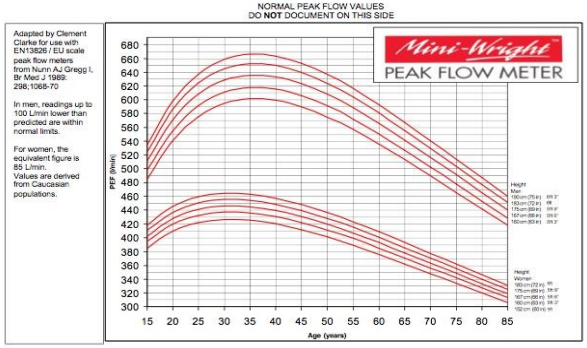
Why Breathlessness matters to patients, providers and commissioners



Dr Sarah Elkin

Consultant in Respiratory Medicine

Imperial College NHS Trust

Outline

- What is breathlessness?
- How do we measure it?
- Why is it important to treat
- What is the cause of breathlessness in COPD
- Non pharmacological interventions
- Pharmacological interventions

Definition

- a subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity. The experience derives from interaction among multiple physiologic, psychological, social, and environmental factors and may induce secondary physiological and behavioral responses".

American Thoracic society

Patients descriptions

"Its the worst feeling in the world, the worst way to die, its like smothering to death……to lose control of your breathing"

"We feel very isolated especially at night"

"a frightening feeling where you don't think you'll get another breath and because it is accompanied by fear and panic, you can actually feel tightening feeling of fear in your chest and mind"

Breathlessness is a common and distressing symptom that could be better managed for the same resource:

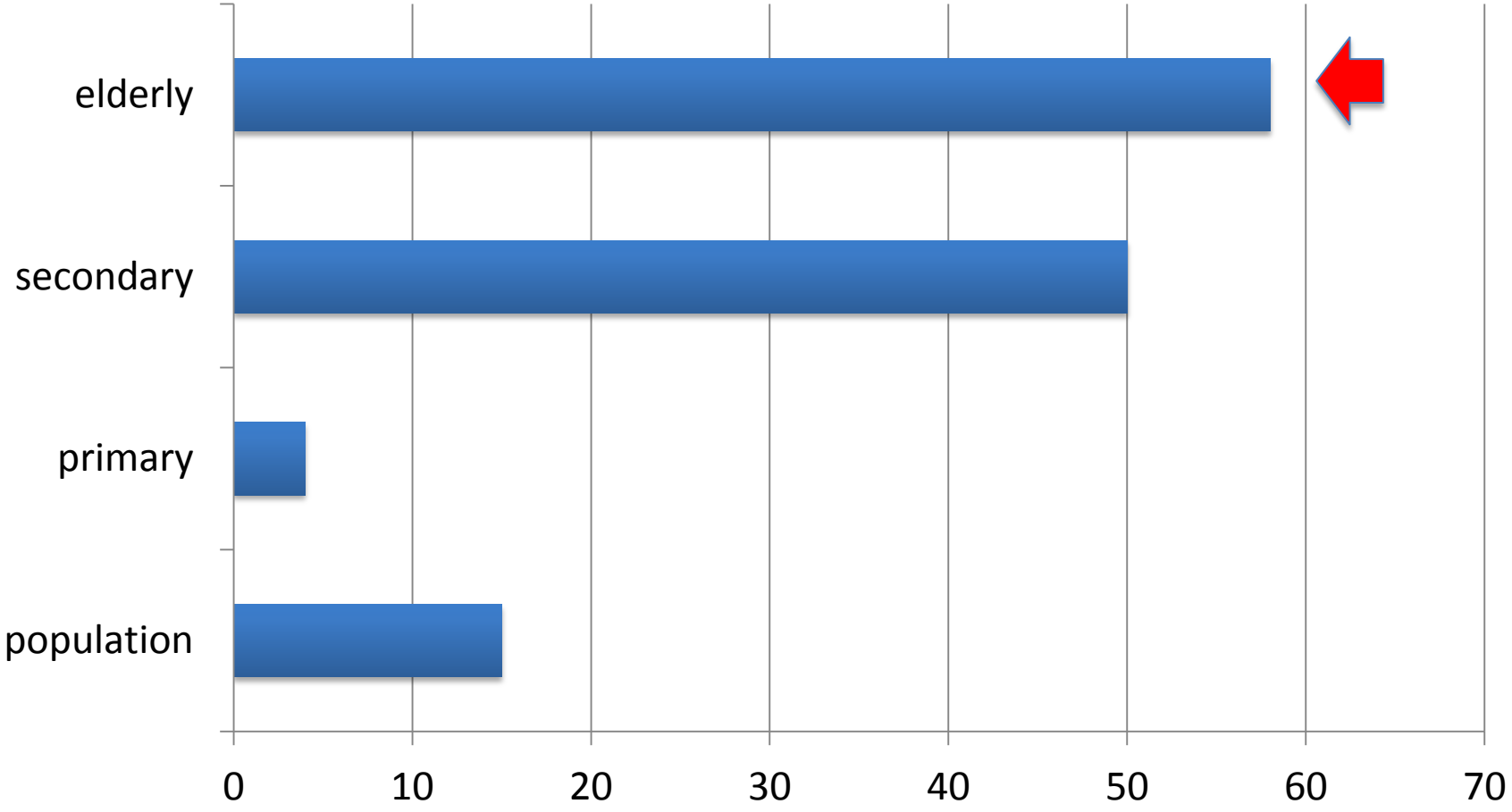
Over 54,000 emergency calls to the London Ambulance Service a year are due to acute breathlessness

'Existing community services could be better used with some restructuring of appointments is needed to enable an initial assessment of 20-30 minutes and there is also a case to be made to restructure outpatient services for people with severe disease'
PCRS

Breathlessness – burden

- Breathlessness affects up to 10% of adult population
- 30% of older people
- Major cause of attendance at emergency department BUT
- Only 1% of recorded GP consultations
- 2/3 is cardio-pulmonary
- Assume all patients anxious to some extent – how much and why?

Incidence of breathlessness



MEASURING BREATHLESSNESS

Baseline Dyspnoea Index

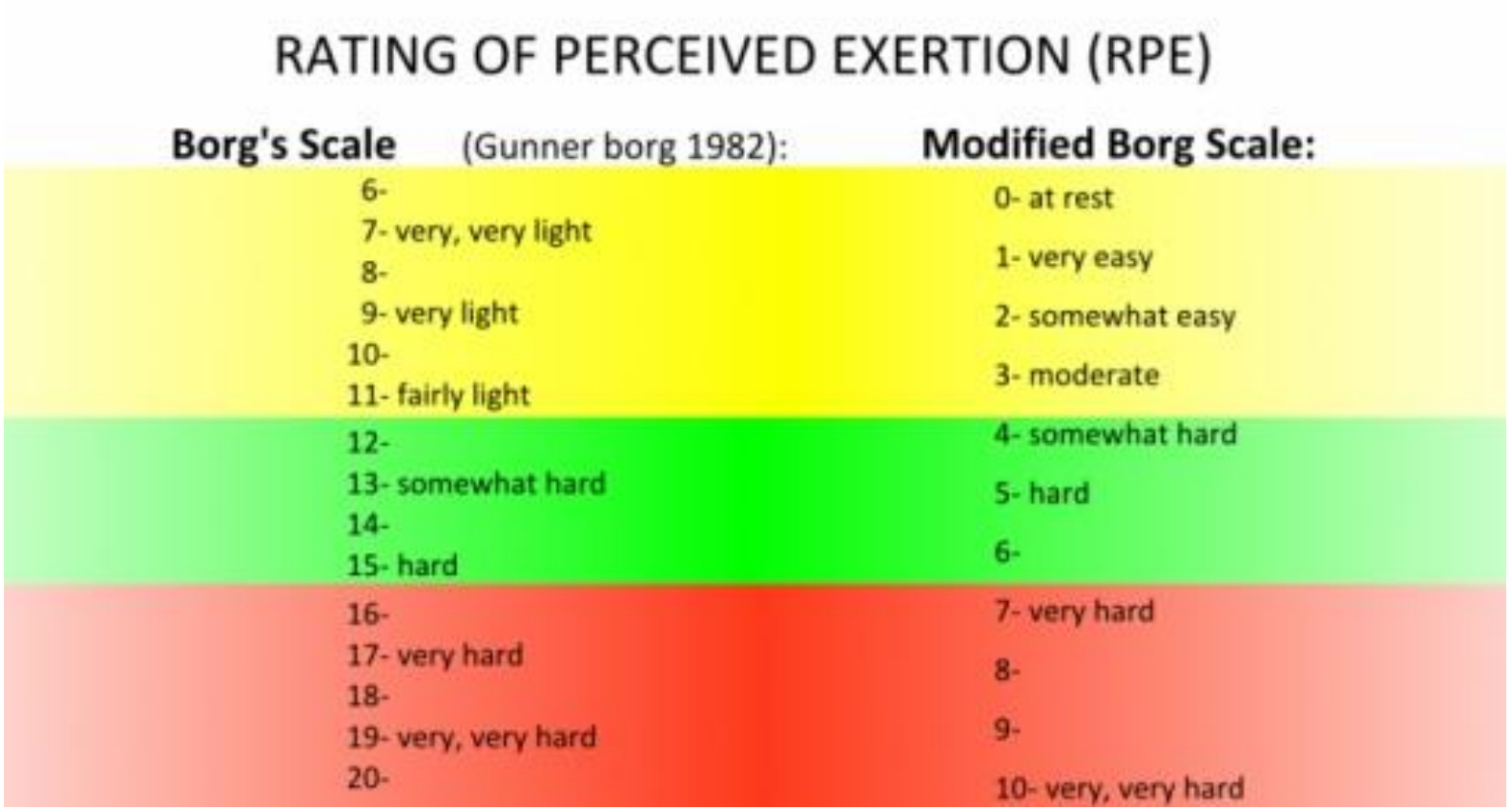
BASELINE DYSPNEA INDEX

Baseline Functional Impairment

_____Grade 4	*No Impairment*	Able to carry out usual activities and occupation without shortness of breath.
_____Grade 3	*Slight Impairment*	Distinct impairment in at least one activity but no activities completely abandoned. Reduction, in activity at work *or* in usual activities, that seems slight or not clearly caused by shortness of breath.
_____Grade 2	*Moderate Impairment*	Subject has changed jobs *and/or* has abandoned at least one usual activity due to shortness of breath.
_____Grade 1	*Severe Impairment*	Subject unable to work or has given up most or all usual activities due to shortness of breath.
_____Grade 0	*Very Severe Impairment*	Unable to work *and* has given up most or all usual activities due to shortness of breath.
_____W	*Amount Uncertain*	Subject is impaired due to shortness of breath, but amount cannot be specified. Details are not sufficient to allow impairment to be categorised.
_____X	*Unknown*	Information unavailable regarding impairment.
_____Y	*Impaired for Reasons Other than Shortness of Breath*	For example, musculoskeletal problem or chest pain.

Usual activities refer to requirements of daily living, maintenance or upkeep of residence, yard work, gardening, shopping, etc.

Borg Perceived Exertion scale



NYHA Heart Failure Breathlessness scale

Table 2 - NYHA Classification - The symptoms of Heart Failure[35]

Class	Patient Symptoms
Class I (Mild)	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnea (shortness of breath).
Class II (Mild)	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation, or dyspnea.
Class III (Moderate)	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, palpitation, or dyspnea.
Class IV (Severe)	Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency at rest. If any physical activity is undertaken, discomfort is increased.

MRC and mMRC Breathlessness Scale

Table 1 - Medical Research Council dyspnoea scale[34]

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 level ground 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 level ground
5	Too breathless to leave the house, or breathless when dressing or undressing

MMRC Dyspnea Scale

Grade **Description of Breathlessness**

0 I only get breathless with strenuous exercise.

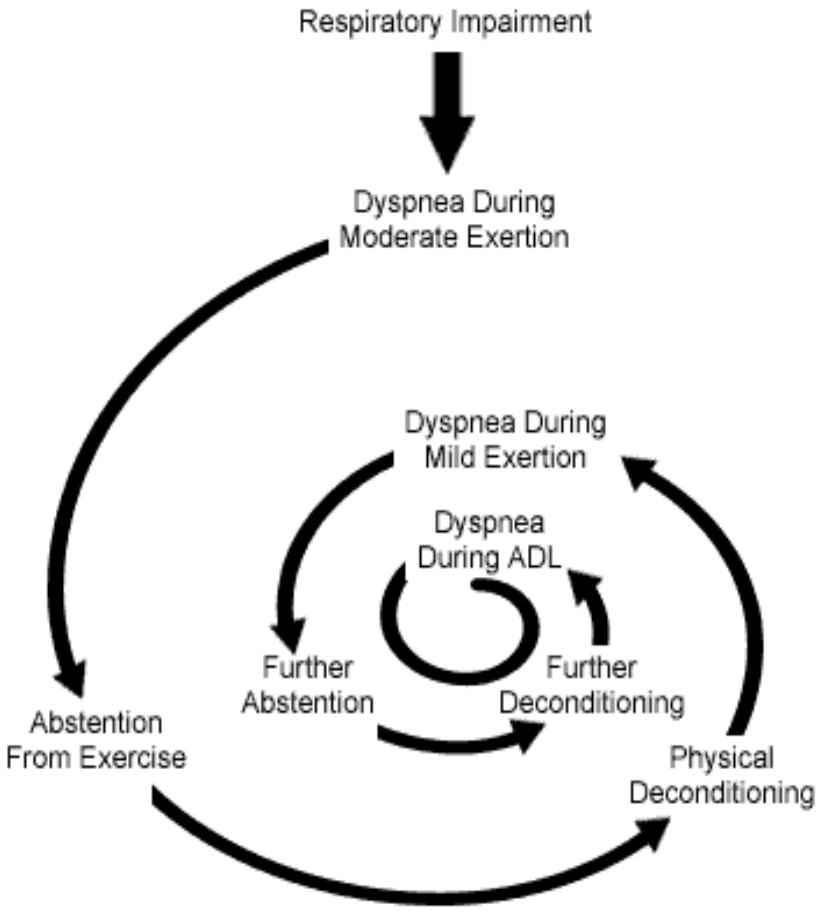
1 I get short of breath when hurrying on level ground or walking up a slight hill.

2 On level ground, I walk slower than people of the same age because of breathlessness, or have to stop for breath when walking at my own pace.

3 I stop for breath after walking about 100 yards or after a few minutes on level ground.

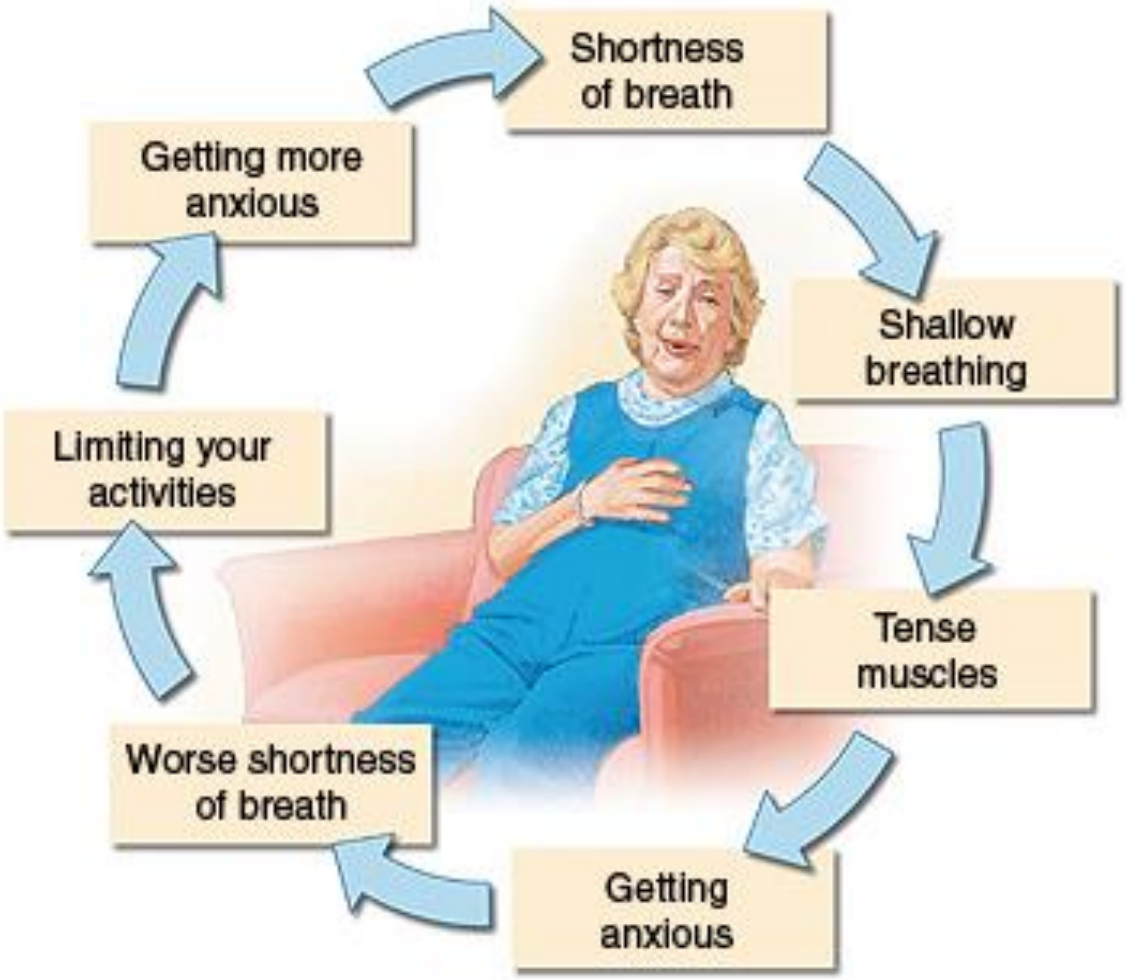
4 I am too breathless to leave the house or I am breathless when dressing.

Breathlessness Spiral of Inactivity



ADL = activities of daily living

Compounded by Anxiety



Diagnosis requires skilled assessment by a doctor combining high quality history-taking and examination with a limited number of evidence-based objective tests

ASK

- When did the breathlessness start?
- What causes it?
- What relieves it? • Any episodes at night?
- Can the patient walk up a flight of stairs?
- Are there any associated symptoms?
- PMH • Occupational and environmental
- Medication • Smoking history in pack years

ASSESS

- Respiratory rate and pattern
- SpO2
- Respiratory and cardiac examination
- Body mass index
- Position of patient
- Blood pressure
- Pulse (rate & rythmn)
- Temperature
- Finger clubbing

RED FLAGS:

- Unexplained weight loss, night sweats
- Haemoptysis
- Rapid or slow respiratory rate
- SpO2 <92% in healthy individual or <88% in patients with known chronic lung disease
- Pulse rate <40 >100 bpm
- Silent chest or confusion

• Breathlessness on exertion, nocturnal dyspnoea, orthopnea • Ankle oedema, raised JVP, fine creps in lung bases • CXR & ECG may be abnormal. NTproBNP will be elevated	**Heart Failure** • Causes include IHD, Hypertension, AF and other arrhythmias, valvular heart disease • Arrange/refer for echocardiogram • Refer to NICE heart failure guidelines
• Progressive exertional breathlessness • BMI >30, examination otherwise may be normal, consider sleep apnoea	**Obesity / Deconditioning** • Consider lifestyle advice, referral to local health trainers/obesity services • Consider co-morbidities e.g. diabetes • If Epworth is >10 then refer to sleep assessment service
• Progressive breathlessness associated with exertion, smoking history (≥10 pack years) • Chest sounds may be abnormal • Spirometry obstructive, CXR may be abnormal, oxygen saturations may be low	**COPD** • Arrange diagnostic spirometry • Refer to NICE COPD guidelines
• Exertional breathlessness • May present with palpitations, pre-syncope / syncope, fatigue • ECG abnormal, check thyroid function	**Arrhythmias** • Most common AF, Bradycardia • Refer to NICE arrhythmias guidelines • Refer for cardiology opinion where appropriate
• Progressive exertional breathlessness, fatigue • Pale, may have lemon tinge or jaundice • Hb low, MCV low, arrange ferritin, B12 & folate	**Anaemia** Investigate potential causes
• Breathlessness variable in intensity and timing, associated with history of atopy • May have wheeze in lung fields, examination may be normal • CXR / spirometry may be normal, may have raised eosinophils	**Asthma** • Arrange PEFR diary • Spirometry with reversibility • Refer to BTS SIGN asthma guidelines

NHS Lambeth Clinical Commissioning Group
NHS Southwark Clinical Commissioning Group

Lambeth and Southwark Adult Breathlessness Assessment Algorithm

Common Causes of Breathlessness to Consider
Focus on co-morbidities

Everyone who is breathless will have some degree of anxiety

If the patient already has a diagnosis causing breathlessness consider at each stable review (or if symptoms worsening) whether this remains the only diagnosis and whether you need to reconsider causation.

STEP 1 → **The history and examination still constitutes 90% of most diagnoses**

HISTORY

- Smoking history (pack years) and what is smoked including tobacco, cannabis and other smoked drugs
- Impact of breathlessness on daily life
- Levels of habitual physical exercise
- Environmental and occupational risk factors
- Acute or Chronic breathlessness
- Co-morbid conditions/Medications
- Sleep Quality
- Mental Health/Psychological Distress
- Onset of breathlessness associated with identifiable emotional /physical event
- Consider professional carer support and informal systems around the patient ie. relatives, neighbours etc

EXAMINATION

- Vital signs: BP, Pulse (rate and rhythm), RR, Temperature, oxygen saturation
- Observe breathing pattern (use of accessory muscles)
- Auscultate chest & assess airways patency
- Assessment for peripheral oedema and JVP
- BMI, waist circumference, neck circumference
- PEF % predicted (for age, sex and height)
- Expired carbon monoxide (ppm)

What could it be?

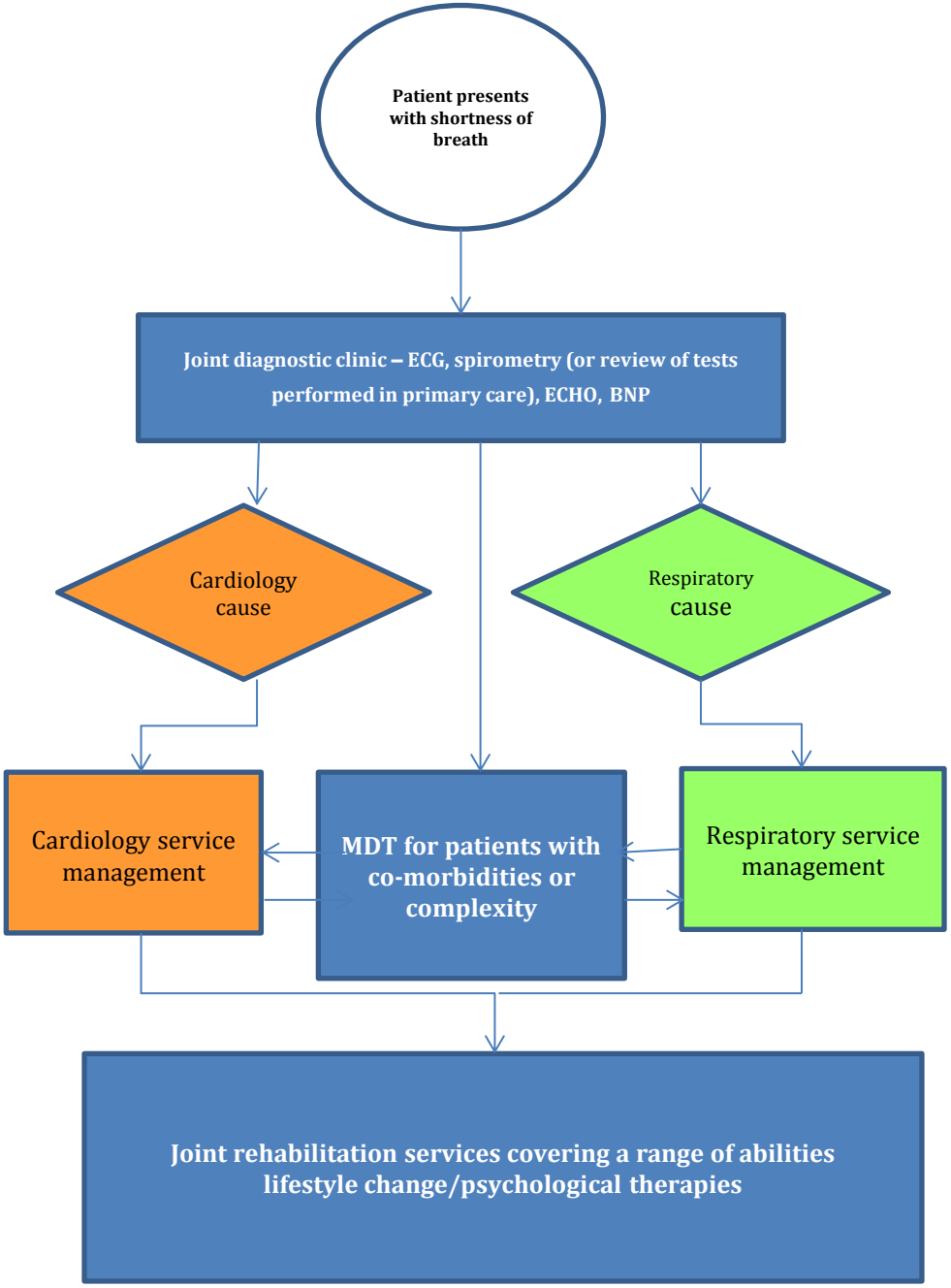
Respiratory	**Cardiac**	**Other**
COPD	Heart failure	Obesity
Lung cancer	Arrhythmia	Anaemia
TB	Valvular disease	Thyroid disease
Lung fibrosis	Pericardial disease	Low physical activity
Severe asthma		Anxiety
Pneumonia		
Pulmonary embolism		
Bronchiectasis		
Asbestos lung disease		
Chest wall & diaphragm disease		

Providing better care for people who are breathless would improve care for people with COPD, asthma, heart failure, anxiety and obesity and break down silos and improve coordination

What are the health needs in breathless patients?

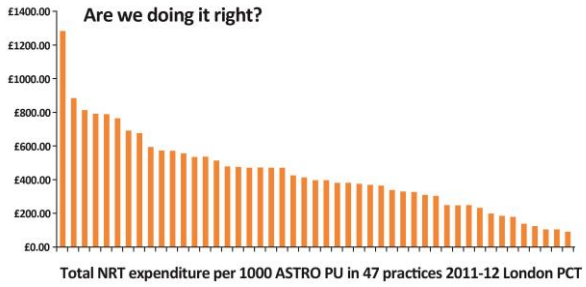
- Knowledge of diagnosis & prognosis
- Information regarding illness, disease management
  - HCP speaking with same voice
- Psychology input
- Supervised exercise
  - Often purchase equipment and too scared to use
- Someone to listen to their concerns
- Awareness of local services

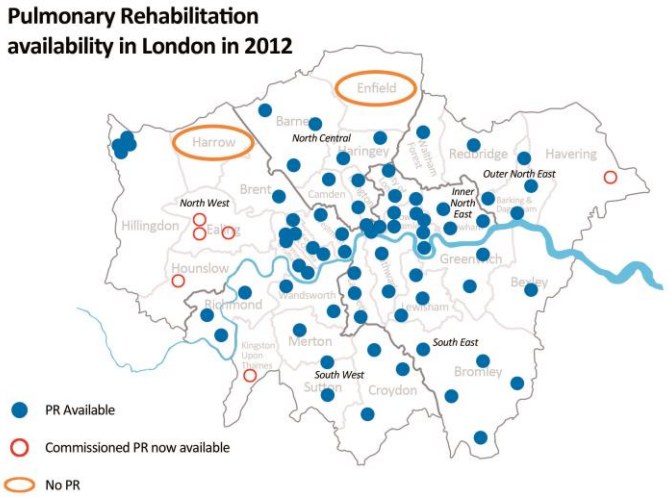
Habraken 2007, Booth 2003

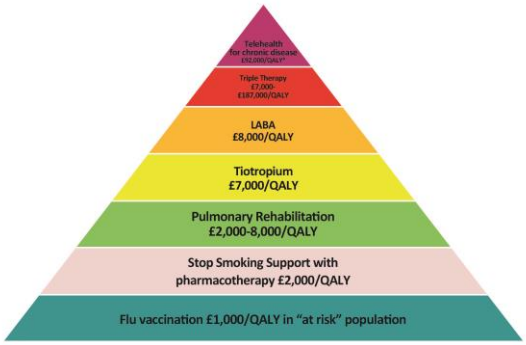

Patient presents with shortness of breath
Joint diagnostic clinic – ECG, spirometry (or review of tests performed in primary care), ECHO, BNP
Cardiology cause
Respiratory cause
Cardiology service management
MDT for patients with co-morbidities or complexity
Respiratory service management
Joint rehabilitation services covering a range of abilities lifestyle change/psychological therapies

Breathlessness – treatment challenges

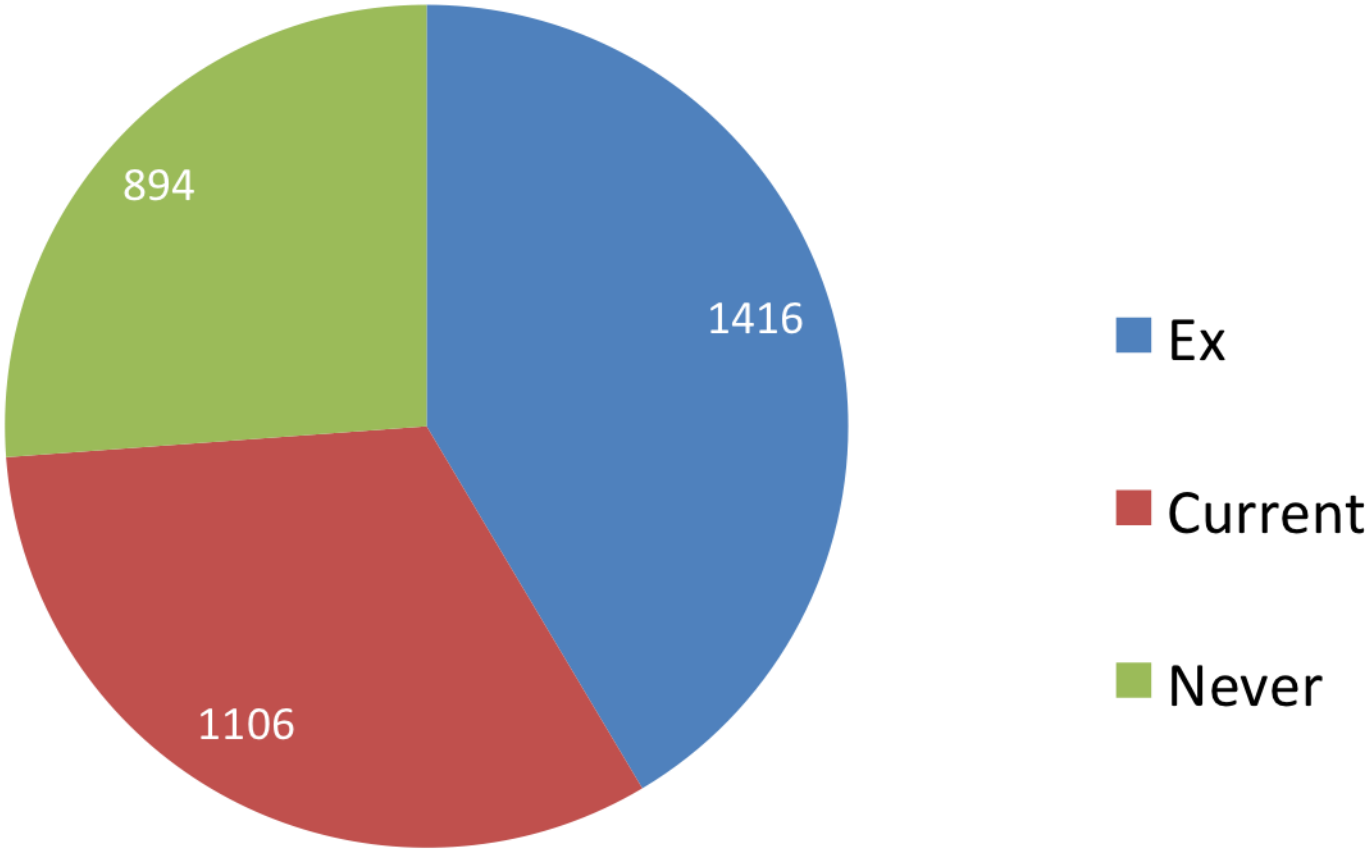
- Strong evidence base for treatments for single conditions, but much weaker for multiple
- But need **more** flu vaccination, stop smoking as treatment, support to increase physical activity, referral to programmes of rehabilitation, weight management, as well as NICE-pharmacotherapy
- Needs to be locally sensitive: demography, relationships, knowledge, services



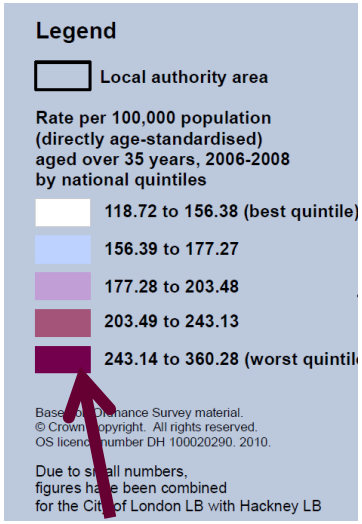




Smoking highly prevalent in people coded as breathless



Londoners dying from smoking



'1 in 5 deaths due to smoking'

NHS London

London Respiratory Team

Improving the experience of all Londoners with COPD and minimising the impact of the disease

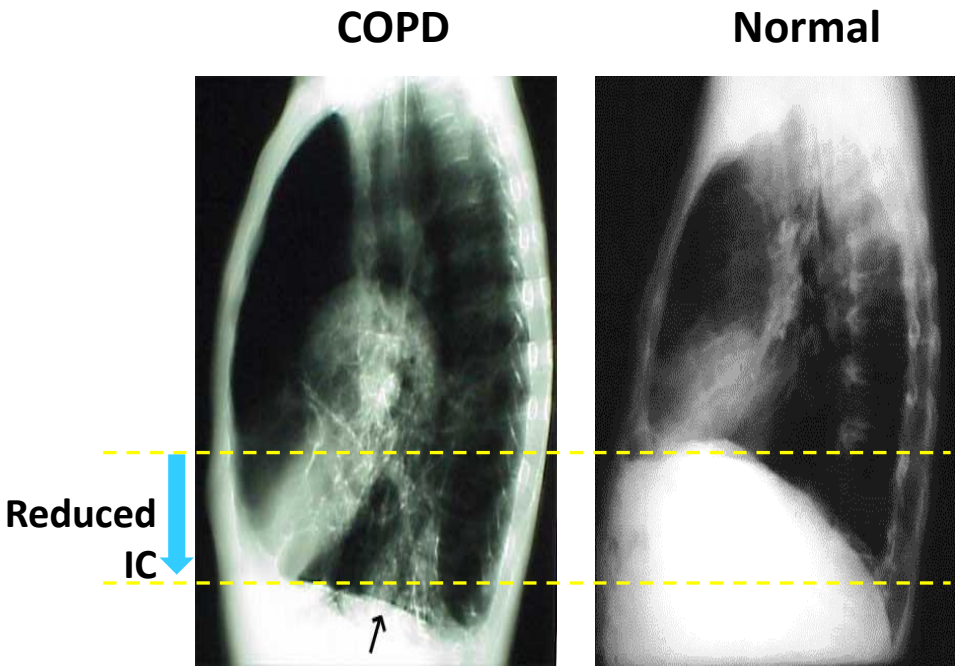
Making Every Contact Count is a concept which aims to improve lifestyles and reduce health inequalities"

http://www.makingeverycontactcount.co.uk/

WHAT CAUSES BREATHLESSNESS IN COPD?

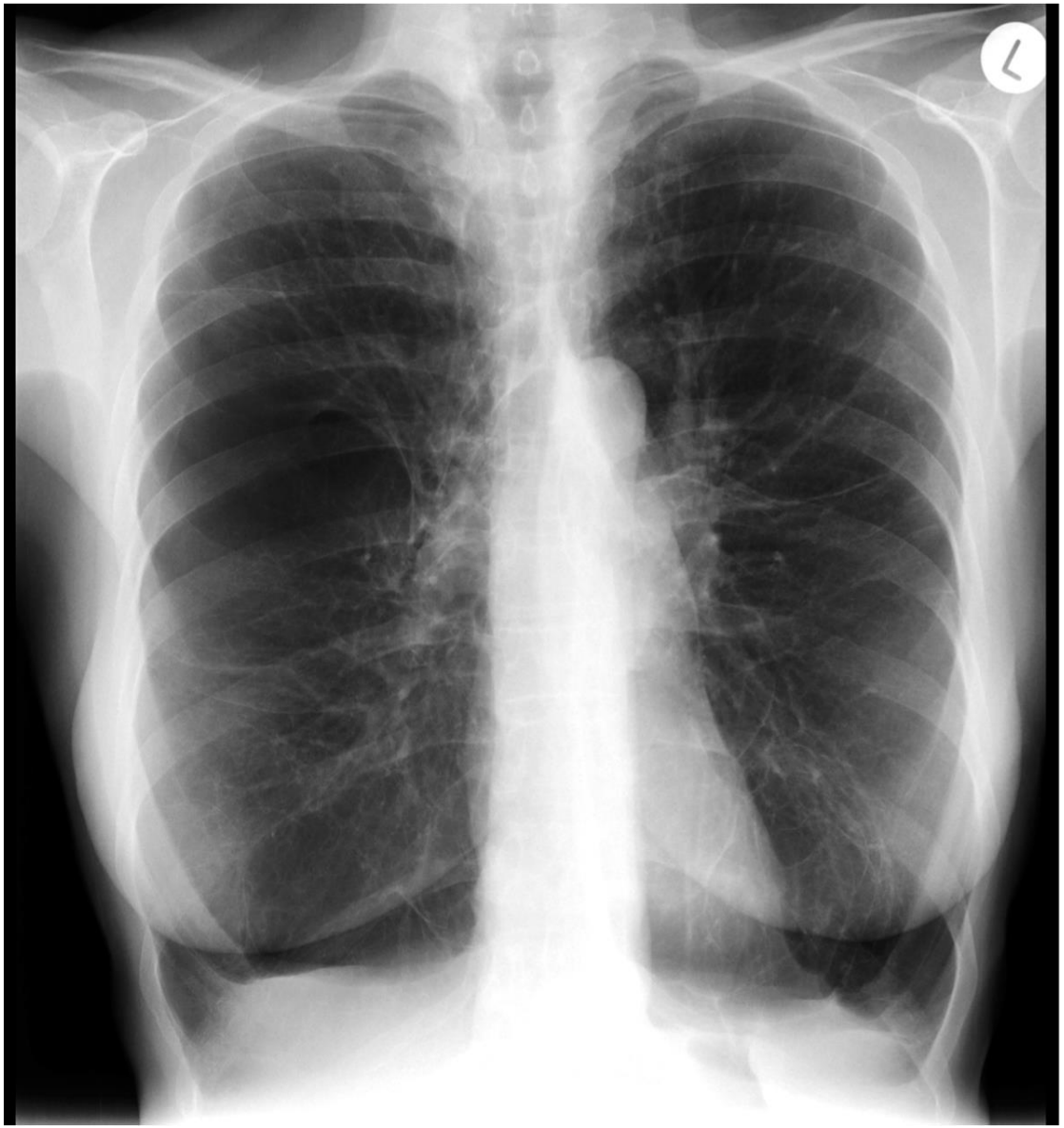
Hyperinflation is a key component of COPD

- Expiratory airflow limitation and airway obstruction trap air progressively during expiration, leading to hyperinflation[1]
- Hyperinflation is thought to develop early in the disease, and is the main mechanism for exertional dyspnea[1]
- Hyperinflation reduces inspiratory capacity, such that functional residual capacity increases, particularly during exercise (dynamic hyperinflation)[1]
  - Results in worsening of dyspnea and limitation of exercise capacity[1]
- Hyperinflation manifests as:
  - an increase in total lung capacity[3]
  - an increase in residual volume (i.e. 'gas trapping')[3]



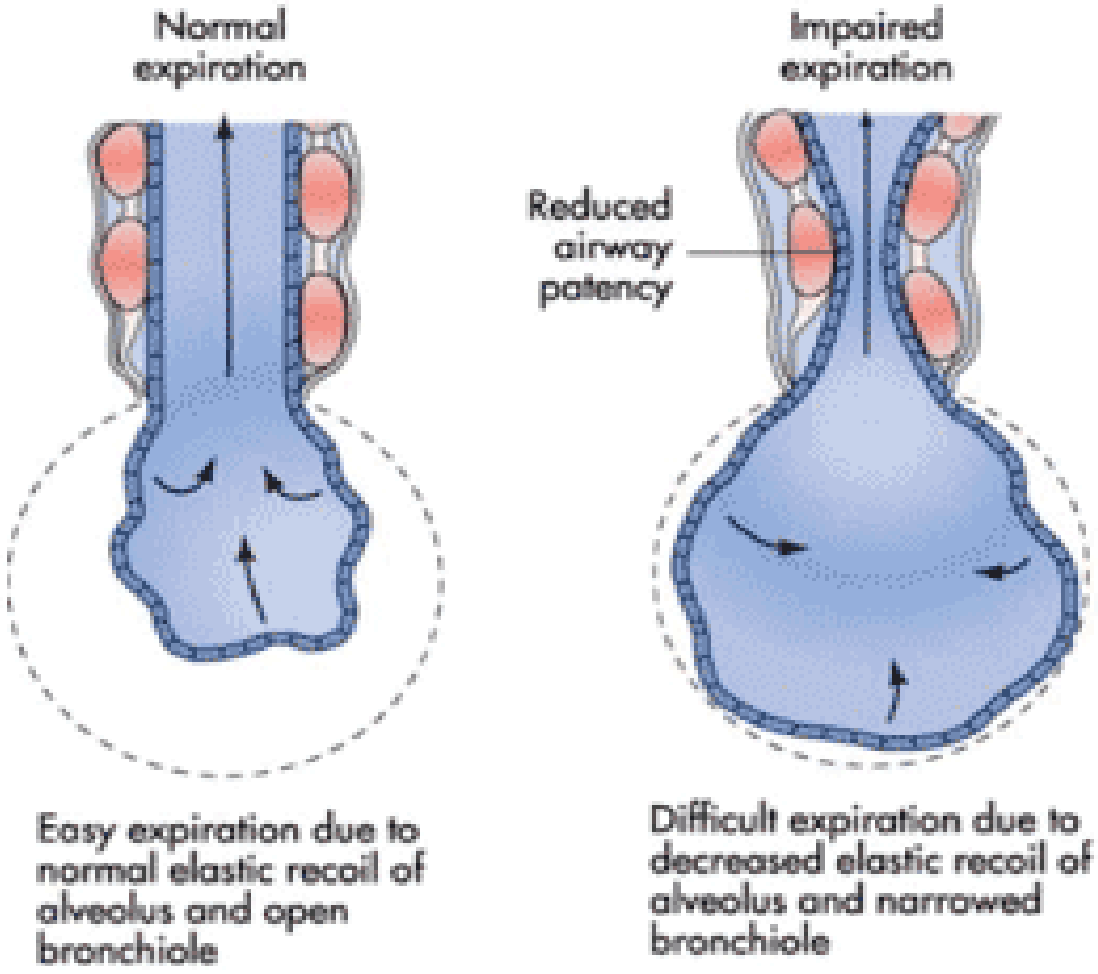
References:
1. GOLD 2015
2. Nici et al. Am J Respir Crit Care Med 2006
3. O'Donnell and Laveneziana. Eur Respir Rev 2006

Lots of air in lungs!



What the CXR does not show

Concept of Dynamic Airflow Obstruction leading to hyperinflation



In COPD Shortness of breath is the most bothersome symptom

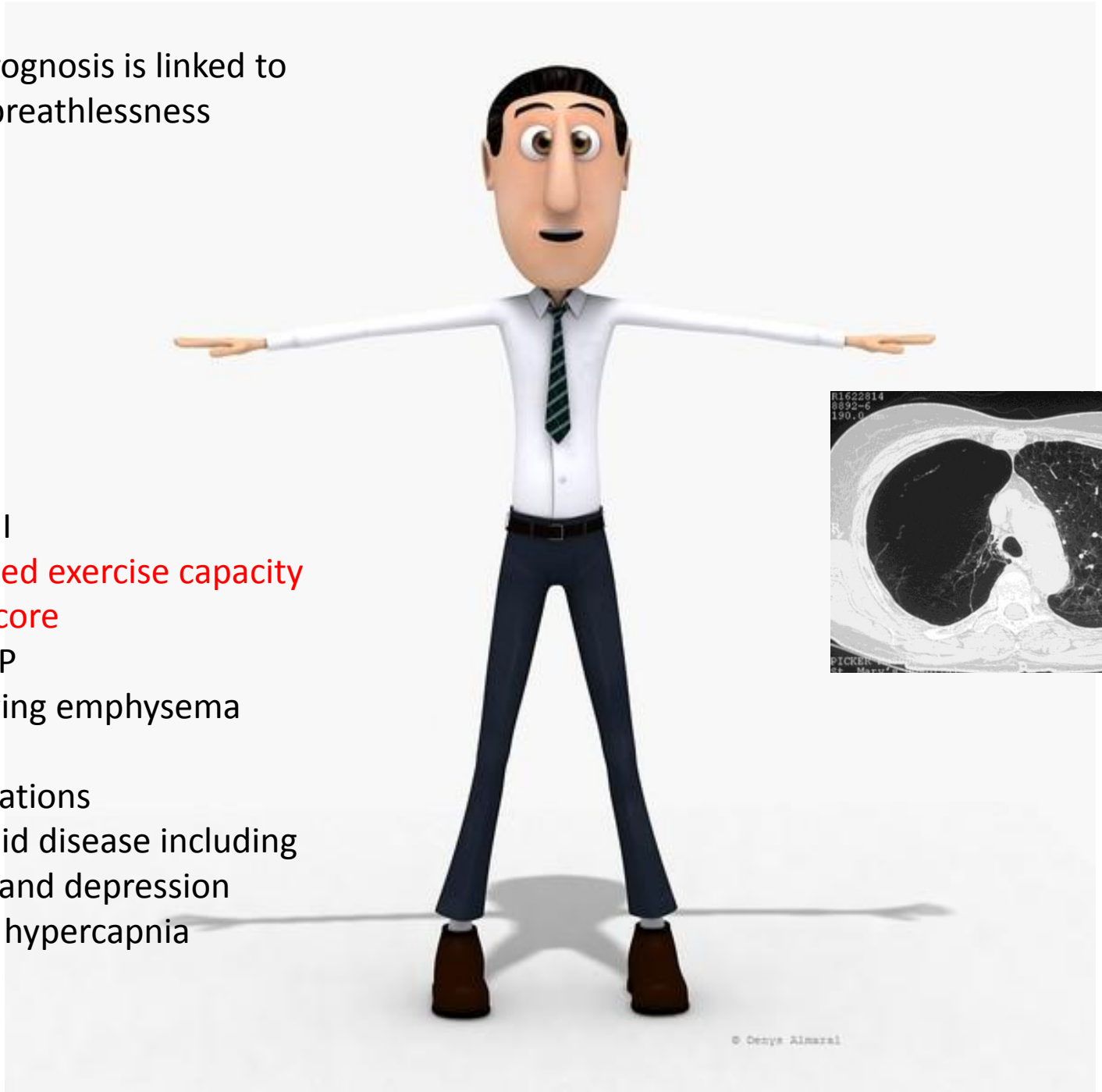
- Shortness of breath is gradual in onset, so patients often relate it to the ageing process or lack of fitness
  - As lung function deteriorates, shortness of breath becomes more intrusive[1,2]
- Patients report that shortness of breath is the most bothersome symptom and is the reason most seek medical attention[1,2]
- Patients restrict activities to avoid shortness of breath[1,2]
  - Patients with COPD spend only a third of the day walking or standing[3]
  - Healthy age-matched healthy individuals spend over half of their time in these activities[3]
- This leads to gradual deterioration of HRQoL,[4] increased dependency and social isolation[1]

HRQoL, health-related quality of life

Reference:

1. Barnett M. *J Clin Nurs*. 2005;14:805–12; 2. GOLD. COPD guidelines 2014. Available at http://www.goldcopd.org [Accessed Dec. 2015]; 3. Cooper CB. *Respir Med*. 2009;103:325–34; 4. O'Donnell DE. *Eur Respir Rev*. 2006;15:37–41

IN COPD Prognosis is linked to degree of breathlessness



Low BMI
Decreased exercise capacity
Mmrc score
High CRP
Ct showing emphysema
FEV1
Exacerbations
Comorbid disease including anxiety and depression
Chronic hypercapnia

MANAGEMENT OF BREATHLESSNESS – NON PHARMACOLOGICAL INTERVENTIONS

Breathing Techniques

- **STOP, DROP and FLOP:**
  - **STOP what you are doing**
  - **Sit down or lean forward with hand on knees and DROP shoulders**
  - **Then FLOP by relaxing muscles around shoulders and chest**
  - **Focus on breathing OUT – not in**

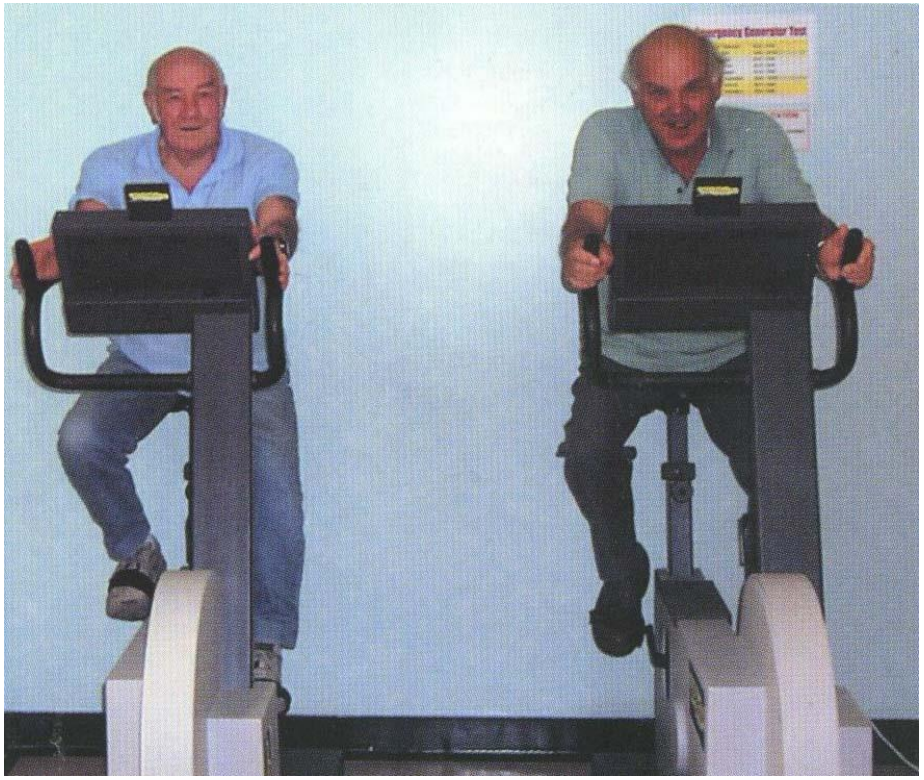
Pulmonary Rehabilitation

‘Breathe Better, Feel Good, Do More’

High Value Care in COPD

Pulmonary Rehabilitation

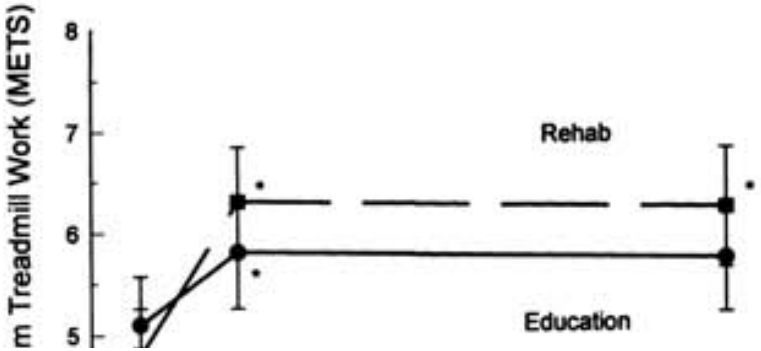
- 6-8 week exercise based class with complimentary education classes
- Run with the intention to cover all aspects of self management
- Always an MDT approach
- Aims for lifestyle/behavioural changes
- Goal orientated
- Common criteria – Chronic lung diagnosis and able to walk >10m, MRC 2-4



Pulmonary Rehabilitation reduces breathlessness

groups are shown in Figure 4. All patients are accounted for without censoring. After 6 years of follow-up, 73 of the original 119 patients were alive (survival rate, 61%). Thirty-eight of the 57 patients in the rehabilitation group (67%) and 35 of the 62 patients in the education group (56%) survived. This group difference was not statistically significant ($P = 0.3$).

The effects of six selected variables on survival for both the univariate and multivariate analyses are shown in



Ries AL et al Ann Intern Med 1995; 122: 823-832

Does PR decrease breathlessness?

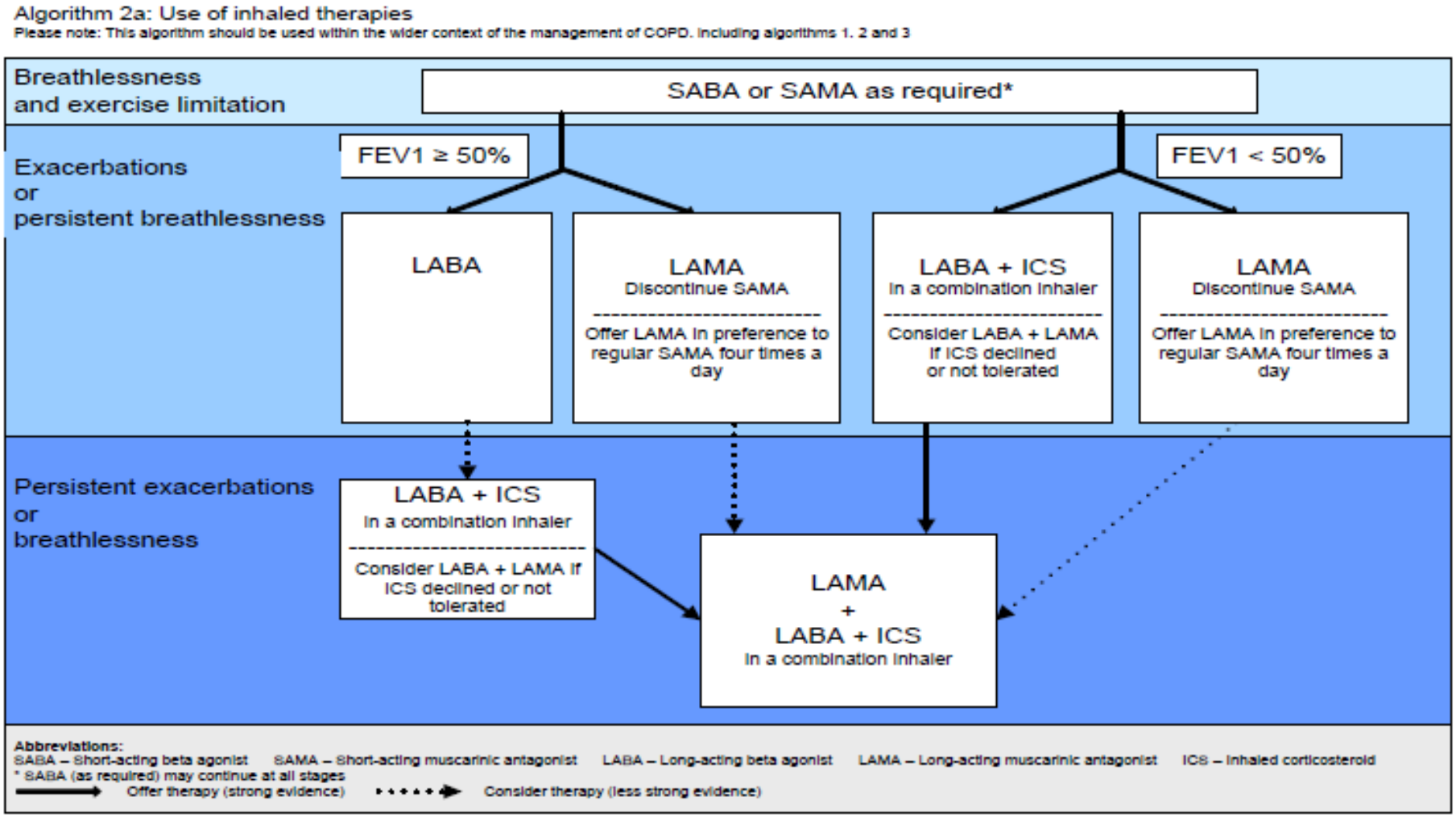
- Improves exercise capacity (**Evidence A)**
- Reduces the perceived intensity of breathlessness (**Evidence A)**
- Can improve health-related quality of life (**Evidence A)**
- Reduces the number of hospitalizations and days in the hospital (**Evidence A)**
- Reduces anxiety and depression associated with COPD (**Evidence A)**
- Benefits extend well beyond the immediate period of training(self efficacy) (**Evidence B)**
- Improves self reported ADL(B**)**
- **Teaches people how to deal with breathlessness**

Griffiths TL, , et al. Results at 1 year of outpatient multidisciplinary pulmonary rehabilitation: a randomised controlled trial. Lancet 2000;355:362–8.
2. Cochrane 2011/2009
3. Pitta F Chest 2008

Responsible Prescribing: Key Points

- Appropriate pharmacologic therapy can reduce COPD symptoms, reduce the frequency and severity of exacerbations, and improve health status and exercise tolerance.
- None of the existing medications for COPD has been shown conclusively to modify the long-term decline in lung function.

COPD NICE Guidance: Does it drive us to overprescribe ICS/LABA?



At present treatment is directed dependent on FEV1 severity

Question: Should we use newer LAMA/LABAs before ICS/LABA in breathless patients?

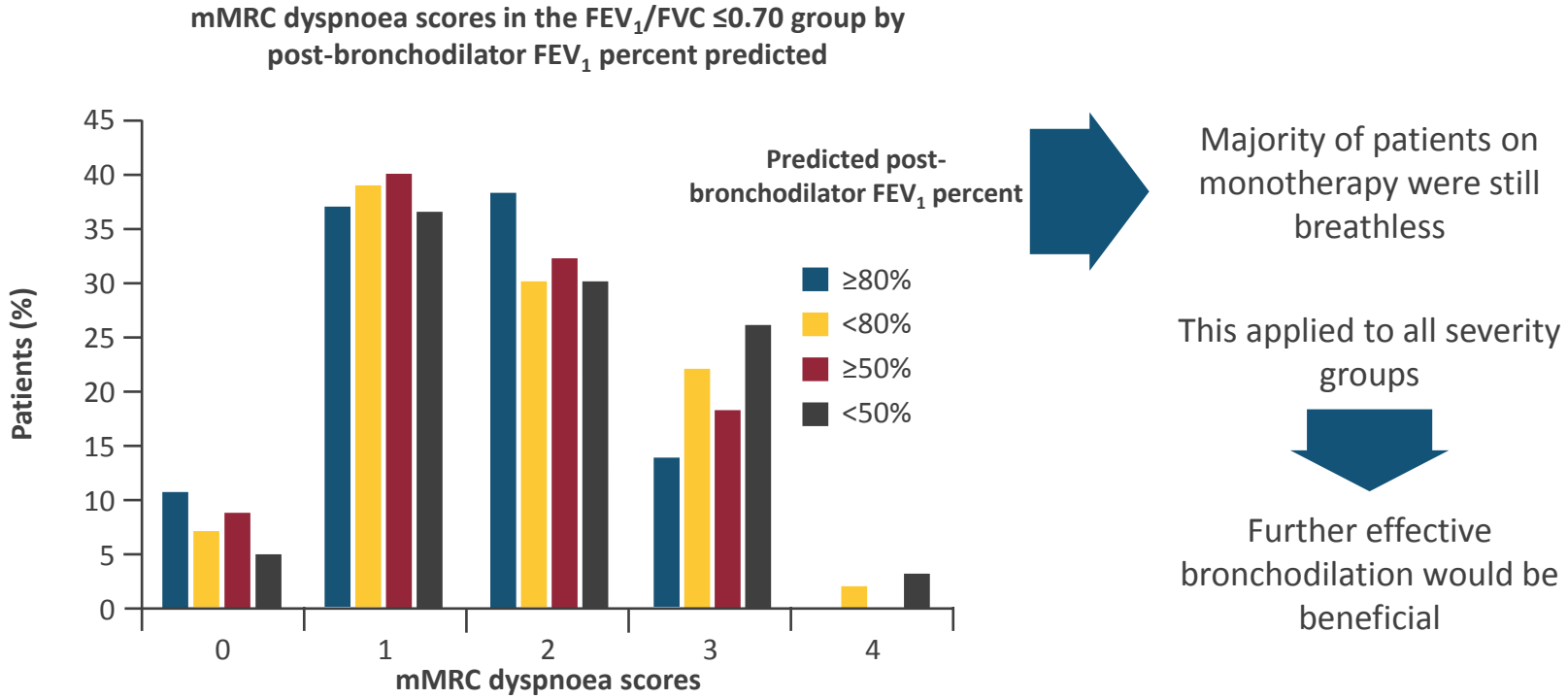
1. Yes
2. No
3. Don’t know
4. Sometimes

COPD

Many patients continue to experience breathlessness on mono-bronchodilator therapy

Real-world study of patients with COPD

On maintenance therapy with single long-acting bronchodilator (n=1072)



FDC, fixed-dose combination

Reference:

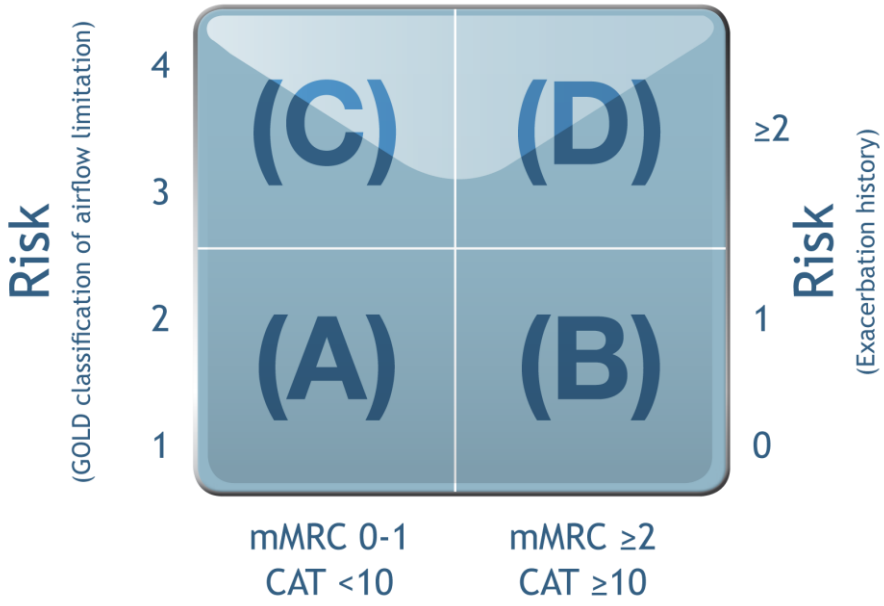
Dransfield MT, et al. *Prim Care Respir J.* 2011;20:46–53

Responsible Prescribing: Bronchodilators

- Long-acting inhaled bronchodilators are convenient and more effective for symptom relief than short- acting bronchodilators.
- Long-acting inhaled bronchodilators reduce exacerbations and related hospitalizations and improve symptoms and health status.
- Combining bronchodilators of different pharmacological classes may improve efficacy

GOLD 2016 recommendations for targeting two bronchodilatory pathways

- Utilising two long-acting bronchodilators with different mechanisms of action (i.e. a LABA and a LAMA via separate devices) is the GOLD Alternative Choice treatment in the following patients
  - GOLD Grades 1 and 2, AND/OR
  - Low exacerbation, AND
  - More symptoms
  - **Equivalent to patients in GOLD Group B**



Reference:

GOLD. http://www.goldcopd.org/uploads/users/files/GOLD_Report 2016.pdf. [Accessed March 2016]

Dual bronchodilators for COPD

Anoro® Ellipta®▼

- 55 µg umeclidinium
- 22 µg vilanterol
- One inhalation
- Once daily

Spiolto® Respimat®

- 2.5 µg tiotropium
- 2.5 µg olodaterol
- Two inhalations
- Once daily

Duaklir® Genuair®▼

- 340 µg aclidinium
- 12 µg formoterol
- One inhalation
- Twice daily

Ultibro® Breezhaler®▼

- 50 µg glycopyrronium
- 110 µg indacaterol
- One inhalation
- Once daily

Reference:

SPCs accessed at www.medicines.org.uk [Accessed Jan 2016]

[Original Research COPD]

CHEST

A Systematic Review With Meta-Analysis of Dual Bronchodilation With LAMA/LABA for the Treatment of Stable COPD

Luigino Calzetta, PhD; Paola Rogliani, MD; Maria Gabriella Matera, MD; and Mario Cazzola, MD

The main finding of this meta-analysis is that, regardless of the LAMA/LABA combination examined, dual bronchodilation was always more effective than the LAMA or LABA alone in terms of the improvement in trough FEV1 .

All LAMA/LABA combinations also improved TDI and SGRQ scores compared with monocomponents

Chest: May 2016

When to use LAMA/LABA : simple guide

- **Predominant Breathless Phenotype** ✔
  - **SABA➔LAMA➔LAMA+LABA**

- **Predominant Chronic Bronchitis/Exacerbator Phenotype**
  - **LAMA➔LABA+ICS or**
    LAMA+LABA➔LAMA+LABA+ICS ✔

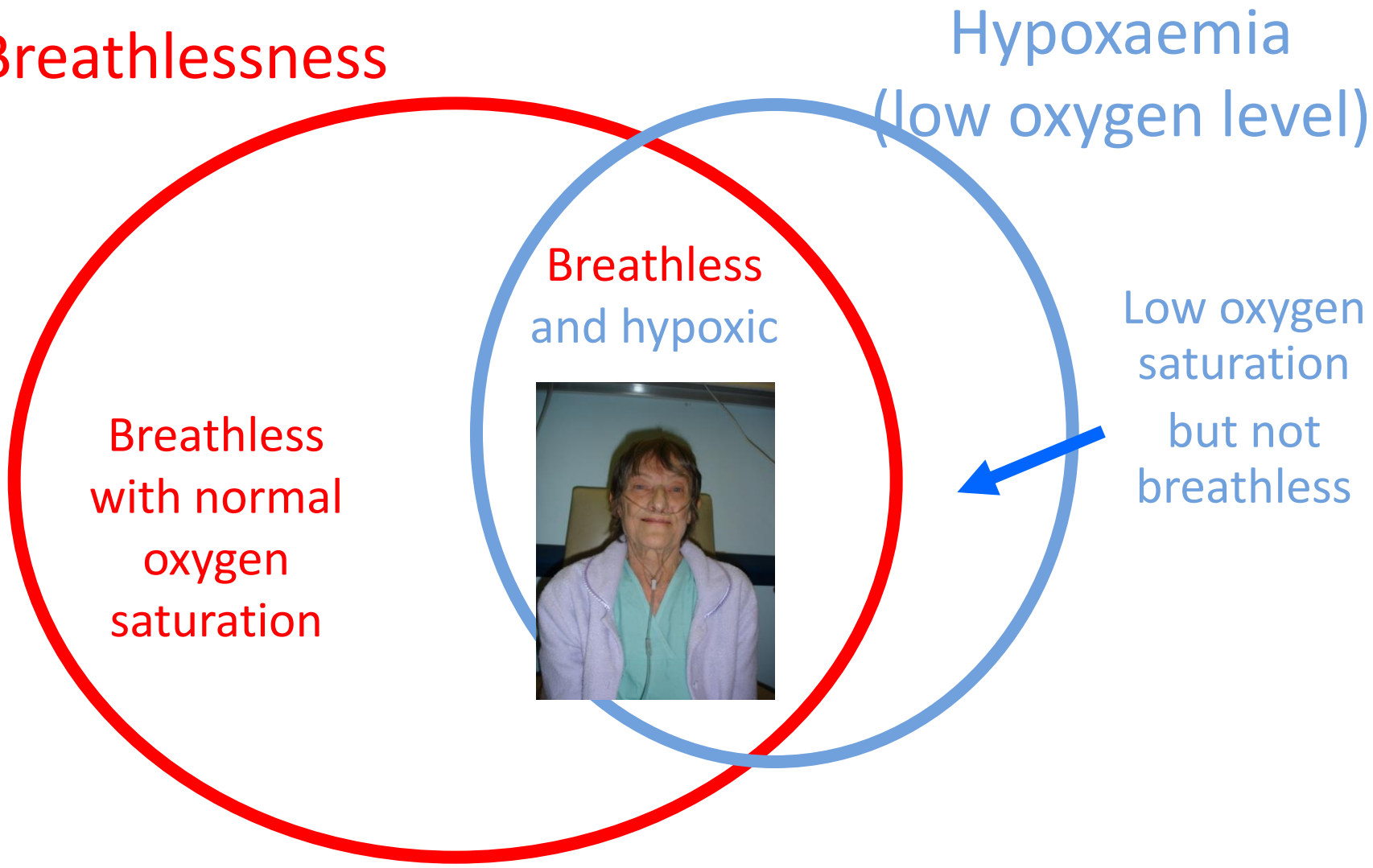
- Predominant Chronic Asthma/ACOS Phenotype ✖
  - SABA+ICS➔LABA+ICS➔LAMA+LABA+ICS

‘I've learnt to get out of breath a little bit is good’

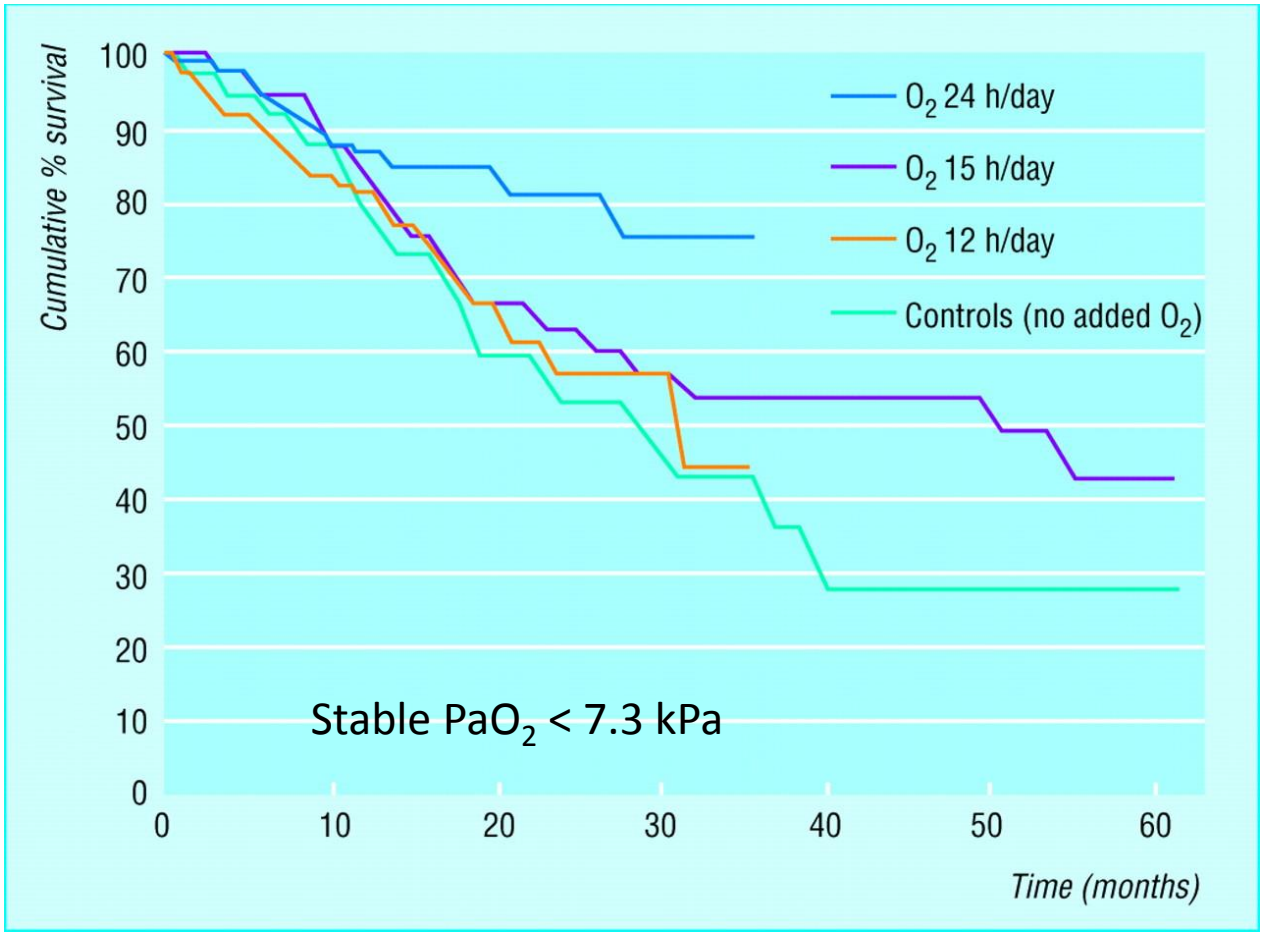
‘I'm doing my own hoovering now, he was doing it before. We're sharing more jobs now…’

‘Looked forward to meeting people twice a week, telling a few jokes..’

Hypoxaemia and Breathlessness



Oxygen improves survival in hypoxaemia



NOTT 1980(203)
MRC 1981 (87 patients)
Goreka 1997

MRC Lancet 1981:1;681-5 & NOT Trial Annals Internal Medicine 1980:93;391-98

Nice Quality statement

- People with COPD potentially requiring long-term oxygen therapy (saturations </= 92 %)are assessed in accordance with NICE guidance by a specialist oxygen service.
- People with COPD receiving long-term oxygen therapy are reviewed at least annually, by a specialist oxygen service as part of the integrated clinical management of their COPD.

Ambulatory oxygen

- Ambulatory oxygen therapy is indicated for patients who desaturate 4% or more below 90% on exercise when breathing air and/or if there is an improvement of 10% in walking distance or breathlessness scores when breathing oxygen: this can be diagnosed by formal exercise testing and oximetry.

Potential Future Landscape

Impress identified 8 areas for research

1. Use Consistent terminology
2. Standardise breathlessness scores and measurements
3. Evaluate Psychological interventions
4. Evaluate combined pulmonary and cardiac rehabilitation
5. Evaluate Physical activity in early breathlessness and versus drug therapy
6. Obesity and breathlessness
7. Support respiratory physiotherapists to evaluate their interventions
8. Evaluate IMPRESS algorithm and BITs

Tips for commissioners

- Be guided by right care framework
- Involve many stakeholders
- Foster integration across specialities
- Check primary care has right equipment and training
- Provide sufficient rehabilitation
- Look for opportunities to integrtae existing teams and services

Conclusions

- Breathlessness can be distressing and disabling
- Often caused by more than one Pathology
- Linked to anxiety
- High prevalence in smokers
- Best addressed by symptom led clinics alongside specialist input