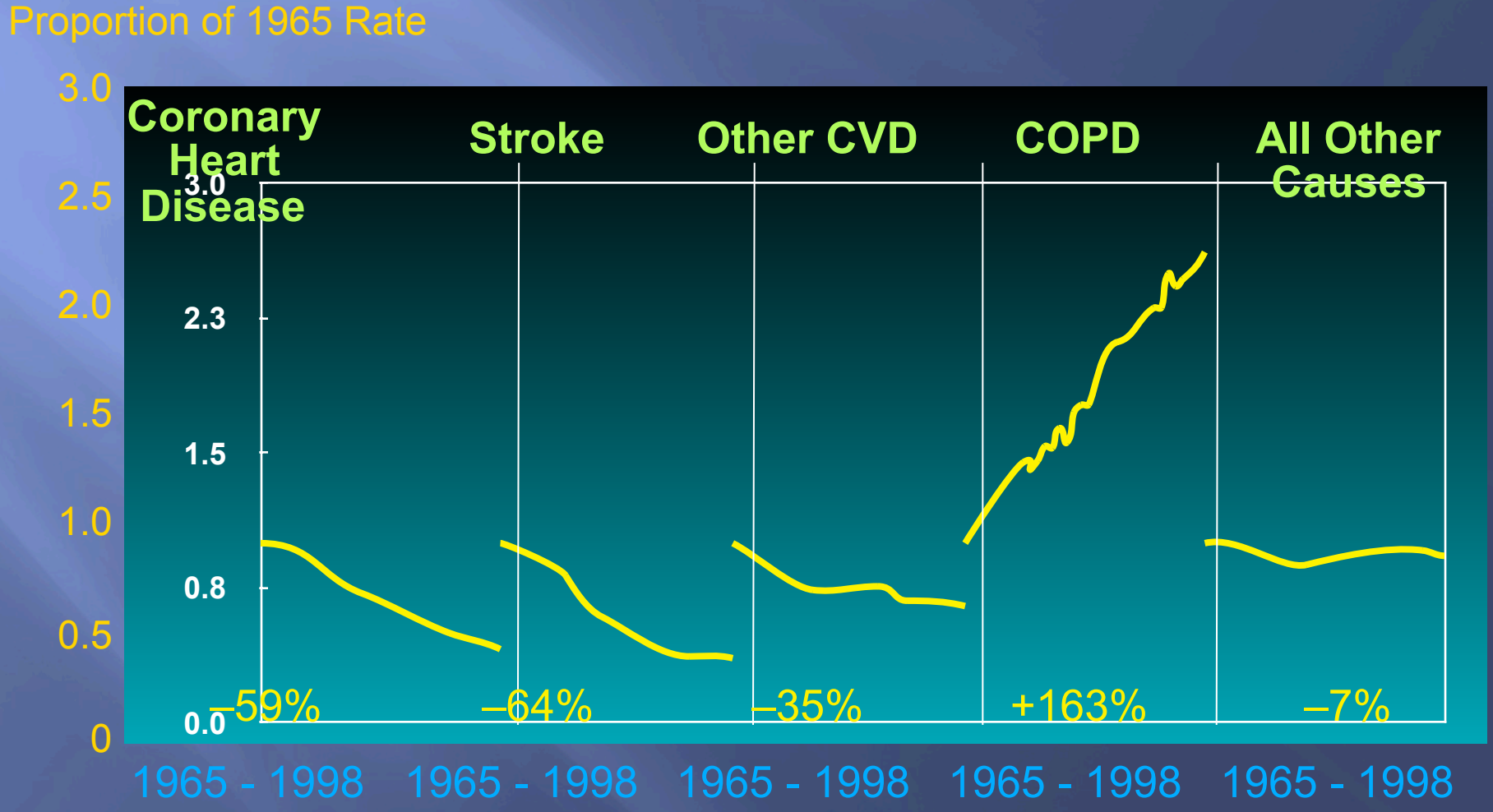
- **NOXIOUS AGENT**
  (tobacco smoke, pollutants, occupational agent)

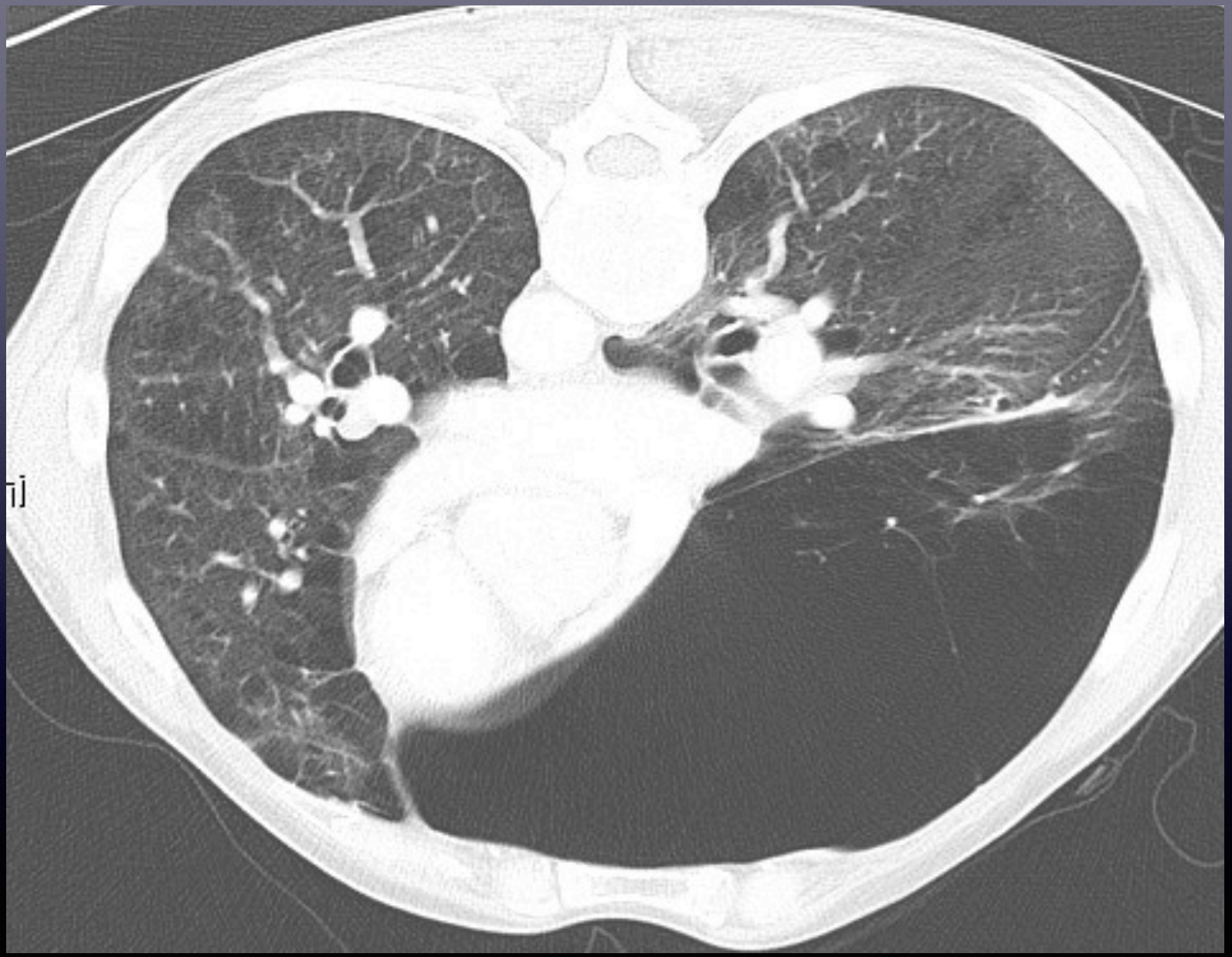


Source: Peter J Barnes,MD

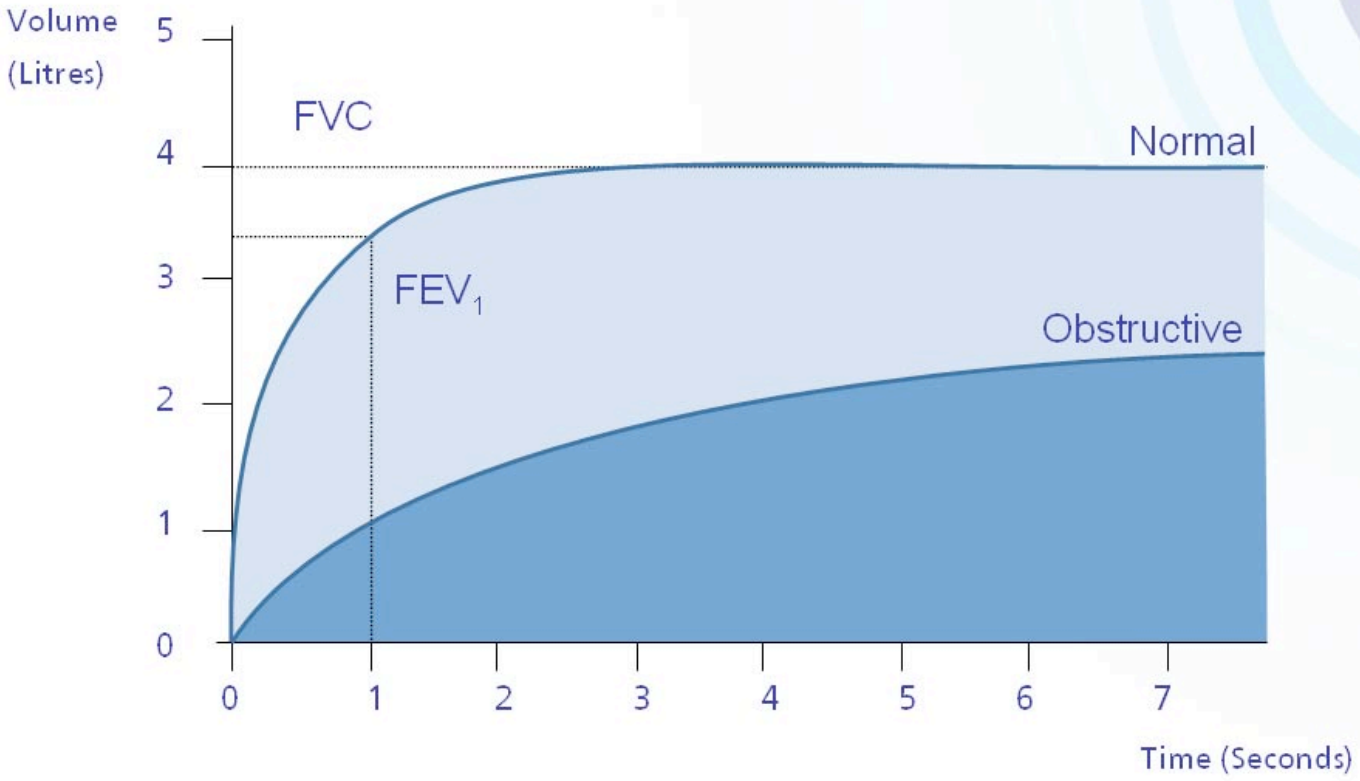
Percent Change in Age-Adjusted Death Rates, U.S., 1965-1998

COPD will be the third leading cause of death by 2020

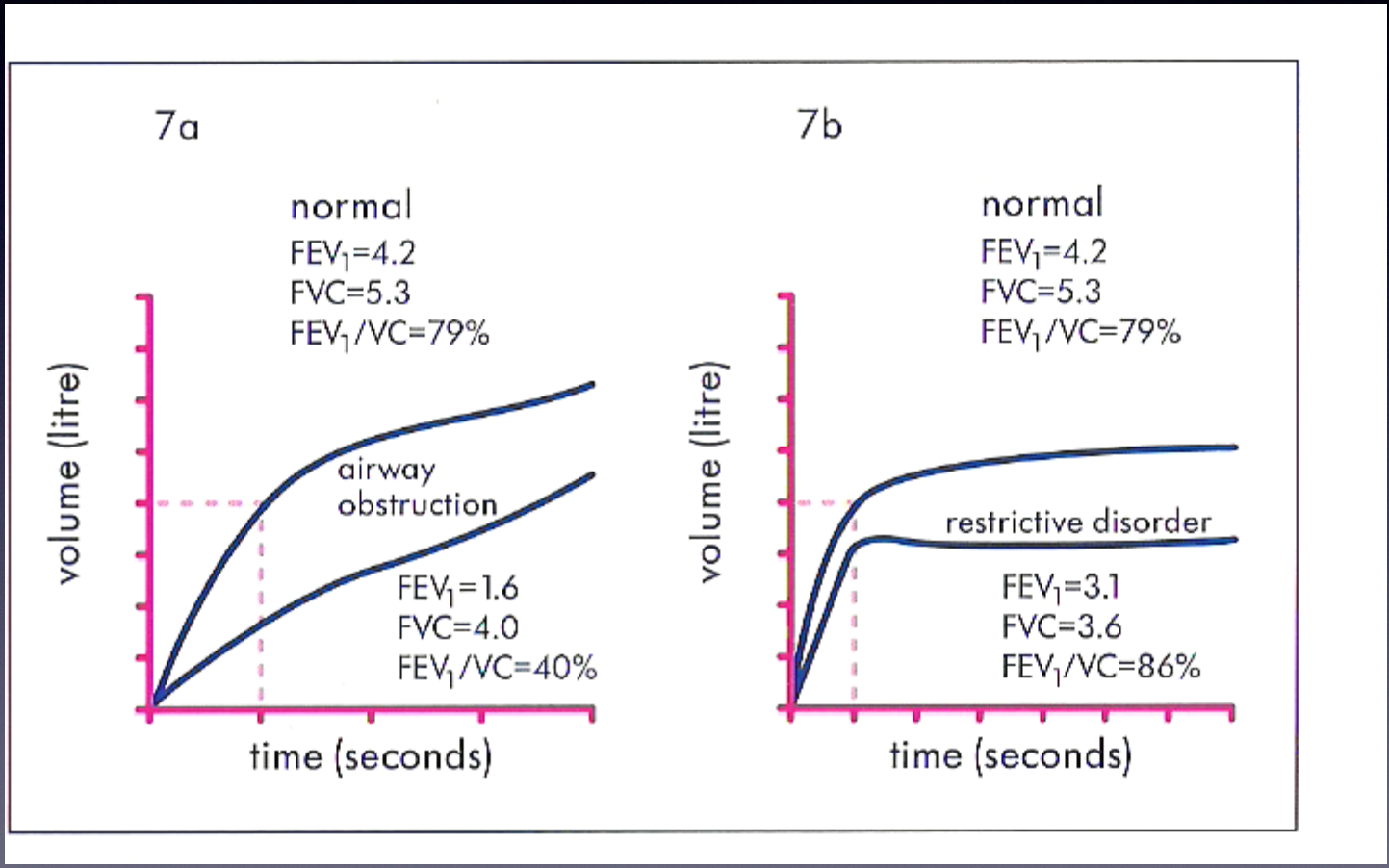




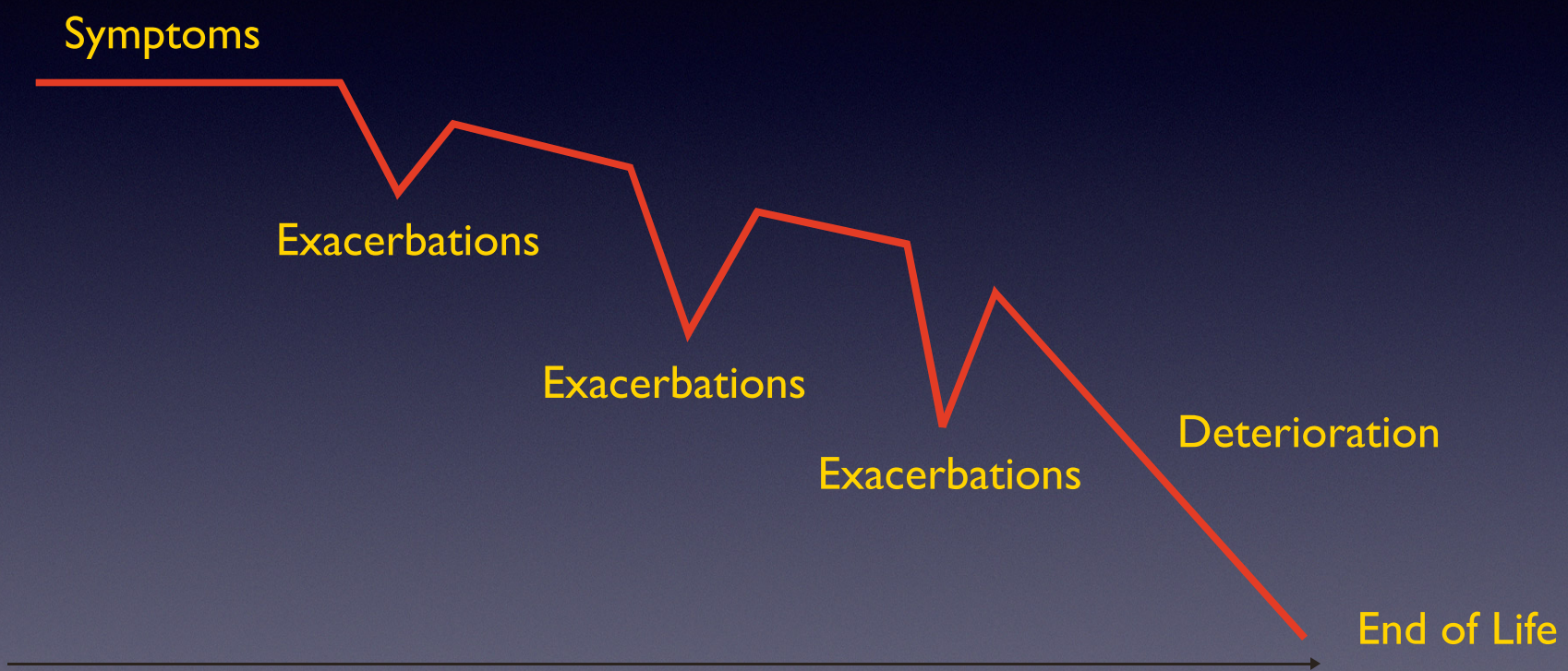
SPIROMETRY CONTINUED



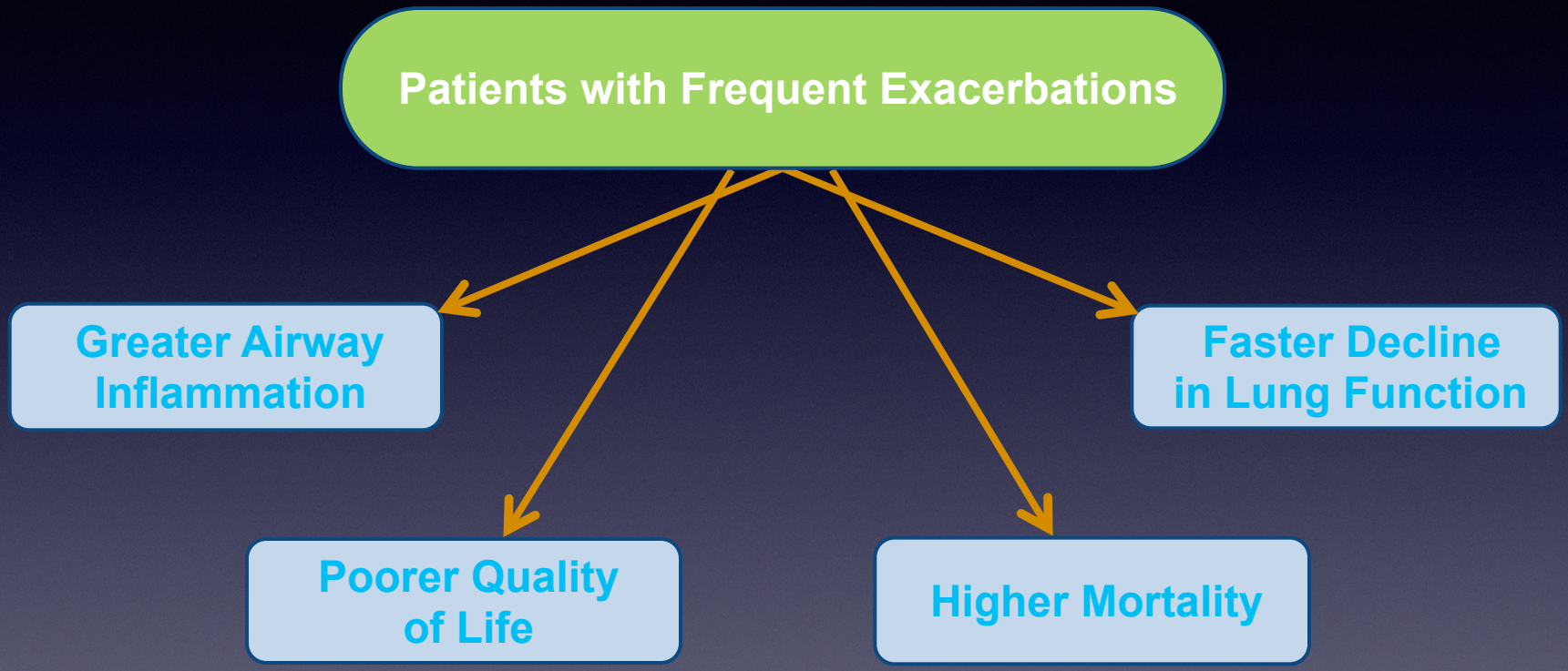
Basic spirometry



Disease Trajectory of a Patients with COPD exacerbations



Impact of exacerbations in COPD



Wedzicha JA, Seemungal TA. Lancet 2007;370:786-796.

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

- mMRC

SOB on strenuous exercise	0
SOB on moderate exercise, SOB on hurrying on a flat or on slight inclines	1
Walk slower than most people my age have to stop own pace	2
Have to stop every few minutes even on level ground	3
Too breathless to leave the house	4

Algorithm 2a:
Breathlessness & exercise limitation

SABA or SAMA PRN

FEV1>50%

FEV1<50%

Exacerbations or persistent SOB

LABA

LAMA Discontinue SAMA

LAMA preferred over regular SAMA

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

GOLD GUIDELINES

GOLD 1 - mild: FEV1≥ 80% predicted
GOLD 2 - moderate: 50% ≤ FEV1 < 80% predicted
GOLD 3 - severe: 30% ≤ FEV1 < 50% predicted
GOLD 4 - very severe: FEV1 <30% predicted.

The GOLD guideline uses a combined COPD assessment approach to group patients according to symptoms and previous history of exacerbations. Symptoms are assessed using the Modified British Medical Research Council (mMRC) or COPD assessment test (CAT) scale. These can be found in the GOLD guidelines. [1]

Group A: low risk (0-1 exacerbation per year, not requiring hospitalisation) and fewer symptoms (mMRC 0-1 or CAT <10)

Group B: low risk (0-1 exacerbation per year, not requiring hospitalisation) and more symptoms (mMRC≥ 2 or CAT≥ 10)

Group C: high risk (≥2 exacerbations per year, or one or more requiring hospitalisation) and fewer symptoms (mMRC 0-1 or CAT <10)

Group D: high risk (≥2 exacerbations per year, or one or more requiring hospitalisation) and more symptoms (mMRC≥ 2 or CAT≥ 10

Triple Therapy

In group D patients who develop further exacerbations on LABA/LAMA therapy, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines suggest two alternative pathways: escalation to LABA/LAMA/ICS or switch to LABA/ICS. [1] Multiple studies support triple therapy with LABA/LAMA/ICS as being superior to single- or double-agent therapy with LABA/LAMA or LABA/ICS regarding rate of moderate to severe COPD exacerbations [77] [78] [79] [80] and rate of hospitalisation. [81] [82] If patients treated with LABA/LAMA/ICS (triple therapy) still have exacerbations, additional options include adding roflumilast, adding a macrolide antibiotic, and stopping the ICS. [1] Stopping the ICS may be appropriate if a lack of efficacy is reported, if there is an elevated risk of adverse events (including pneumonia), or if there would be no significant harm from withdrawal of ICS. [1]

Treatment options in GOLD Group D patients

More

In group D patients who develop further exacerbations on LABA/LAMA therapy, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines suggest two alternative pathways: escalation to LABA/LAMA/ICS or switch to LABA/ICS. [1]

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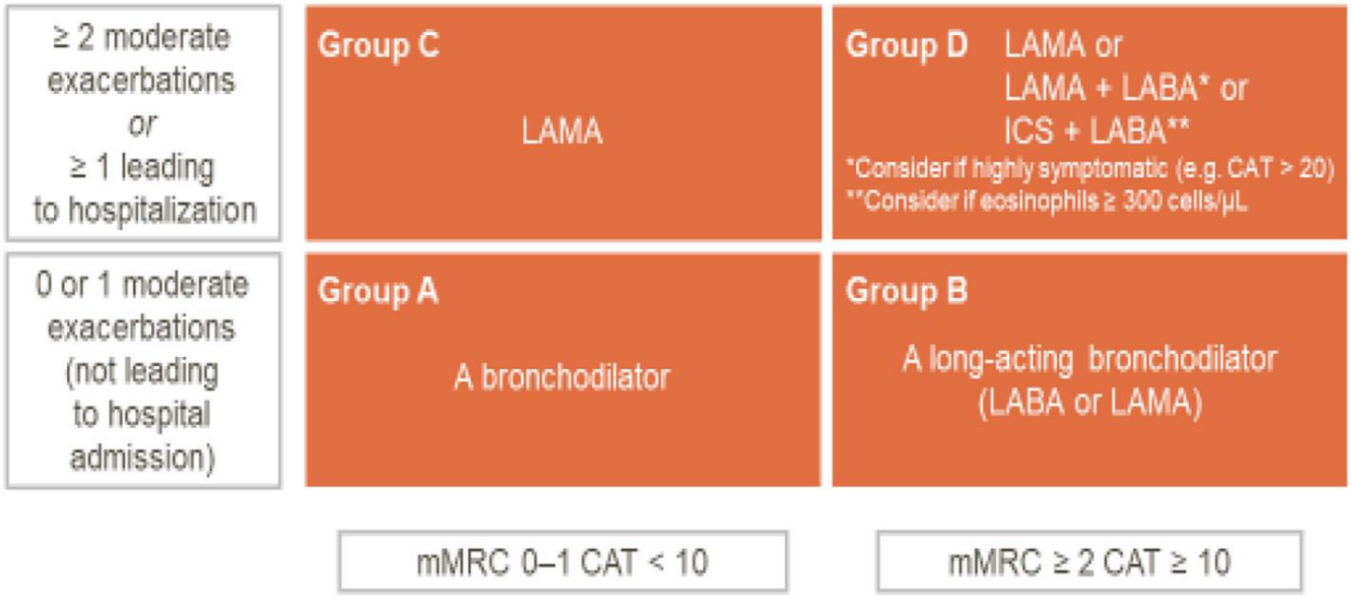
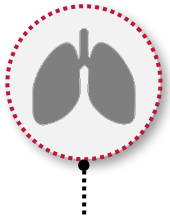
GOLD 2019: GUIDANCE FOR INITIAL PHARMACOLOGICAL TREATMENT[1]



Initiation of pharmacological management of COPD should be made according to the individualised assessment of symptoms and exacerbation risk.

COPD treatment should be individualised based on symptoms and exacerbation risk

For SYMPTOMATIC patients

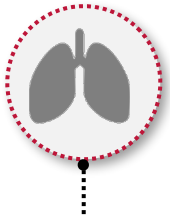


Symptomatic despite as-needed SABA/ SAMA

LAMA/LABA

Maximal bronchodilation

For SYMPTOMATIC patients on COPD maintenance therapy and a HISTORY of EXACERBATIONS



Symptomatic despite COPD maintenance therapy

History of COPD exacerbations

ICS/LAMA/LABA

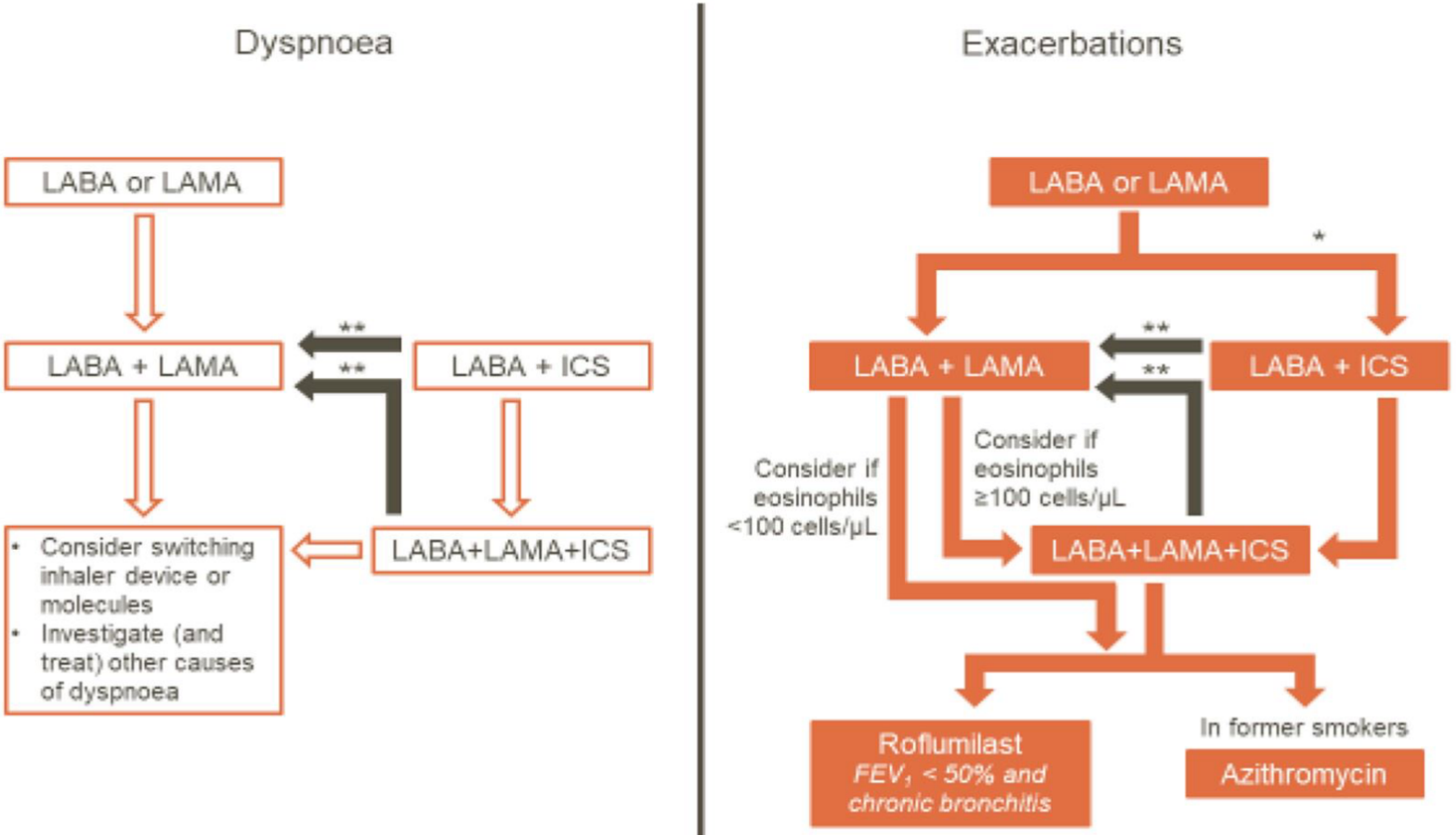
Triple Therapy

CAT, COPD Assessment Test; COPD, chronic obstructive pulmonary disease; ICS, inhaled corticosteroids; LABA, long-acting β_2-agonist; LAMA, long-acting muscarinic antagonist; mMRC, Modified Medical Research Council Dyspnoea Scale; SABA, short-acting β_2-agonist; SAMA, short-acting muscarinic agonist

Global Initiative for Chronic Obstructive Lung Disease (GOLD) Report 2019. Available from: http://goldcopd.org. Accessed November 2018

GOLD 2019: Position of Triple Therapy[1]

- A separate algorithm is provided for follow-up treatment. This is independent to the patients' GOLD group at diagnosis
- Treatment options are individualised based on if a patient is presenting with dyspnoea or exacerbations. Both pathways include triple therapy
- The exacerbation algorithm should also be used for patients who require a change in treatment for both dyspnea and exacerbations.



*Consider if eosinophils ≥300 cells/µL, or ≥100 cells/µL and ≥2 moderate exacerbations / 1 hospitalisation.
**Consider de-escalation of ICS or switch if pneumonia, inappropriate indication or lack of response to ICS.

Ensuring the right patient receives the right COPD treatment

Benefits and risks of ICS use in COPD management

GOLD supports the individualisation of COPD treatment: long-established benefits of ICS-containing treatments need to be balanced with risks[1]

GOLD further states:

- Results from ICS withdrawal studies are equivocal
- ICS withdrawal can be considered if:
  - Patient experienced a pneumonia
  - Inappropriate ICS original indication, or
  - Lack of response to an ICS

COPD, chronic obstructive pulmonary disease; GOLD, Global Initiative for Chronic Obstructive Lung Disease; ICS, inhaled corticosteroid

Global Initiative for Chronic Obstructive Lung Disease (GOLD) Report 2019. Available from: http://goldcopd.org. Accessed November 2018

Ensuring the right patient receives the right COPD treatment

Benefits and risks of ICS use in COPD management

Patients who may benefit the most from ICS-containing therapy:

- remain symptomatic on existing maintenance therapy and have a history of exacerbations[1]
- could have elevated blood eosinophil levels combined with other clinical parameters[1]
- have a diagnosis of asthma or features suggestive of asthma containing treatments need to be balanced with risks[1]

1. .Global Initiative for Chronic Obstructive Lung Disease (GOLD) Report 2019. Available from: http://goldcopd.org. Accessed November 2018

Ensuring the right patient receives the right COPD treatment

Benefits and risks of ICS use in COPD management

Benefits[1,2]

- Well-established
- Recommended as an treatment option for patients with a history of exacerations
- Reduced number of exacerbations*
- Improved lung function*
- Improved QoL*

Risks[3–5]

- Adverse events, e.g. pneumonia, in patients:
  - with history of pneumonia or exacerbations
  - Current smokers
  - ≥55 years of age
  - with poor lung function
  - with low body mass index
  - with multiple comorbid diseases

*compared to placebo or LABA alone
COPD, chronic obstructive pulmonary disease; GOLD, Global Initiative for Chronic Obstructive Lung Disease; ICS, inhaled corticosteroid; QoL, quality of life

UK/TLY/0012/18 (4)
November 2018

1.Global Initiative for Chronic Obstructive Lung Disease (GOLD) Report 2019. Available from: http://goldcopd.org. Accessed November 2018; 2. Nannini L et al. Cochrane Database Syst Rev. 2013;CD006829; 3. Kew K et al. Cochrane Database Syst Rev. 2014;CD010115; 4. Mullerova H et al. Respir Med. 2012;106:1124–1133; 5. DiSantostefano R et al. Int J Chron Obstruct Pulmon Dis. 2014;9:457–468.

Impact of ICS withdrawal on lung function and QoL in patients with a history of exacerbations*

Current evidence does not provide compelling argument for ICS withdrawal

- Following ICS withdrawal[1-6]
  - Increase in exacerbations
  - Trend towards decline in lung function (FEV_1 reduction: 23–50 mL)
  - Trend towards worsened QoL (SGRQ score +0.5 to +2.5)

* Patients with a history of at least 1 exacerbation in the last 12 months
FEV_1, forced expiratory volume in 1 second; ICS, inhaled corticosteroids; QoL, quality of life; SGRQ, St George's Respiratory Questionnaire

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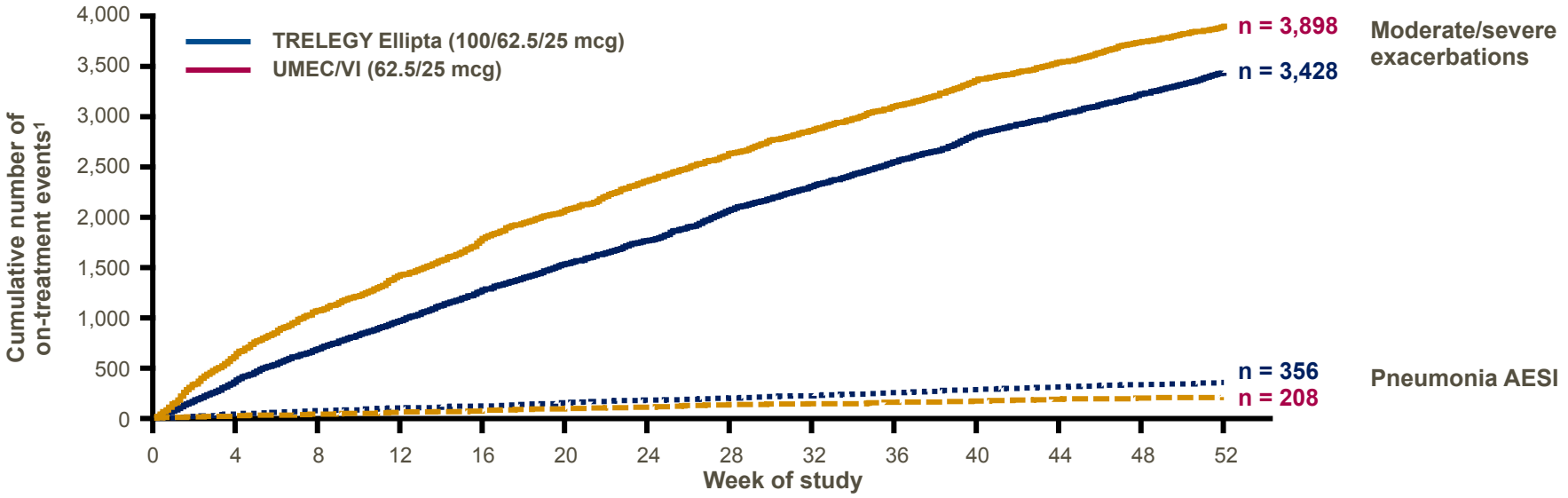
November 2018

1. Wouters EF, et al. Thorax. 2005;60:480–487; 2. Choudhury AB, et al. Respir Res. 2007;8:93; 3. Chapman KR, et al. Am J Respir Crit Care Med. 2018;198:329–339; 4. van der Valk P, et al. Am J Respir Crit Care Med. 2002;166:1358–1363; 5. Magnussen H, et al. N Engl J Med. 2014;371:1285–129
Watz H, et al. Lancet Respir Med. 2016;4:390–398.

TRELEGY Ellipta vs LAMA/LABA demonstrates a greater benefit in exacerbation reduction compared to the risk of pneumonia[1]



- The increased risk of pneumonia, which is a class effect with all ICS, has not been associated with an increased risk of death[2,3]
- Conversely, exacerbations, in particular frequent exacerbations and those leading to hospitalisations, are associated with a significant increase in death[4–6]
- Thus, ICS-containing therapy demonstrates a favourable benefit:risk profile

FF, fluticasone furoate; UMEC, umeclidinium; VI, vilanterol

UK/TLY/0012/18 (4)
November 2018

1. GlaxoSmithKline. Data on file: RF/TLY/0053/18; 2. Kew KM & Seniukovich A. Cochrane Database Syst Rev. 2014;3:CD010115; 3. European Medicines Agency. PRAC reviews known risk of pneumonia with inhaled corticosteroids for chronic obstructive pulmonary disease. Available at: http://www.ema.europa.eu/docs/en_GB/document_library/Press_release/2016/03/WC500203476.pdf. (accessed August 2018); 4. Suissa S, et al. Thorax. 2012;67:957–963; 5. Lahousse L, et al. Eur Heart J. 2015;36:1754–1761; 6. Black-Shinn JL, et al. COPD. 2014;11:546–551.

Safety of ICS withdrawal

Lack of difference in AEs after ICS withdrawal compared with ICS continuation

Study	Safety
COPE[1] (N=244)	Similar frequency of SAEs in placebo (13%) versus FP (12%) Primarily respiratory events
COSMIC[2] (N=497)	No difference in AEs between groups
WISP[3] (N=260)	Three COPD deaths in FP group; all had severe disease and frequent exacerbations prior to trial No difference in AEs between groups
WISDOM[4] (N=2458)	No difference in AEs between groups Pneumonia: ICS withdrawal = 5.5%; ICS continuation = 5.8%
SUNSET[5]	No difference in AEs between groups Pneumonia: ICS withdrawal = 1.1%; ICS continuation = 1.7%
INSTEAD[6] (N=581)	No notable differences in AEs between groups
OPTIMO[7] (N=816)	Safety not reported in publication

Across-study comparisons are limited due to differences in study design and patient population

AE, adverse event; COPD, chronic obstructive pulmonary disease; FP, fluticasone propionate; ICS, inhaled corticosteroids; SAE, serious AE

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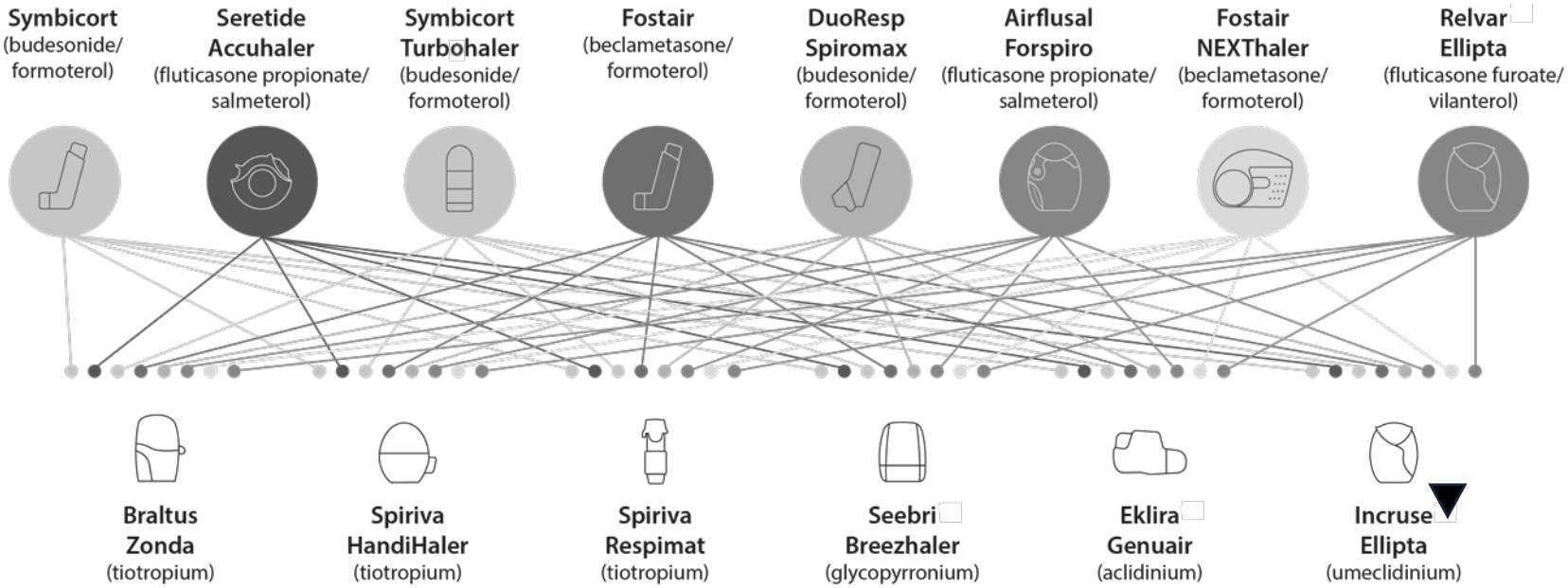
November 2018

1. van der Valk P et al. Am J Respir Crit Care Med. 2002:166:1358–1363; 2. Wouters EF et al. Thorax. 2005;60:480–487; 3. Choudhury AB et al. Respir Res. 2007;8:93; 4. Magnussen H et al. N Engl J Med. 2014;371:1285–1294; 5. Chapman KR, et al. Am J Respir Crit Care Med. 2018 Aug 1;198(3):329-339; 6. Rossi A et al. Eur Respir J. 2014;44:1548–1556; 7. Rossi A et al. Respir Res 2014;15:77.

OVER 40 DIFFERENT COMBINATIONS EXIST FOR PATIENTS REQUIRING ICS/LABA + LAMA

35% of patients with COPD in the UK are already prescribed ICS/LABA + LAMA



The diagram does not represent all inhalers or all possible combinations

ICS / LABA Combinations:

- 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

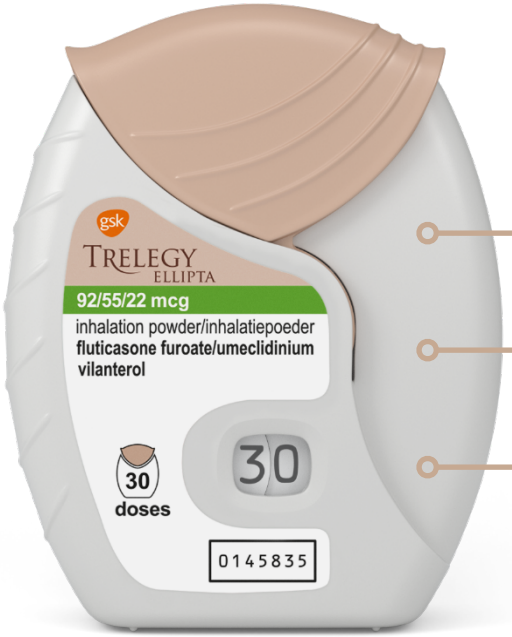
For COPD

Anoro▼
(umeclidinium bromide/ vilanterol)
LAMA/LABA

Relvar▼
(fluticasone furoate/ vilanterol)
ICS/LABA

Incruse▼
(umeclidinium bromide)
LAMA

INTRODUCING TRELEGY ELLIPTA



the only COPD triple therapy delivered in a single daily inhalation

ICS (FLUTICASONE FUROATE 92 MCG)

LAMA (UMECLIDINIUM 55 MCG)

LABA (VILANTEROL 22 MCG)

all delivered via the easy-to-use Ellipta inhaler[1]

TRELEGY ELLIPTA IS INDICATED AS A MAINTENANCE TREATMENT IN ADULT PATIENTS WITH MODERATE TO SEVERE COPD WHO ARE NOT ADEQUATELY TREATED BY A COMBINATION OF AN ICS AND A LABA OR A COMBINATION OF A LONG-ACTING B2-AGONIST AND A LONG-ACTING MUSCARINIC ANTAGONIST[2]

COPD: Chronic obstructive pulmonary disease; ICS: Inhaled corticosteroid;
LAMA: Long-acting muscarinic antagonist; LABA: Long-acting beta2 agonist;

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November 2018

1. van der Palen J *et al*. NPJ Prim Care Respir Med 2016; 26:16079 ; 2. Trelegy Ellipta (fluticasone furoate/umeclidinium/vilanterol 92/55/22 mcg) Summary of Product Characteristics

THE ELLIPTA INHALER IS EASY TO USE[1]

With just three steps, patients simply: Open, inhale, close

>95% of patients with COPD were able to use Ellipta correctly the first time following instruction[2]

COPD: Chronic obstructive pulmonary disease;

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November 2018

1. van der Palen J *et al*. NPJ Prim Care Respir Med 2016; 26:16079 2 Riley JH *et al.* Int J Chron Obstruct Pulmon Dis 2016; 11: 1873-1880;

TRELEGY ELLIPTA DEMONSTRATED SIGNIFICANT IMPROVEMENTS IN LUNG FUNCTION AND HEALTH-RELATED QUALITY OF LIFE VS. SYMBICORT TURBOHALER WITH ADDITIONAL IMPROVEMENTS IN EXACERBATION RATE[1]

TRELEGY ELLIPTA (n=911) VS. SYMBICORT TURBOHALER (n=899) DEMONSTRATED…

SUPERIOR IMPROVEMENT IN LUNG FUNCTION

A significant

171 mL

lung function improvement from baseline at 24 weeks

124 mL vs. -29 mL trough FEV_1 change, respectively (95% CI: 148, 194 mL; p<0.001)[1]

SUPERIOR QUALITY OF LIFE IMPROVEMENT

And a significant

2.2 unit

improvement from baseline in SGRQ score* at 24 weeks

6.6 vs. 4.3 units improvement, respectively (95% CI: 1.0, 3.5; p<0.001)[1]

SUPERIOR EXCERBATION RATE REDUCTION

35%

relative reduction in mean annual rate of moderate/severe COPD exacerbations, calculated over 24 weeks (p=0.002)

0.22 vs. 0.34, respectively (ratio: 0.65 [95% CI: 0.49, 0.86]; absolute rate reduction 0.12)

CI, confidence interval; FEV1, forced expiratory volume in one second; SGRQ, St. George's Respiratory Questionnaire
*The SGRQ is a validated disease-specific health status assessment for use in asthma and COPD and a difference of 4 units or more is considered clinically meaningful[3]

1. Lipson DA *et al*. 2017. Am J Respir Crit Care Med 196(4): 438–446

Dry powder Turbohaler

Right Patient. Right Treatment. Right Time.

LAMA/LABA

For patients who remain symptomatic on a short acting bronchodilator

Duaklir Genuair
aclidinium bromide/formoterol

ICS/LABA

For patients with a history of exacerbations

Symbicort
budesonide/formoterol

ICS/LABA + LAMA

For patients who remain symptomatic and have a history of exacerbations

Symbicort
budesonide/formoterol

\+

Eklira Genuair
aclidinium bromide

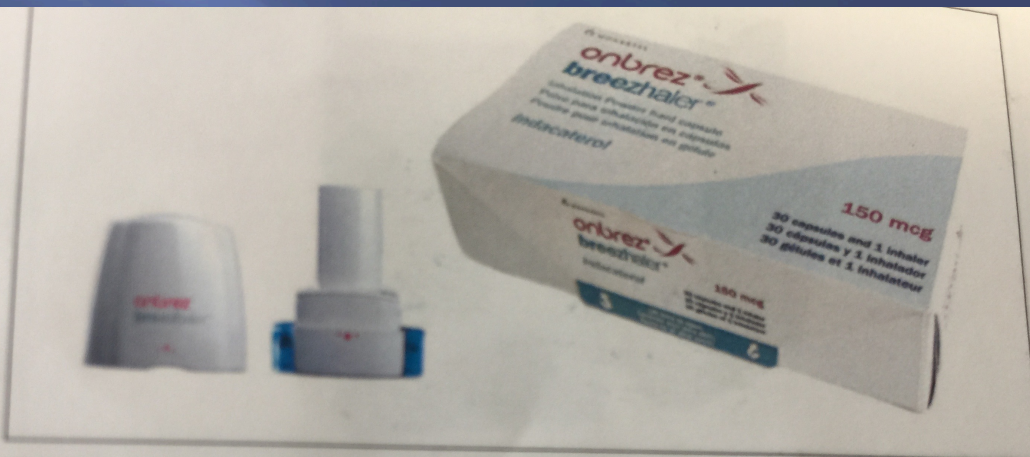
Seretide Accuhaler

- 500 mcg

HANDIHALER

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


When your first
step is LAMA*,
make
step
£25.80
every 30 days,
saving £7.70 vs Sp
HandiHaler® refill
Zonda®
TEVA



ONBREZ BREEZHALER 150 microgram Novartis

Indacaterol 150 microgram per cap

Long acting reliever-breath actuated inhaler, dry powder

Price: 30 caps plus inhaler=£32.19


DuoResp®
Spiromax®
160 mcg/4,5 mcg
inhalatiepoeder
budesonide/
formoterol-
fumaraat-
dihydraat
H37230
PP3820

NEXThaler
Training Device
Not for therapeutic use.
For training purposes only.
2012/11-E-03015
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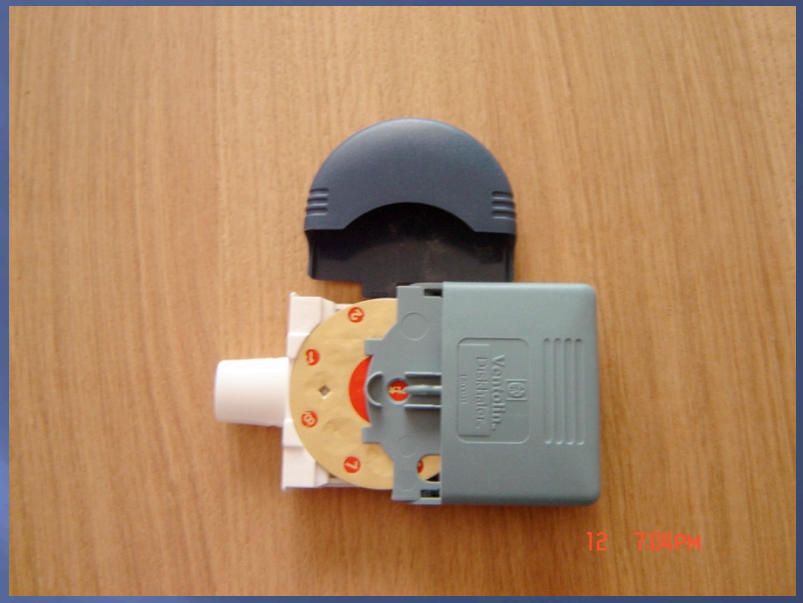
DRY POWDER INHALERS



Usage of Indacaterol Breezehaler

Hear

Feel

See

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	Minima
Tiotropium	Yes (A)	Yes (A)	Yes (A)	Yes (A)	Yes (A)	Yes (B)	NA	NA	Minima
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 polycythemia
- Increase exercise tolerance
- Improvement in QOL & QOS
- Reduced cost to healthcare

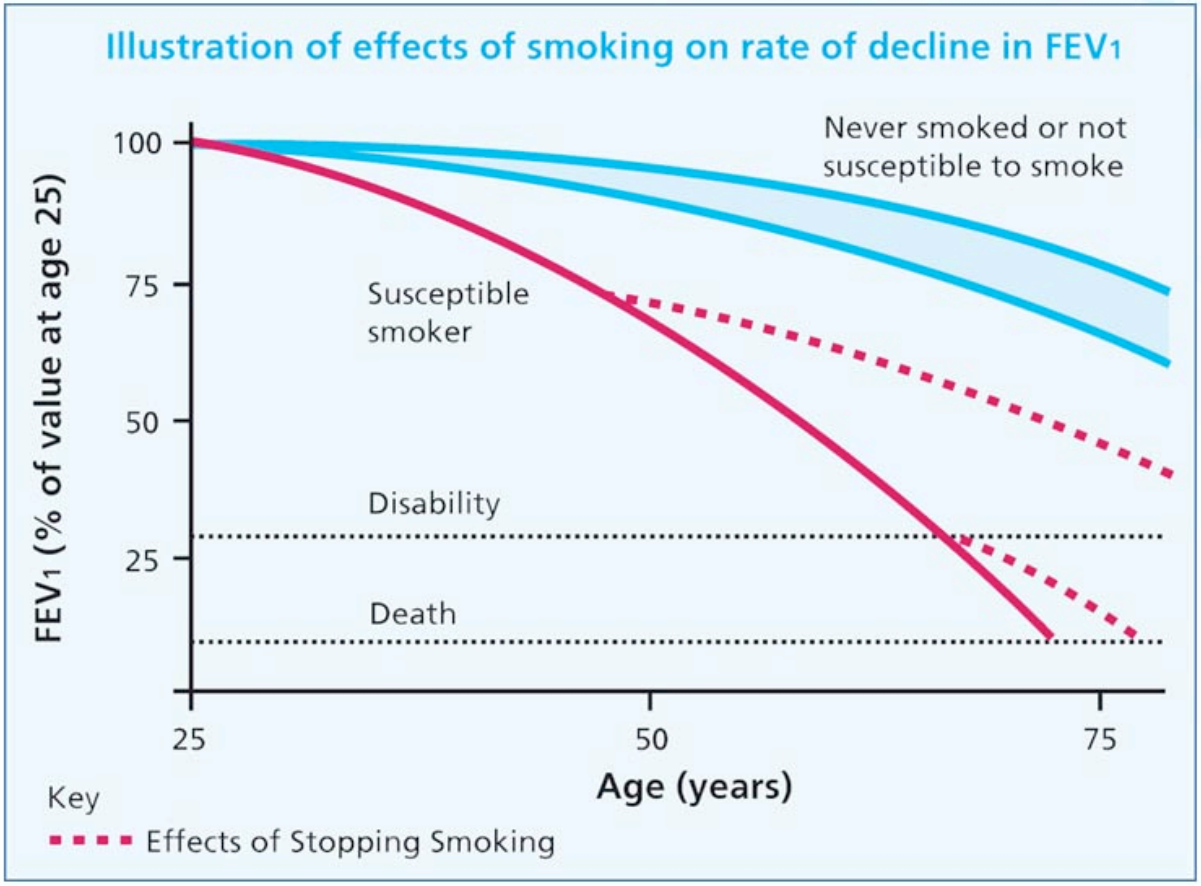
Liquid oxygen Dewar & better QOL

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




10
Pulmonary Rehabilitation
Elena
Paul
Sarah
David P
David W

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

Home Ventilation:

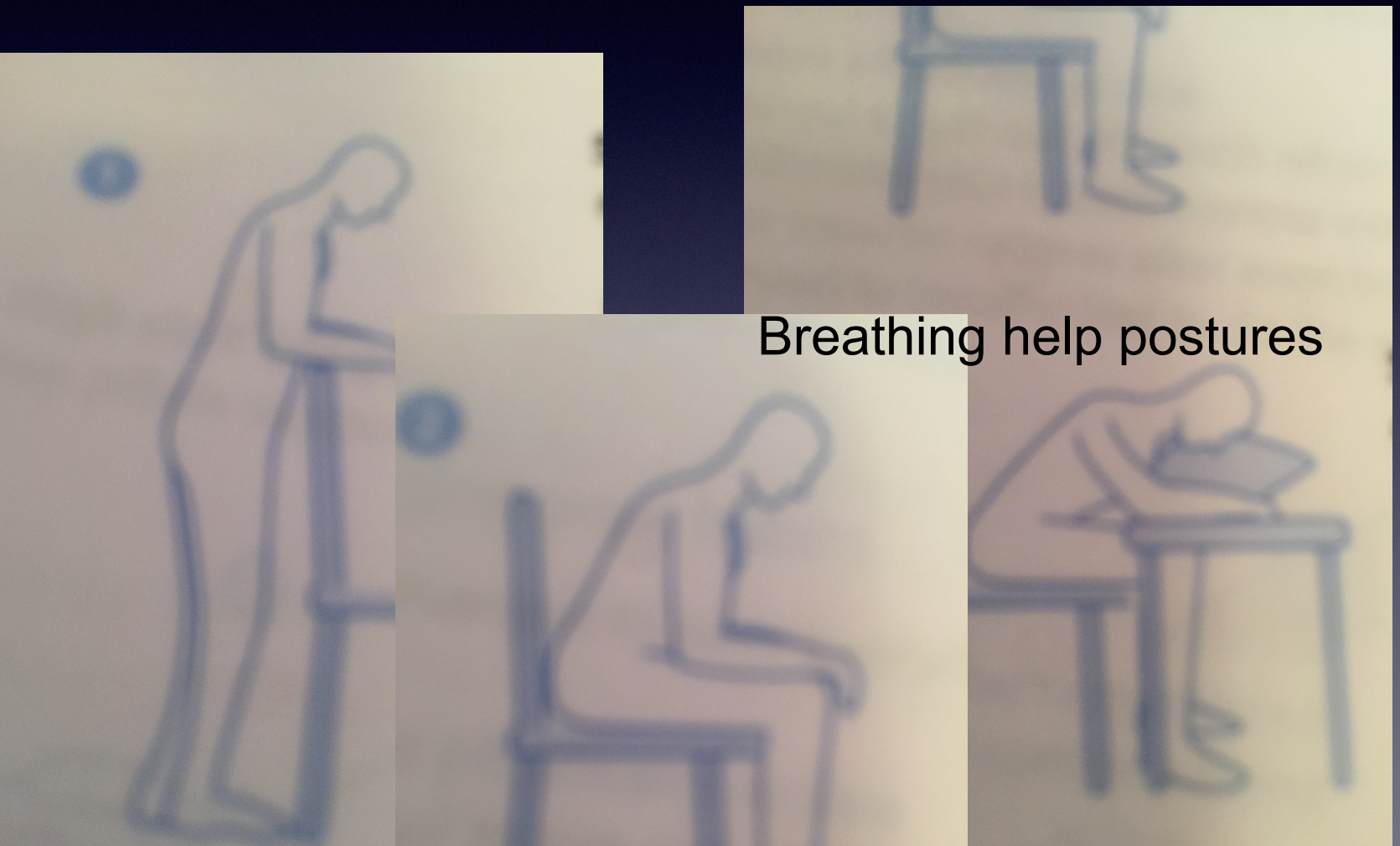
- Patients admitted with pH less than7.3 should be considered for Domiciliary Non invasive ventilation
- COPD with: recurrent (>3) AHRF requiring NIV or intolerance of LTOT (because of CO2 retention) with symptomatic sleep disturbance

Nutrition

- Weight loss and a depletion of fat-free mass (FFM) may be observed in stable COPD patients.
- Being underweight is associated with an increased mortality risk.
- Criteria to define weight loss are:
  - Weight loss >10% in the past 6 months or >5% in the past month.
- Nutritional therapy may only be effective if combined with exercise or other anabolic stimuli.

Underweight	BMI <21 kg $\cdot m^{-2}$;age >50 yrs
Normal weight	BMI <21–25 kg $\cdot m^{-2}$
Overweight	BMI <30 kg $\cdot m^{-2}$
Obese	BMI ≥30 kg $\cdot m^{-2}$

- ACBT-Active cycle of breathing teahnique



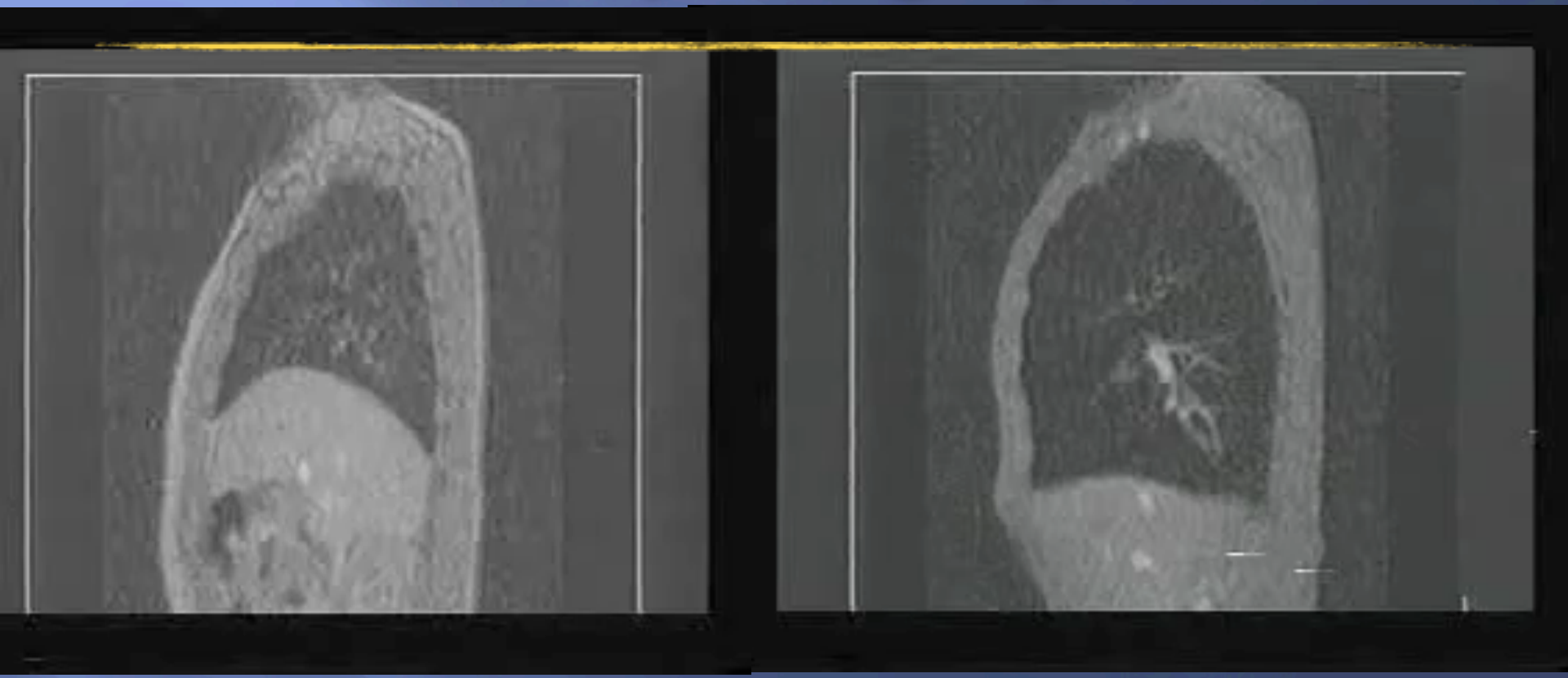
Breathing help postures

Power Breathe Device

- Heart and Lung Transplant

- Anxiety and hospital admissions-Lorazepam/ CBT
- End stage disease and Palliative care

The history: Surgery works!



Normal

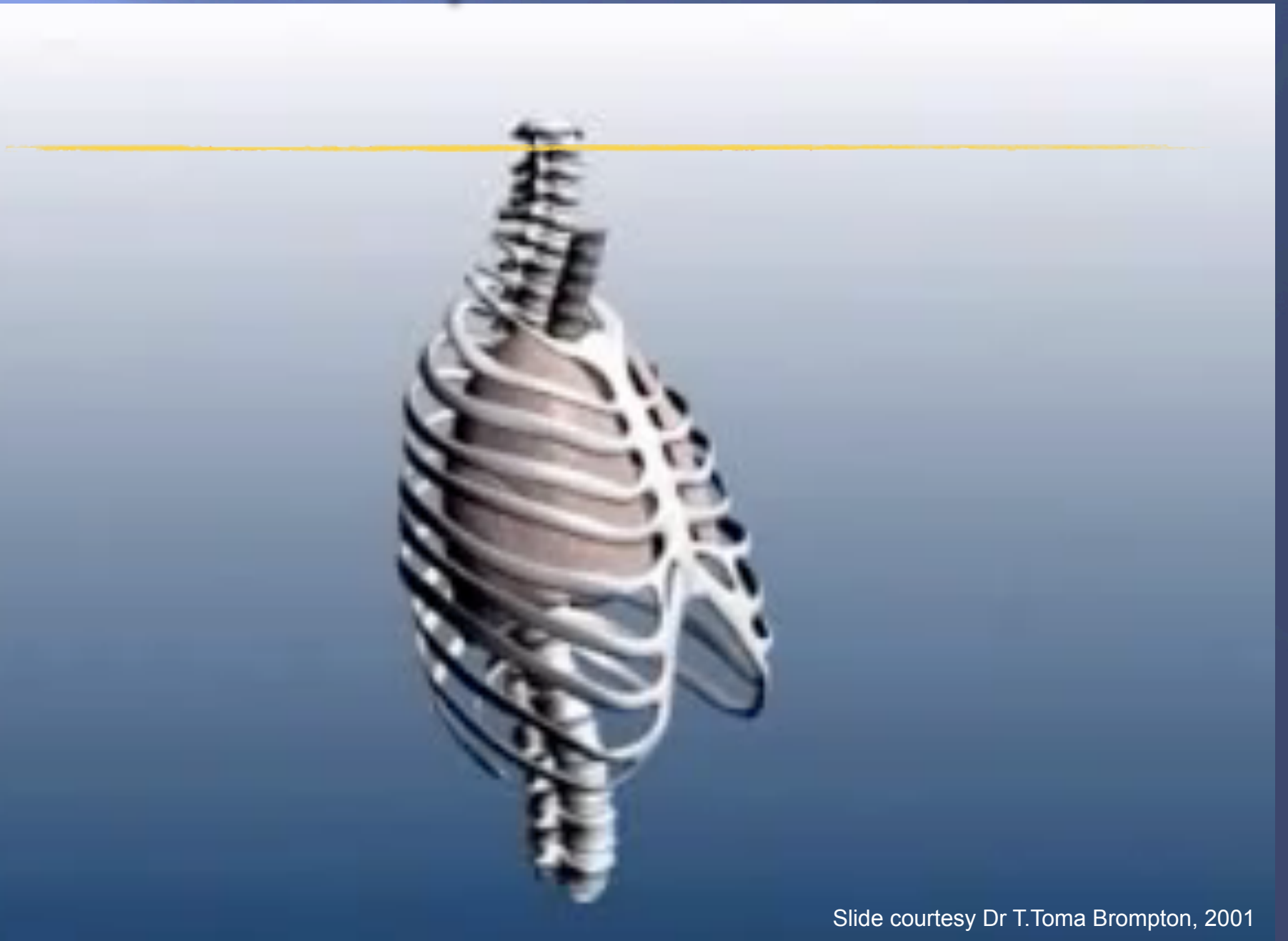
Severe COPD

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

NEW BRONCHOSCOPIC PROCEDURES IN COPD CARE

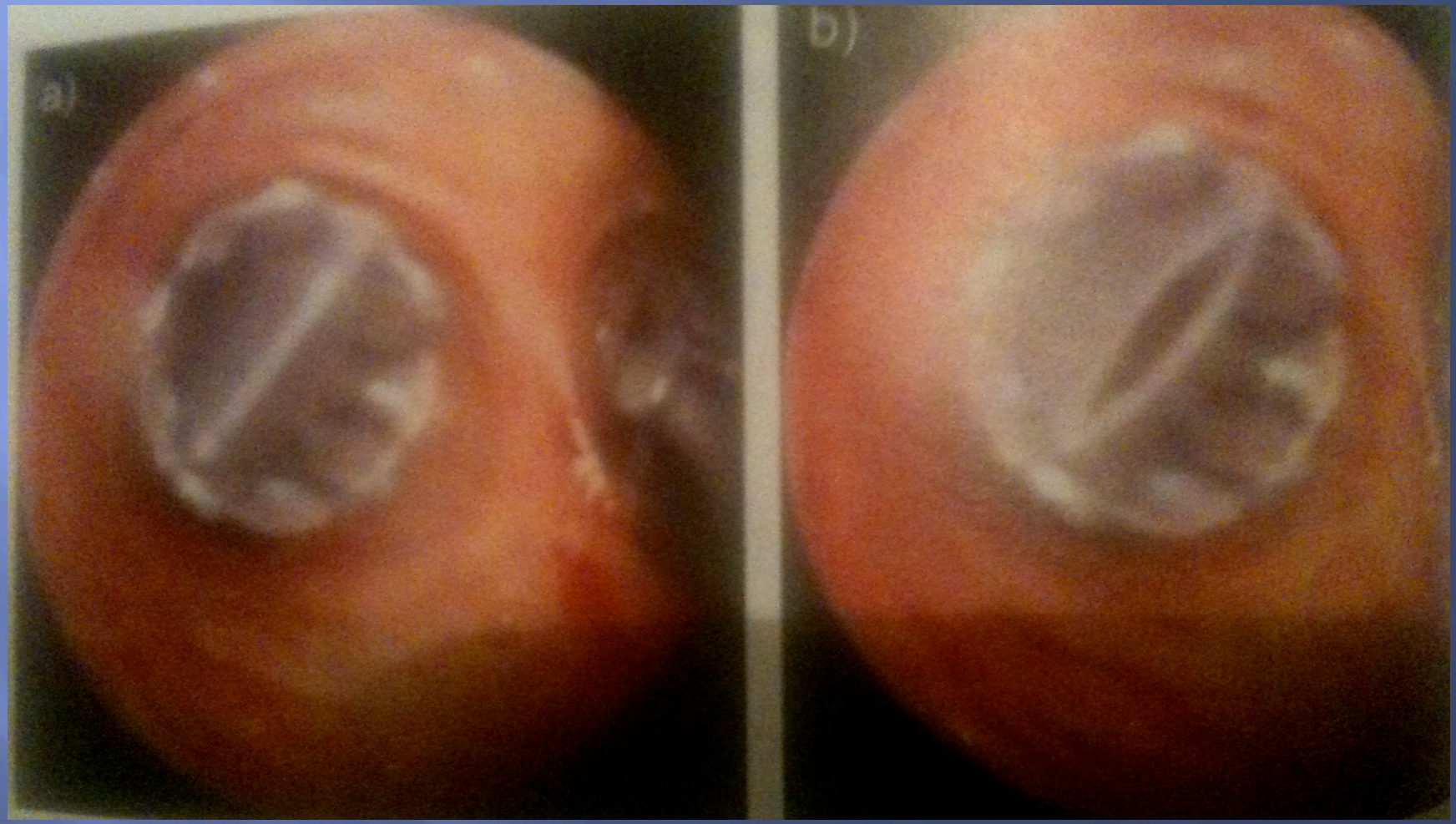
BLVR for Emphysema

Bronchoscopic "LVR" mechanism



Slide courtesy Dr T.Toma Brompton, 2001

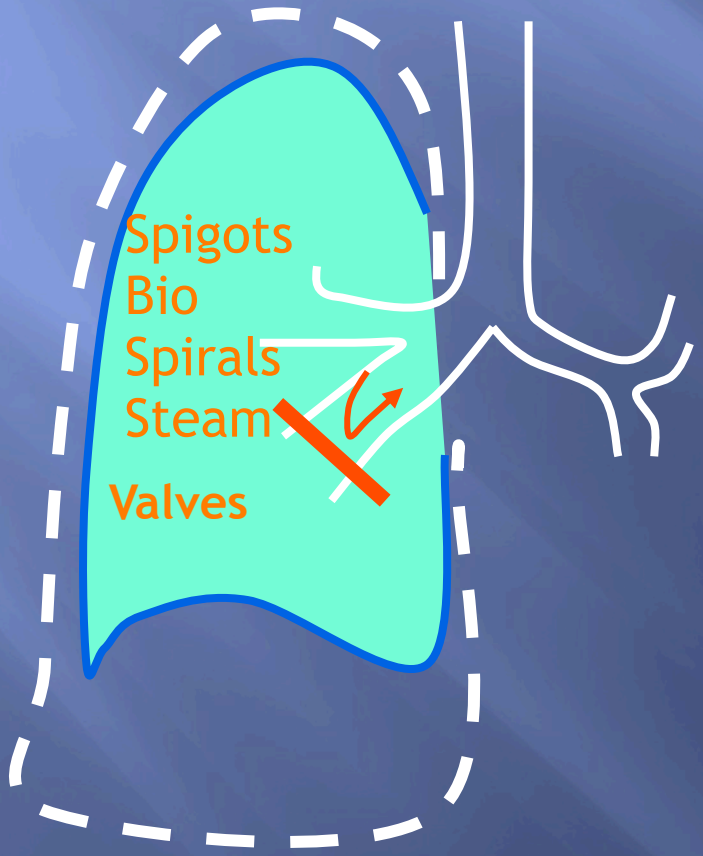
BLVR for Emphysema

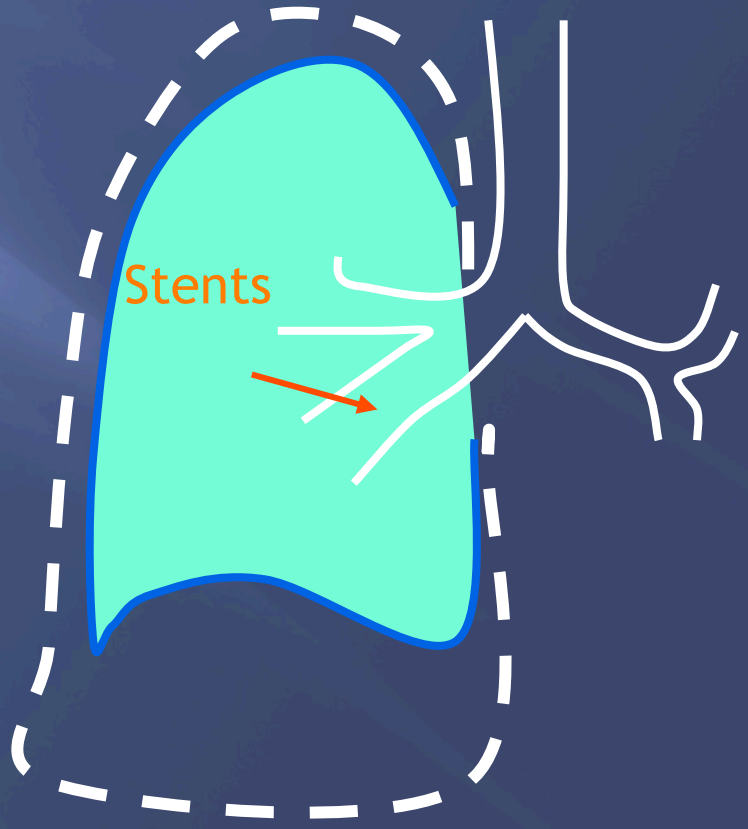


Bronchoscopic Lung Volume Reduction Techniques

Slides courtesy of Dr T.Toma

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





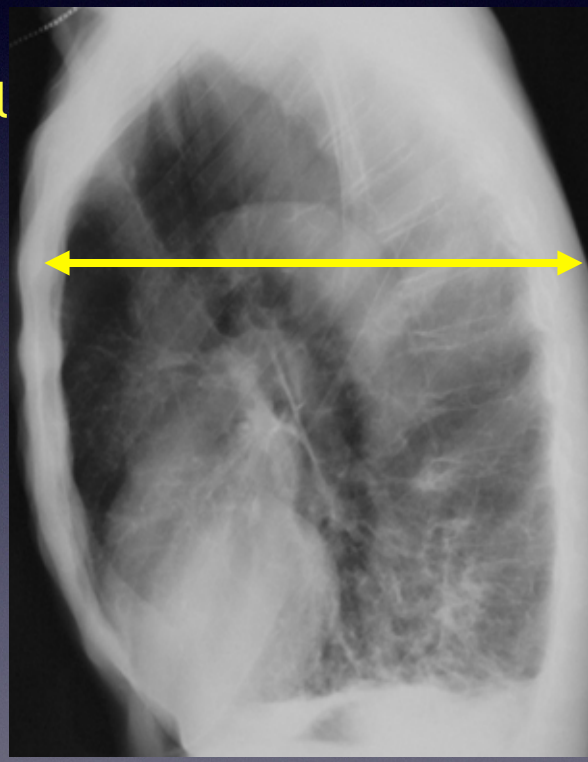
Patient Selection for Coil placements

- **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

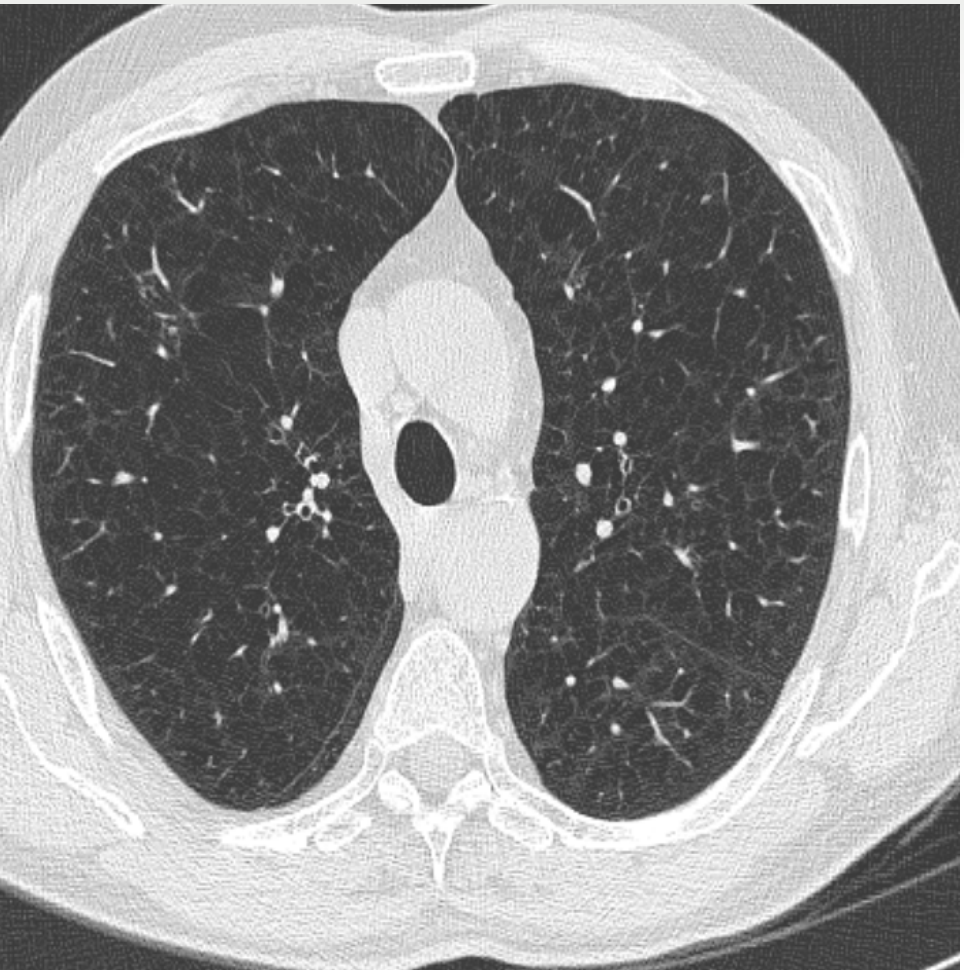
- Re Pneu coils small shape memory nitinol implants designed to gather and compress diseased tissue retension the diseased airway network and mechanically increase the elastic recoil in the Emphysematous lung.
- The retensioning effect of the coils may also tether small airways open, helping to prevent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

LVCR

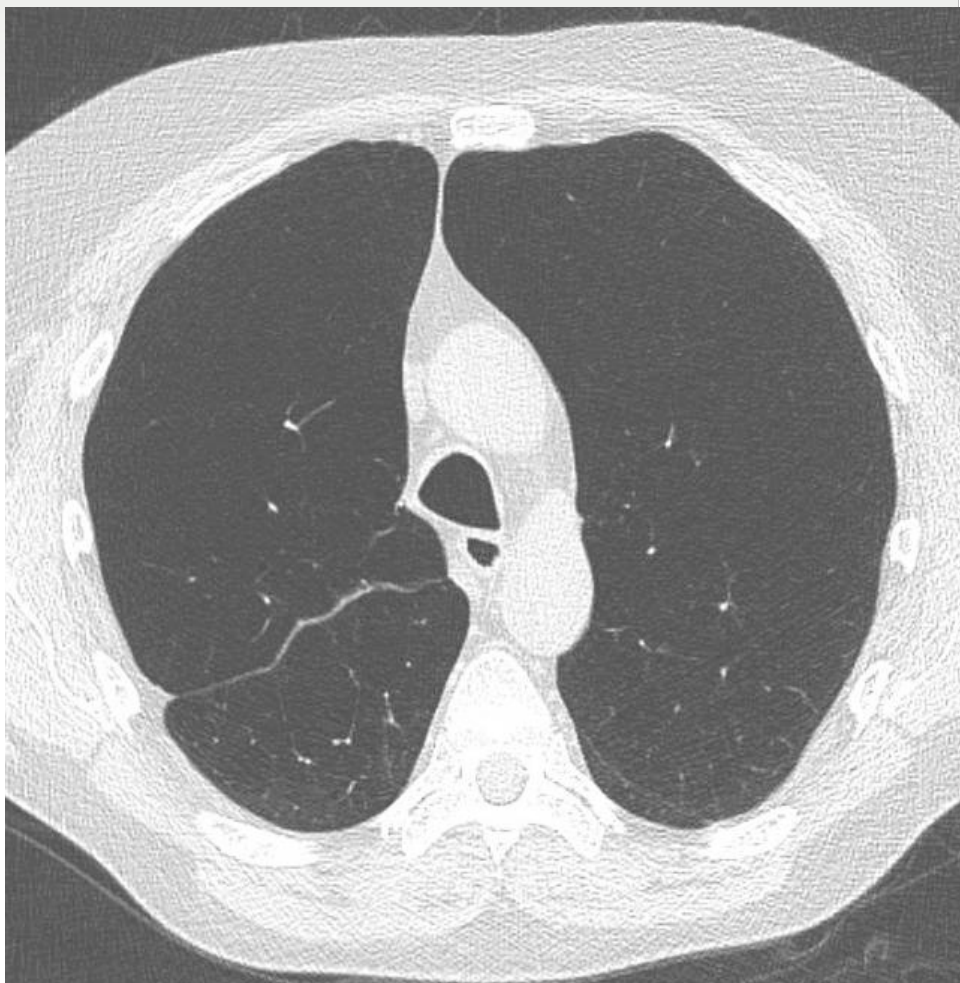
- Airways tethering is a key benefit designed to prevent air trapping and hyperinflation is fundamental and exclusive element of coils design
- improve exercise capacity lung functions and quality of life

CT visualization of tissue sufficiency

Sufficient structural tissue

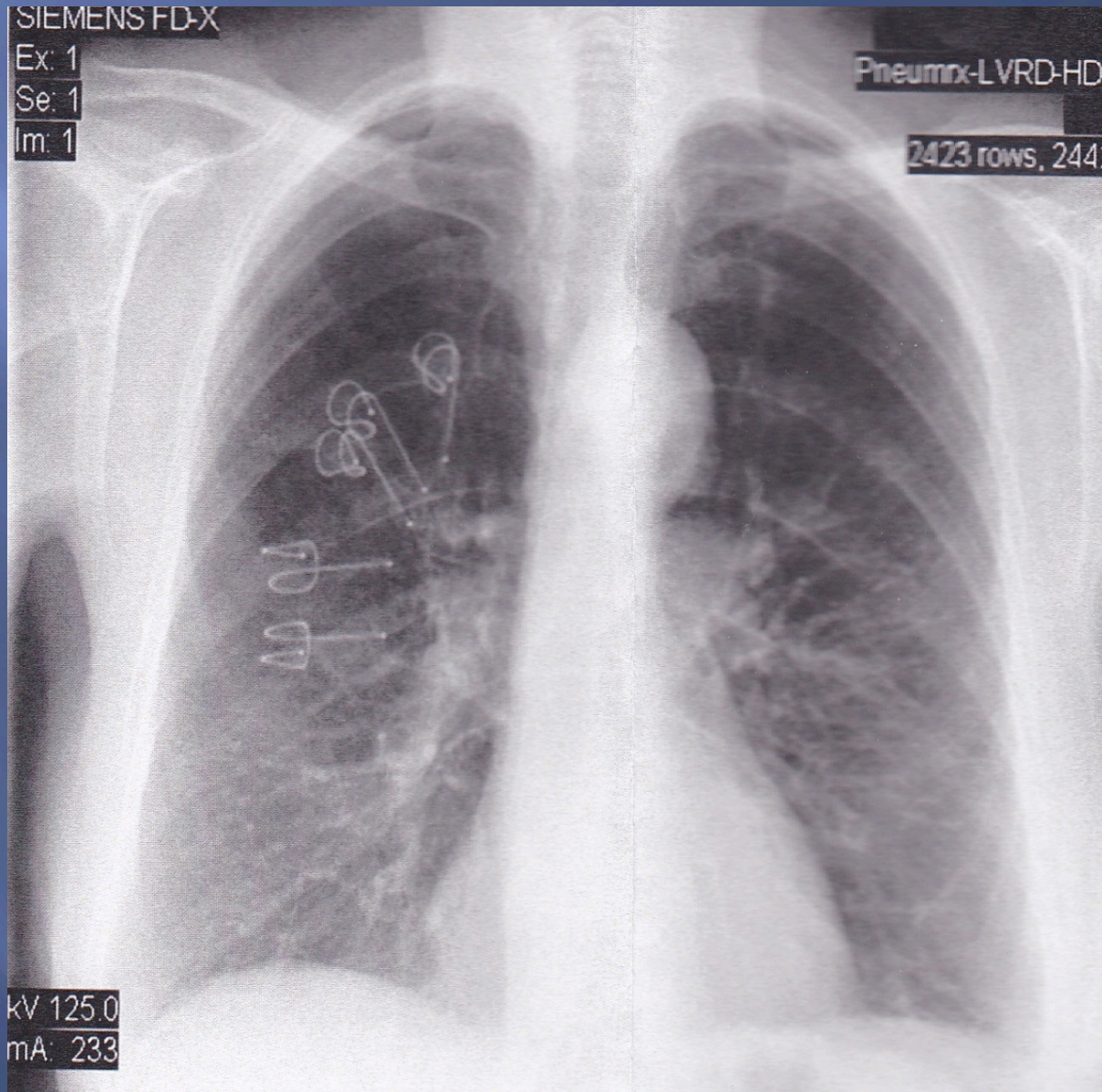


Insufficient structural tissue



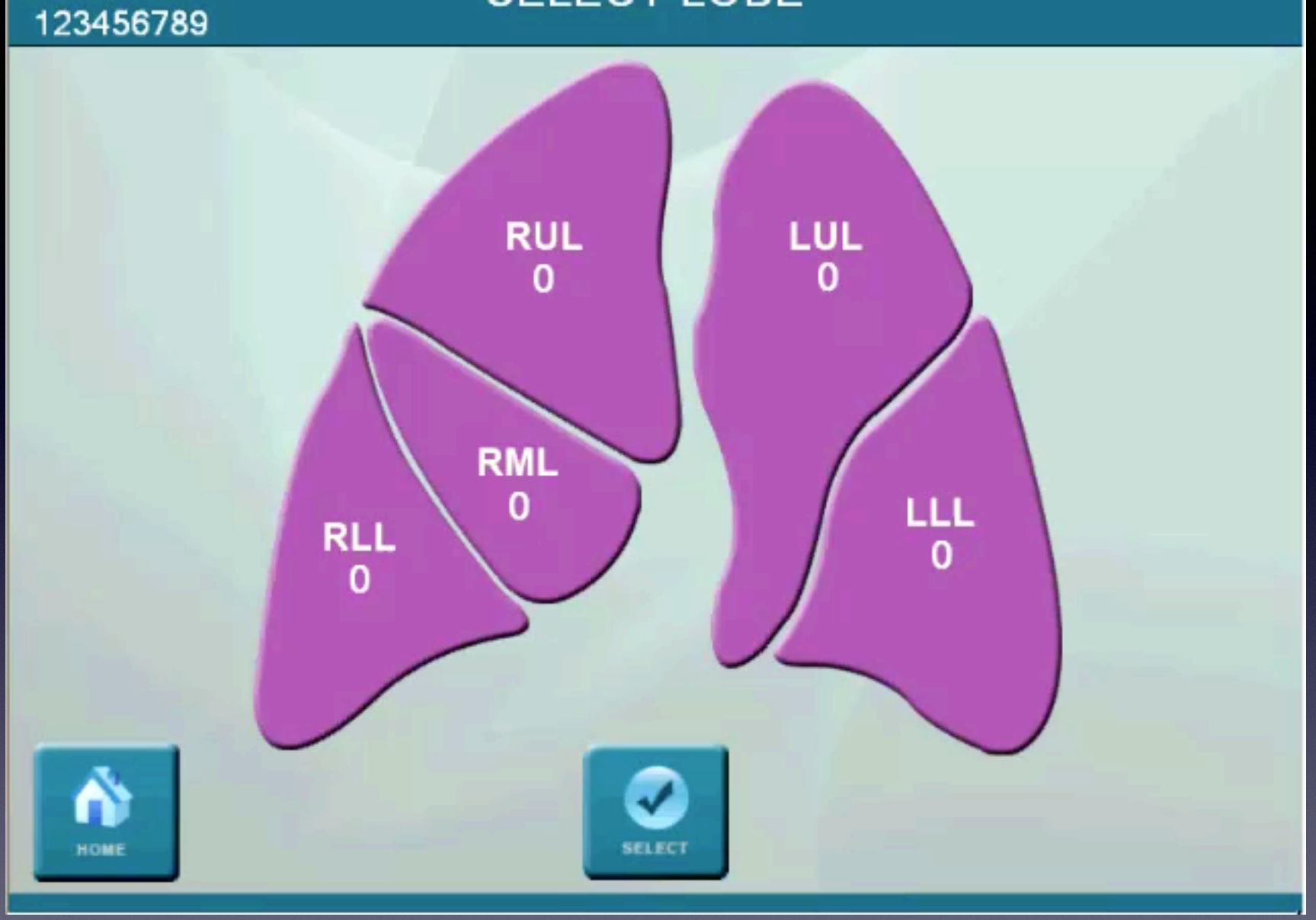
Lung volume reduction coils in Emphysema

New Bronchoscopic treatment



BLVRC

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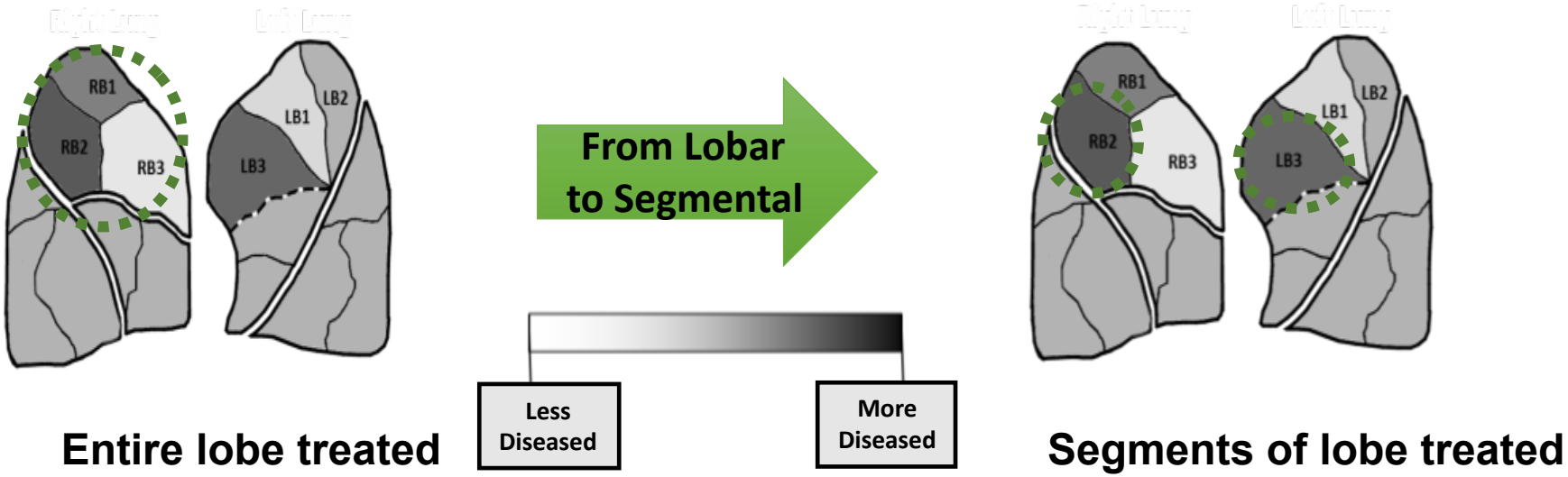
Emphysema Clinical Studies

Uptake Study	Year	CV+ and CV-	HI > 1.2	1700ml. Cap	Lobar vs. Segmental	Number of procedures	Safety	Efficacy
AUS FIM Study ('07) 5 cal/g	2008	Y	N	N	One entire lobe	1	good	low
SIMULTANEOUS BL ('08) 7.5 cal/g	2009	Y	N	N	Both lobes	1	Untenable for most	high
VAPOR Study ('09) 10 cal/g	2010	Y	Y	N	One entire lobe	1	Marginal	Very good
Commercial ('12) 10 cal/g	2012	Y	Y	N	One entire lobe	1	Untenable for some	Very good
STEP-UP ('13) 8.5 cal/g	2015	Y	Y	Y	**Segmental**	**2**	Very good	Very good

- Bottom line, lobar ablation too much volume treated/procedure
- Reducing volume/procedure by treating segmentally is key to improved safety while maintaining efficacy

Segmental Lung Volume Reduction



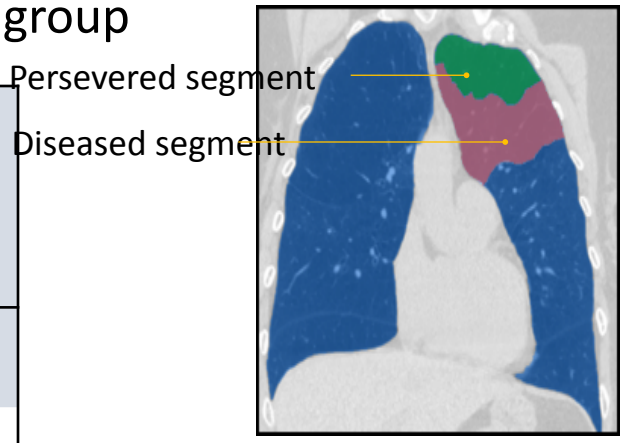
- Step-wise approach: treat one segment , treat 1 to 2 segments 90d apart
- Treat only most diseased segments, leaving healthier segments to help breathing
- Effective in CV+ and CV- patients

Volume Changes Post Vapor Treatment

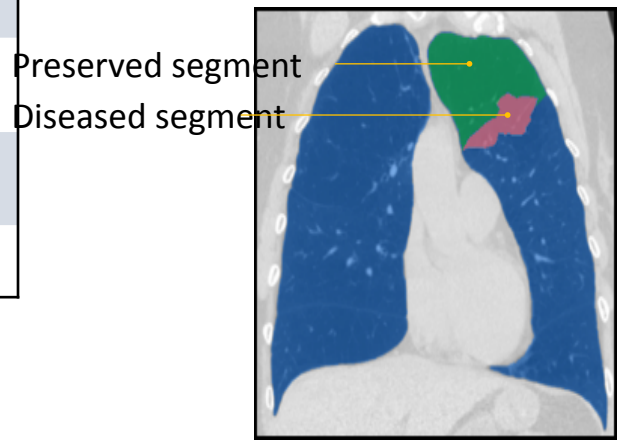
Volume changes at 6 mo in STEP-UP RCT treatment group

	First treatment (n=40) % volume change 6 months	Second treatment (n=36) % volume change 6 months
Reduced Segment(s)	**-42%** (26%)	**-33%** (20%)
Preserved Segment(s)	**+11%** (32%)	**+11%** (21%)
Treated Upper Lobe	**-12%** (15%)	**-16%** (13%)
Preserved Middle Lobe	**+14%** (54%)	**+8%** (10%)
Preserved Lower Lobe	**+8%** (17%)	**+8%** (14%)

Data is mean change (SD).



Baseline



6 mo post-treatment

Radiographic image of treated (in red) and preserved (in green) segments for a STEP-UP patient at baseline and six months post treatment. The diseased, treated LB3 segment (in red) was effectively reduced in volume post vapor ablation. The healthier, preserved LB1 segment (in green), expanded post vapor ablation.

COPD prognosis

Although short-term survival for patients with COPD and respiratory failure depends on the overall severity of acute illness, long-term survival is primarily influenced by the severity of COPD and the presence of comorbid conditions.

Traditionally, prognosis has been reported based on the FEV1, which is a part of pulmonary function testing. A meta-regression analysis showed a significant correlation between increased FEV1 and lower risk of COPD exacerbation. [161]

In addition to the FEV1, other factors that predict prognosis are weight (very low weight is a negative prognostic factor [162]), distance walked in 6 minutes, and degree of shortness of breath with activities. These factors, known as the Body mass index, airflow Obstruction, Dyspnoea, and Exercise (BODE) index, can be used to provide information on prognosis for 1-year, 2-year, and 4-year survival. [163]

One study revealed that plasma pro-adrenomedullin concentration plus BODE index is a better prognostic tool than BODE index alone. [164]

Elevation of adrenomedullin, arginine vasopressin, atrial natriuretic peptide, and C-reactive protein [165] is associated with increased risk of death in patients with stable COPD. [166]

Recently, more interest has been put on comorbidities and prior exacerbations as the predictor of COPD course. CODEX index (comorbidities, obstruction, dyspnoea, and previous severe exacerbations) is proved to be superior to BODE index in predicting prognosis for COPD patients. [167]

Frequent COPD exacerbations and requirement for multiple intubation and invasive mechanical

COPD HOT CLINIC & MDM

Case History 1

- Severe COPD 71 female on 2 Litres ambulatory Oxygen has SOB productive cough but difficult to bring up sputum patient noted H/R110/min on Uniphyllin 200 mg bd
- Coughing up blood with sputum
- Prednisolone of 5mg od, 3 chest infections in the last year On Relvar and Anoro Ellipta
- Sputum grew Pseudomonas
- Management plans?

Case History 2

- A78 year old with very severe COPD, smoking 10/day SOB on inclines cough with sputum very anxious and fed up with her illness on treatment Trimbo Inhaler recently started with recent ankle swellings and made her feel funny

Case History 3

- 72 year male cough with SOB, FEV1=1.18 (44.6%), FVC=3.06 (84.8%) FEV1/ FVC=38.72,
- which Inhalers
- had difficulties with Anoro Ellipta
- What next had 4 exacerbations in the year

Case History 4

- Known 55year old with Asthma now COPD FEV1 16.3% FEV1/FVC=40% with high Eosinophils, recurrent chest infections, BMI 24, has narrow angle glaucoma, Ultibro Breezhaler & Symbicort 200/6 2puff BD Respimat spiolto
- pco2=8.32, pO2=7.33, PH=7.40, BIC=40
- Sats=87% on air

Smoking and our patients