MediConf UK.LTD

PROMOTING EXCELLENCE IN HEALTH EDUCATION

Respiratory Study Morning
A Year in Review: Applying new evidence to clinical practice

Steve Holmes (GP)

Jury's Inn

Middlesborough

Sat 12th March 2016

A Year in Review: Applying new evidence to clinical practice

9.30 – 11.00

Asthma Year in Review

- Diagnosis in adults and children
- Treatment update (non-pharmacological and pharmacological)

New Inhaler Devices (asthma/COPD)

- Structured review of new inhalers
- Simple teaching and assessment

11.00 – 11.30

Coffee time and chat

11.30 – 13.00

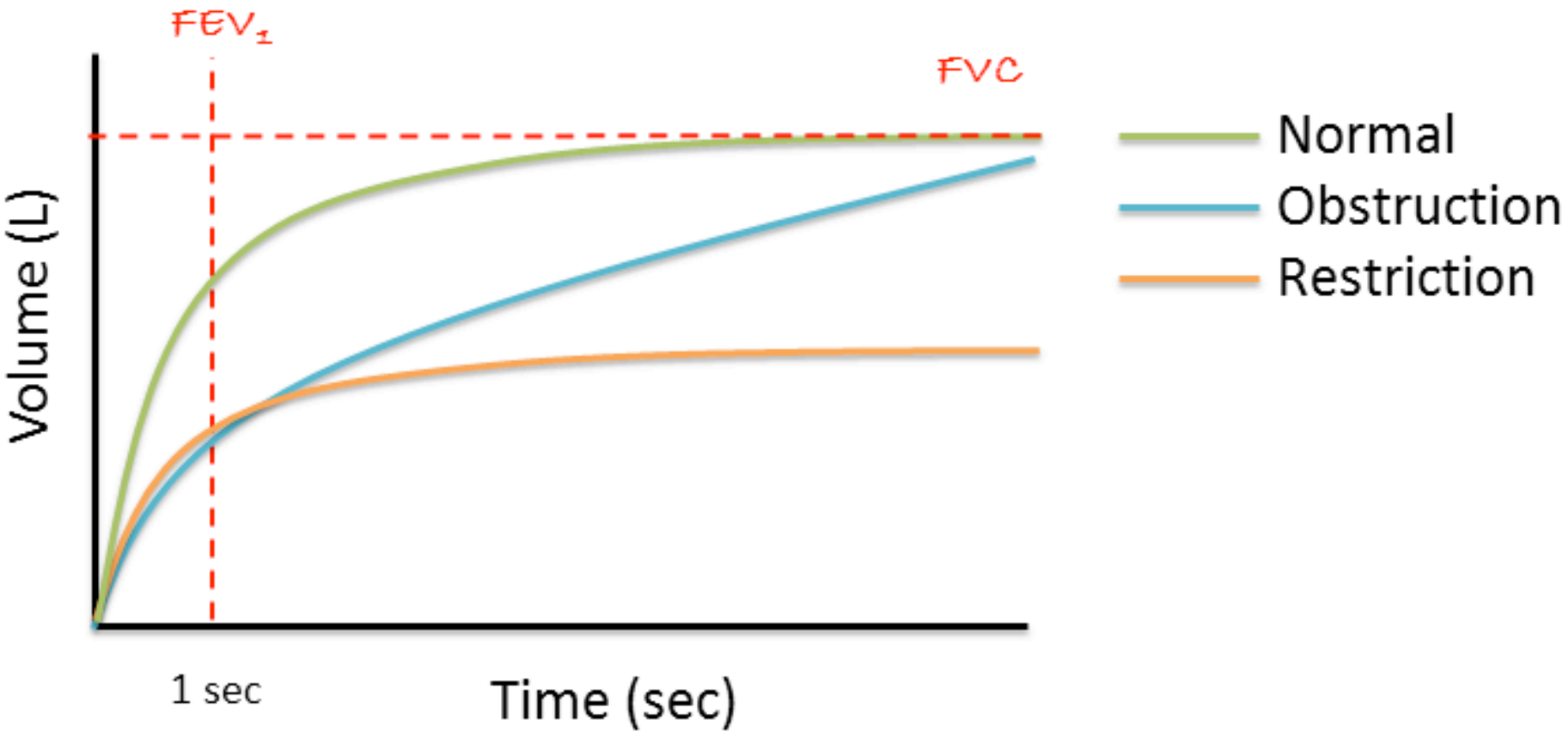
COPD Year in Review

- Early accurate diagnosis and spirometry interpretation
- Treatment update

Respiratory areas not to forget

- Smoking as a long term condition, carcinoma of the lung, interstitial lung disease, bronchiectasis, respiratory infections

Using microspirometry effectively in clinical practice


FEV1
FVC
Volume (L)
1 sec
Time (sec)
Normal
Obstruction
Restriction

Microspirometry is not for diagnosis

Quality assured microspirometry

This session will cover

1. Using the microspirometer in practice
2. Monitoring rationale
3. Case finding / “screening” rationale

Quality assured microspirometry

1. **Using the microspirometer in practice**
2. Monitoring rationale
3. Case finding / “screening” rationale

Calibration

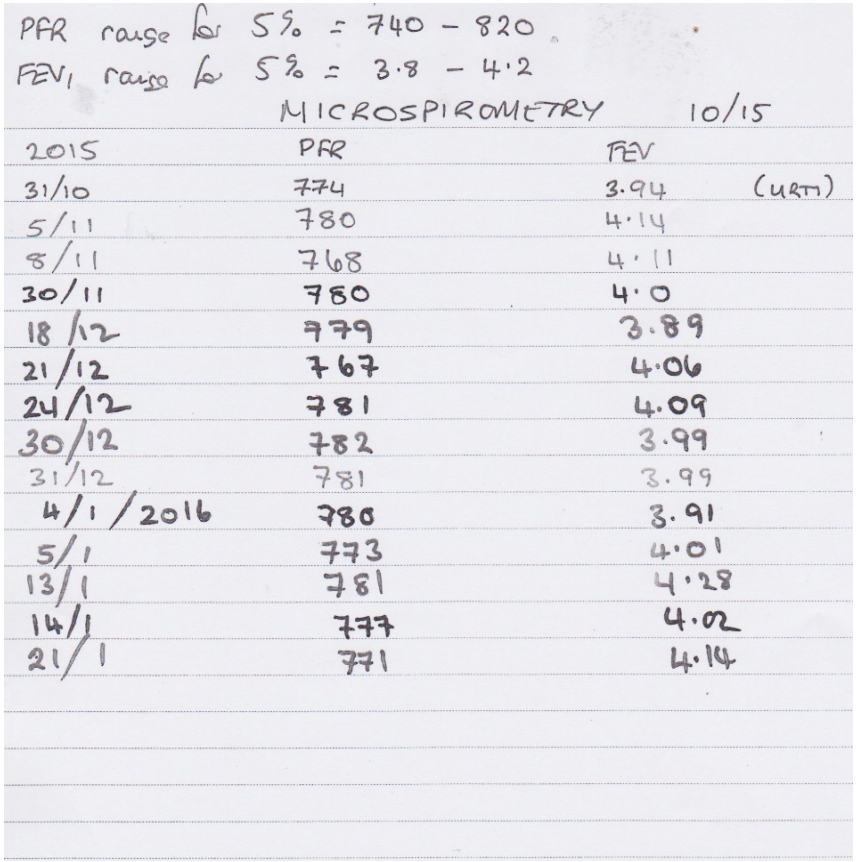
- Need to consider that equipment should be calibrated – and quite a lot of our measuring equipment is?
- How do you calibrate your peak flow meters?
- “Biological calibration”

Biological Calibration

- Clinician (without asthma) should have had their own quality spirometry performed and know what their own PFR (peak flow rate) and FEV1 (forced expiratory volume at 1 second).
- Machine should be 5% of ideal (different to with calibration syringe as human variability too)
- Ideally calibrated at each session
- Recommend “practice calibration” every month (safety net)

Adapted from Levy ML, Quanjer PH, Booker R, Cooper BG, Holmes S, Small I. Diagnostic Spirometry in Primary Care: Proposed standards for general practice compliant with American Thoracic Society and European Respiratory Society recommendations. Primary Care Respiratory Journal. 2009;18(3):130-47

Keep a record



PFR range for 5% = 740 – 820
FEV1 range for 5% = 3.8 – 4.2

MICROSPIROMETRY 10/15

2015	PFR	FEV	
31/10	774	3.94	(URTI)
5/11	780	4.14	
8/11	768	4.11	
30/11	780	4.0	
18/12	779	3.89	
21/12	767	4.06	
24/12	781	4.09	
30/12	782	3.99	
31/12	781	3.99	
4/1/2016	780	3.91	
5/1	773	4.01	
13/1	781	4.28	
14/1	777	4.02	
21/1	771	4.14	

- PFR 780 (range 740 – 820)
- FEV1 4.0 (3.8 – 4.2)

Adapted from Levy ML, Quanjer PH, Booker R, Cooper BG, Holmes S, Small I. Diagnostic Spirometry in Primary Care: Proposed standards for general practice compliant with American Thoracic Society and European Respiratory Society recommendations. Primary Care Respiratory Journal. 2009;18(3):130-47

Using microspirometry with patient (similar to peak flow meter)

- New mouth piece
- Blow out as fast / hard as you can (for at least one second) – we will need at least three short tests and we want maximum effort
- Should take three readings and ideally two would be within 100mls or 5%
- Record best (and second best readings) and if needed the degree of effort apparent

Adapted from Levy ML, Quanjer PH, Booker R, Cooper BG, Holmes S, Small I. Diagnostic Spirometry in Primary Care: Proposed standards for general practice compliant with American Thoracic Society and European Respiratory Society recommendations. Primary Care Respiratory Journal. 2009;18(3):130-47

Quality assured micro-spirometry

1. Using the microspirometer in practice

2. **Monitoring rationale**

3. Case finding / “screening” rationale

Monitoring of FEV1 and PEFR

- Useful to be able to measure at consultations and home visits rapidly – but is only part of a review
- Review of patient for COPD includes:
  - Symptoms (MRC)
  - Severity of obstruction (FEV1)
  - Exacerbation rate
  - Smoking status
  - BMI etc

Monitoring of COPD – FEV1 or full spirometry

- Quality Outcome Framework (QOF) asks for FEV1[1] not full spirometry nor further FVC, FEV1/FVC ratio)
- NICE Guidelines suggest FEV1 important (not full spirometry, nor FVC, FEV1/FVC ratio)[2]
- Major prognostic indicators look for FEV1 alone (not other parameters (eg. BODE[3] / DOSE[4])

1- NHS Information Centre. Quality and Outcome Framework 2012. 2013

2- National Collaborating Centre for Chronic Conditions COPD. Management of chronic obstructive pulmonary disease in adults in primary and secondary care (partial update). Clinical Guideline 101. London2011

3- Cote CG, Pinto-Plata VM, Marin JM, Nekach H, Dordelly LJ, Celli BR. The modified BODE index: validation with mortality in COPD. European Respiratory Journal. 2008;32(5):1269-

4- Jones RC, Donaldson GC, Chavannes NH, Kida K, Dickson-Spillmann M, Harding S, et al. Derivation and Validation of a Composite Index of Severity in Chronic Obstructive Pulmonary Disease: The DOSE Index. Am J Respir Crit Care Med. 2009;180(12):1189-95

A patient attends and is more breathlessness with COPD

- Pulmonary Embolus
- Carcinoma of Lung
- Anaemia
- Heart Failure
- Pneumonia
- Anxiety
- Bronchiectasis
- Pneumothorax
- Pleural effusion
- Deconditioning

None of these will be picked up by annual spirometry

Effective use of resources

- **STOP – doing diagnostic spirometry every year on routine review**
  - This will save around 20-30 minutes of spirometry time per patient which can be used for other screening and clinical tasks
- **10,000 patient list size (average prevalence of 190 patients) = 95 hours of spirometry time freed up from routine review**
- **Use the time to listen to the patient and react to their symptoms and do a great review**

Holmes S, Scullion JE Effective Care Effective Communication – Changing the Face of COPD Care (PCRS / REUK, 2014)

Clinical Tips

- FEV1 and PEFR in COPD does not change during an exacerbation
- Equipment is easily portable in diagnostic clinician bag (for home visits)
- Can be used for asthma and COPD monitoring

- Recommend time is important in the NHS– all we need is a quality FEV1 and PFR measurement (don't go for expensive fancy machines that take lots of time to calibrate)

Quality assured micro-spirometry

1. Using the microspirometer in practice
2. Monitoring rationale
3. **Case finding / “screening” rationale**

Case finding for COPD

Consider a diagnosis of COPD for people who are:

- over 35, **and**
- smokers or ex-smokers, **and**
- have any of these symptoms:
  - exertional breathlessness
  - chronic cough
  - regular sputum production
  - frequent winter 'bronchitis'
  - wheeze

NICE Guidelines CG101 – Chronic Obstructive Pulmonary Disease (2010)

Traditional case finding for COPD

- Diagnostic spirometry in every patient we think of:
  - Expensive in time and resources; very low pick up (less than 10%)
- Questionnaires
  - The best pick up in around 20% of people
  - Lower pick up if postal questionnaires
- Opportunistic
  - Often missed many times before given questionnaire or referred for spirometry

Tinkelman DG, Price D, Nordyke RJ, Halbert RJ. COPD screening efforts in primary care: what is the yield? Prim Care Respir J. 2007;16(1):41-8

The missing millions are out there!

- Screening of smokers over 40 in general practice may yield 10 - 20% undiagnosed COPD cases, with a substantial proportion of these having severe disease[1]
- Findings:

  Moderate in 57.4%, severe in 36.8% and very severe in 5.8%

Tinkelman DG, Price D, Nordyke RJ, Halbert RJ. COPD screening efforts in primary care: what is the yield? Prim Care Respir J. 2007;16(1):41-8

Three easy areas to case find in primary care

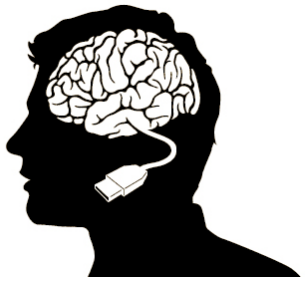
1. Smokers with symptoms over the age of 35 years (especially in smoking cessation clinics)
2. People with other long term conditions (diabetes / CHD)
3. People presenting with “another episode of bronchitis” (the FEV1 does not change a lot in COPD during an exacerbation)[1,2]

1- Prieto Centurion V, Huang F, Naureckas E, Camargo Jr C, Charbeneau J, Joo M, et al. Confirmatory spirometry for adults hospitalized with a diagnosis of asthma or chronic obstructive pulmonary disease exacerbation. BMC Pulmonary Medicine. 2012;12(1):73
2- Rea H KT, Adair J, Robinson E, Sheridan N. Spirometry for patients in hospital and one month after admission with an acute exacerbation of COPD International Journal of Chronic Obstructive Pulmonary Disease. 2011;6:527 - 32

LLN for White Caucasian Males

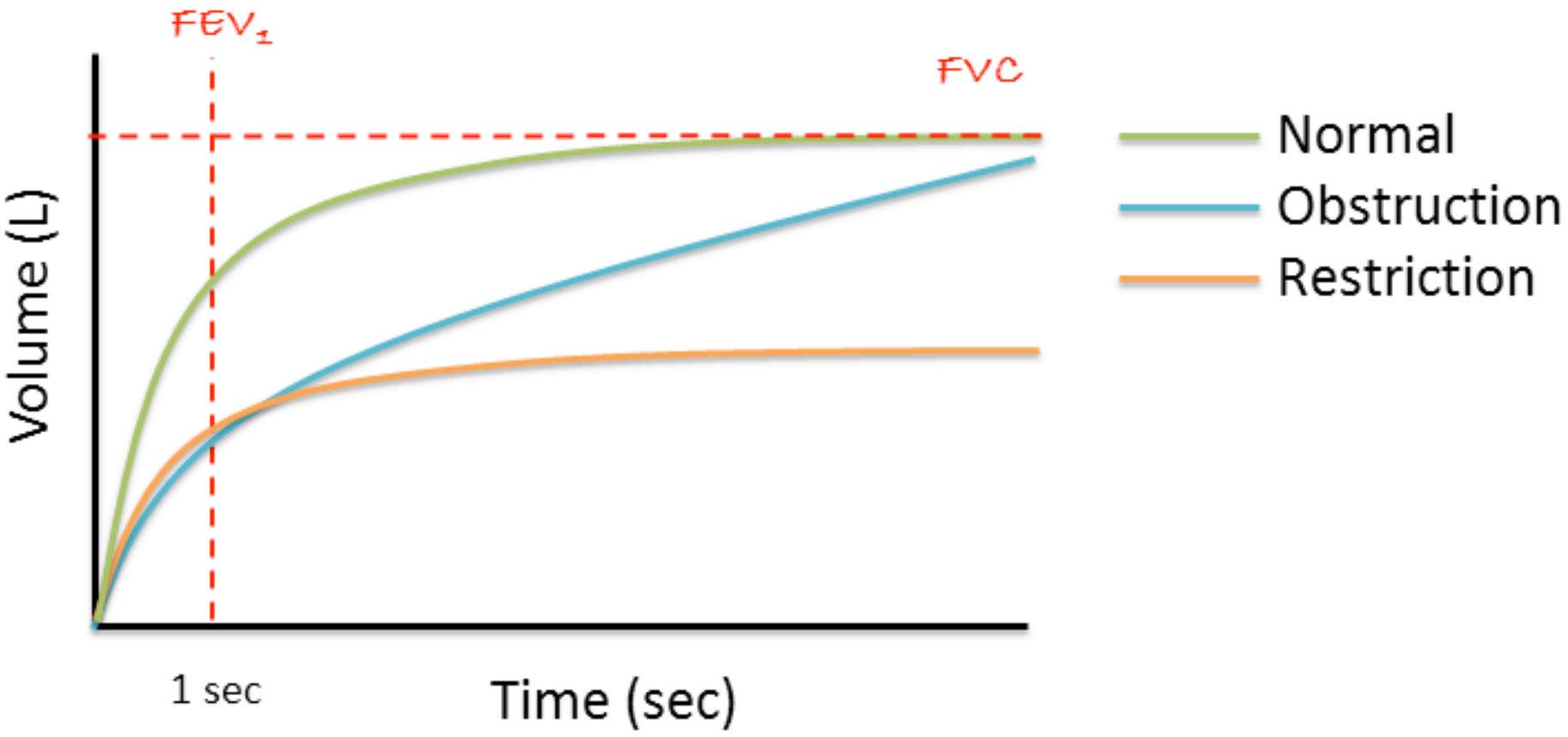
FEV1	Units: L	Male	Whites									
cm	Ins	Age	5	10	15	20	25	30	35	40	45	50	55
122	48		1.07	1.17	1.36	1.54	1.55	1.50	1.45	1.40	1.34	1.28	1.21
130	51		1.24	1.37	1.58	1.79	1.80	1.75	1.68	1.62	1.56	1.48	1.40
137	54		1.40	1.54	1.78	2.02	2.04	1.98	1.90	1.83	1.75	1.67	1.58
145	57		1.60	1.76	2.03	2.31	2.33	2.25	2.17	2.09	2.00	1.91	1.81
152	60		1.79	1.97	2.28	2.58	2.59	2.52	2.43	2.33	2.24	2.13	2.02
160	63		2.02	2.22	2.56	2.91	2.93	2.84	2.73	2.63	2.52	2.41	2.28
168	66		2.27	2.48	2.87	3.26	3.28	3.18	3.06	2.94	2.83	2.70	2.55
175	69		2.49	2.73	3.16	3.58	3.61	3.50	3.37	3.24	3.11	2.97	2.81
183	72		2.76	3.04	3.51	3.97	4.01	3.89	3.74	3.60	3.45	3.29	3.11
191	75		3.06	3.36	3.88	4.39	4.43	4.29	4.13	3.98	3.82	3.64	3.45
198	78		3.33	3.65	4.22	4.78	4.82	4.68	4.50	4.33	4.15	3.96	3.75
206	81		3.65	4.01	4.63	5.25	5.29	5.12	4.93	4.75	4.56	4.34	4.11

Quanjer PH, Stanojevic S, Cole TJ, Baur X, Hall GL, Culver BH, et al. Multi-ethnic reference values for spirometry for the 3 –95-yr age range: the global lung function 2012 equations. European Respiratory Journal. 2012 December 1, 2012;40(6):1324-43



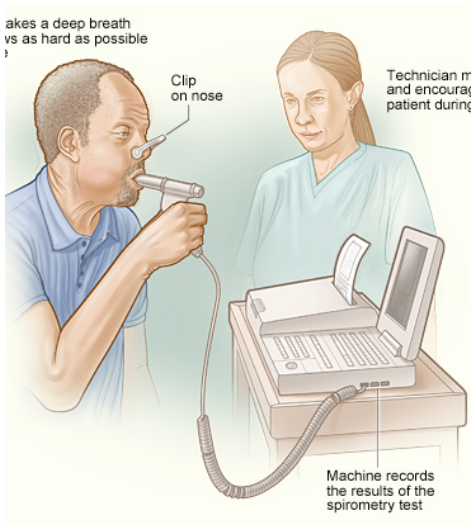
Remember

- If FEV_1 is low this may be restrictive or obstructive and might be asthma too!
- If FEV_1 is normal, unless lots of symptoms (mild COPD) it is not COPD, nor restrictive
- It might be something else (ca lung/bronchiectasis/ heart failure/anaemia)


FEV1
FVC
Volume (L)
1 sec
Time (sec)
Normal
Obstruction
Restriction

FEV1 is below the Lower Limit of Normal (LLN)

- Ask patient to book for full diagnostic spirometry (if bronchitis presentation perhaps when they think they are back to normal in 5-6 weeks time) – give information
- Indicate it will help to manage their lung health much better (need for inhalers, antibiotics with flare ups) this should be positive and active



Diagnostic Spirometry in Primary Care: Proposed standards for general practice compliant with American Thoracic Society and European Respiratory Society recommendations.

EVERY DIAGNOSIS MATTERS – GET IT RIGHT!

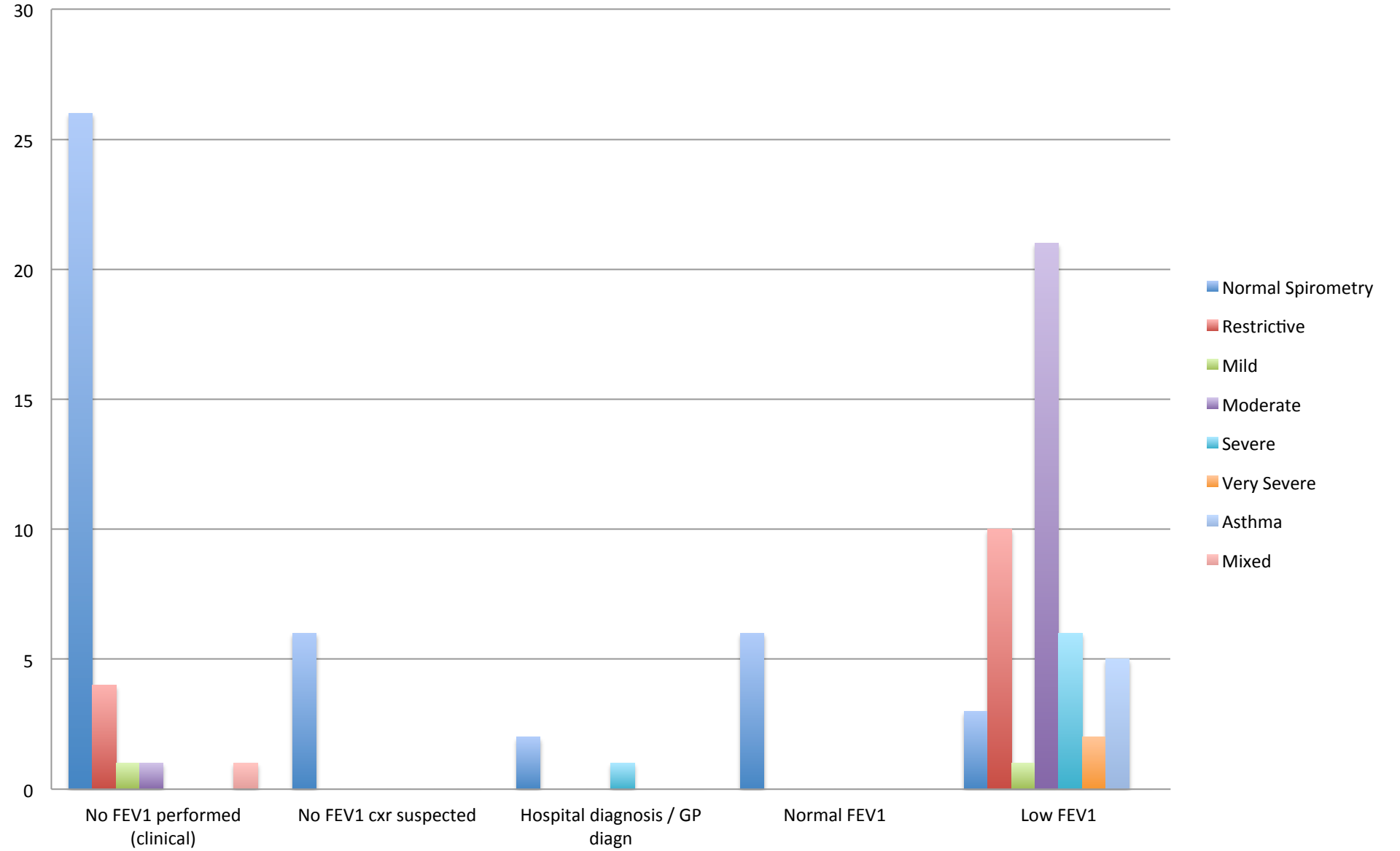
Levy ML, Quanjer PH, Booker R, Cooper BG, Holmes S, Small I. Primary Care Respiratory Journal. 2009;18(3):130-47

COPD diagnosis

- Good history and examination
- Chest xray, full blood count and BMI (?)
- Confirmed by diagnostic quality spirometry

NICE Guidelines CG101 – Chronic Obstructive Pulmonary Disease (2010)

PMP Spirometry in 2013 - 2014



Holmes S, Beer K (2014) Review of Spirometry use at Park Medical Practice

Top Tip – use microspirometry for routine review and for case finding list size of 10,000 will free up around 200 hrs per year

But use high quality diagnostic spirometry to make the diagnosis

Holmes S, Beer K (2014) Review of Spirometry use at Park Medical Practice – actual calculated value for list size of 10,000 was 221hr

Microspirometry is not for diagnosis

COPD – Making the diagnosis is important

Diagnostic Spirometry in Primary Care: Proposed standards for general practice compliant with American Thoracic Society and European Respiratory Society recommendations.

EVERY DIAGNOSIS MATTERS – GET IT RIGHT!

Levy ML, Quanjer PH, Booker R, Cooper BG, Holmes S, Small I. Primary Care Respiratory Journal. 2009;18(3):130-47

Get it right – please!

- **False positive interpretations**
  - some patients lose jobs which support their family, while others are prescribed expensive, unnecessary inhalers which may have serious side-effects
- **False negative interpretations**
  - no interventions are made to eliminate the exposures causing lung disease (such as occupational factors or cigarette smoking).
- "In our experience, pulmonary specialists have been as likely to make these mistakes as have primary care providers."

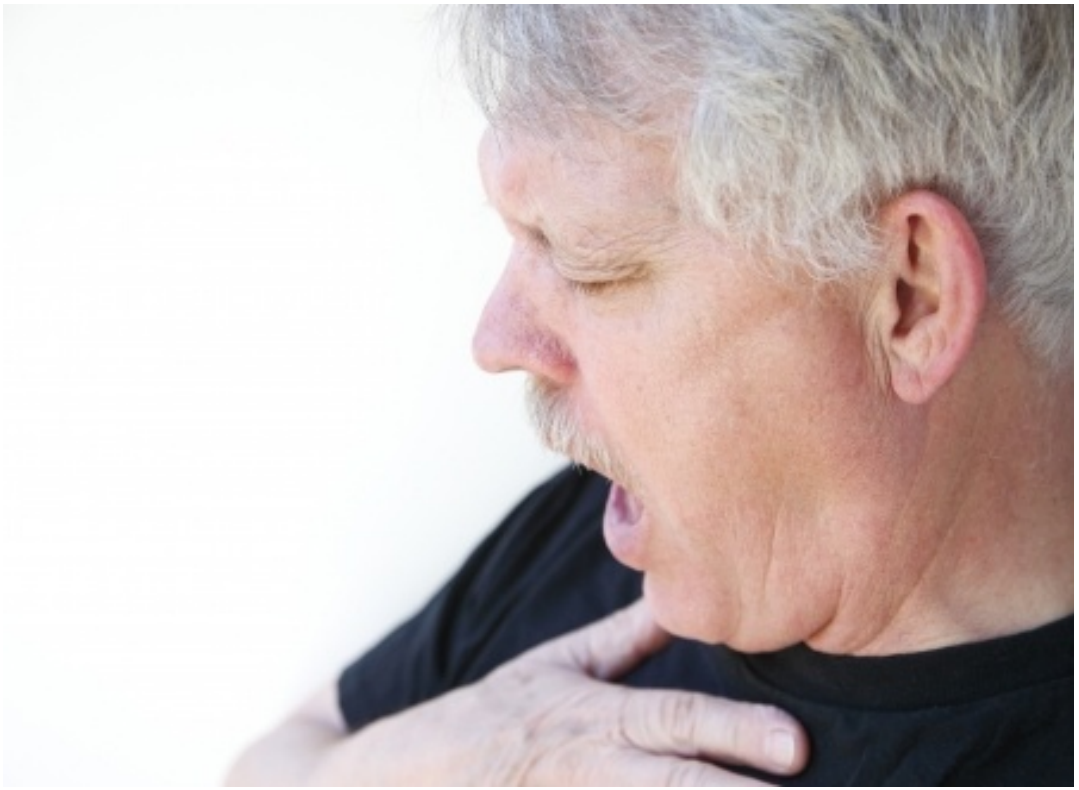
Enright P, Schermer T. Don't pay for poor quality spirometry tests. Primary Care Respiratory Journal. 2013;22:15

Comparison of quality in specialist undertaken spirometry (Glasgow, 2004)[1] versus Shepton Mallet primary care (2014)[2]– for "first / diagnostic" spirometry)

	Glasgow Spirometry Tent	Park Medical Practice
Number	826	194
Average age	50.9 +/- 15.7y	63.9
Quality A	41.2%	85.6%
Quality B	10.2%	11.3%
Quality C	20.5%	3.1%
Quality D	21.1%	0%
Quality F	7%	0%

Maio S, Sherrill DL, MacNee W, Lange P, Costabel U, Dahlén S-E, et al. The European Respiratory Society spirometry tent: a unique form of screening for airway obstruction. European Respiratory Journal. 2012;39(6):1458-67.
2- Holmes S, Beer K (2014) Review of Spirometry use at Park Medical Practice

When should we think of the diagnosis?



Case finding for COPD

Consider a diagnosis of COPD for people who are:

- over 35, **and**
- smokers or ex-smokers, **and**
- have any of these symptoms:
  - exertional breathlessness
  - chronic cough
  - regular sputum production
  - frequent winter 'bronchitis'
  - wheeze

NICE Guidelines CG101 – Chronic Obstructive Pulmonary Disease (2010)

Contraindications to spirometry testing

Table 3. Relative contraindications to spirometry. (Adapted from ref 6).

Relative contraindication	Rationale
Known or suspected respiratory infection	Potential contamination of equipment and cross infection risk Results unlikely to be meaningful, reliable or reproducible
Haemoptysis of unknown origin	Exacerbation of the problem and possible major haemorrhage. Possible active pulmonary tuberculosis leading to contamination of equipment and cross infection risk
Pneumothorax	Aggravation of the condition
Unstable cardiovascular status: recent (within 1 month) myocardial infarction, uncontrolled hypertension or pulmonary embolism	Forced expiration can worsen angina or cause potentially dangerous blood pressure changes
Uncontrolled hypertension or history of haemorrhagic cerebrovascular event	Precipitation of cerebral bleed
Recent thoracic, abdominal or eye surgery	Pain or incisional hernias. Raised intraocular pressure post ophthalmic surgery undesirable
Nausea, vomiting or pain	Effect on patient's ability to co-operate and perform the test
Confusion, dementia	Unlikely to be able to comply with instructions

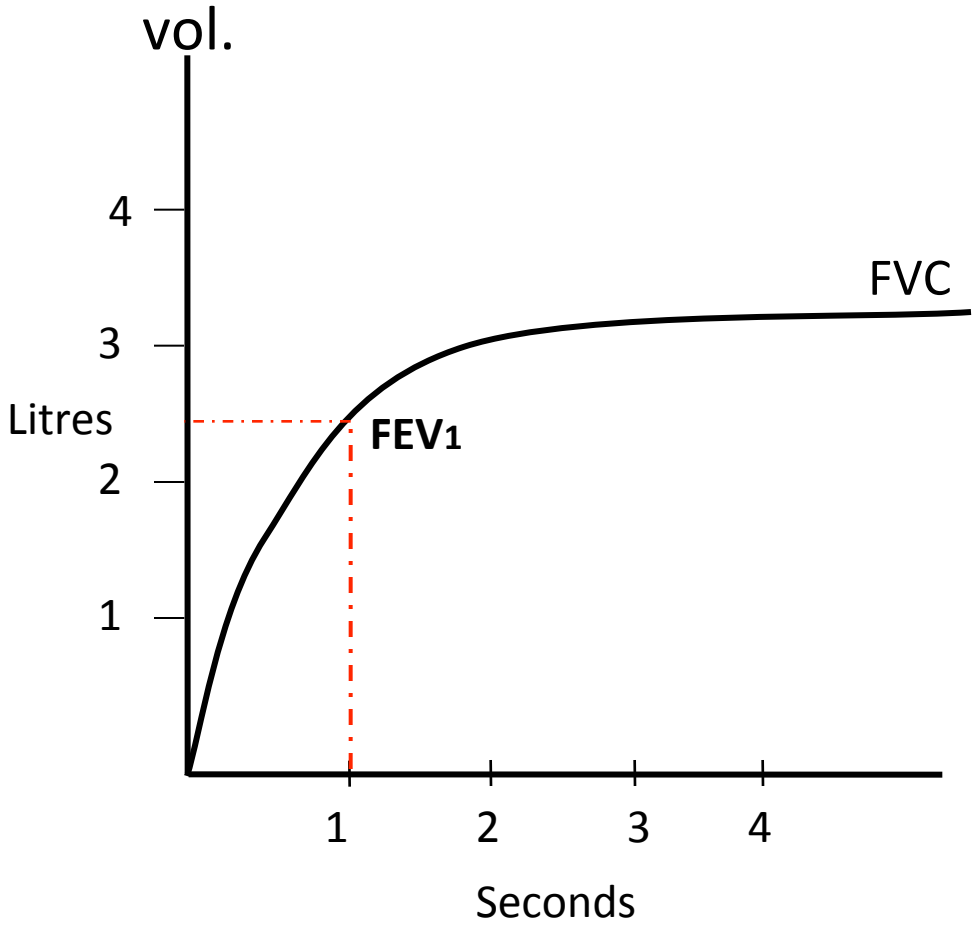
Levy ML, Quanjer PH, Booker R, Cooper BG, Holmes S, Small I. Primary Care Respiratory Journal. 2009;18(3):130-47

Adjusting caucasian reference values

Population	FEV1	FVC
Hong Kong Chinese	1.0	1.0
Japanese American	0.89	
Polynesian	0.9	0.9
North Indian / Pakistan	0.9	0.9
South Indian / African	0.87	0.87

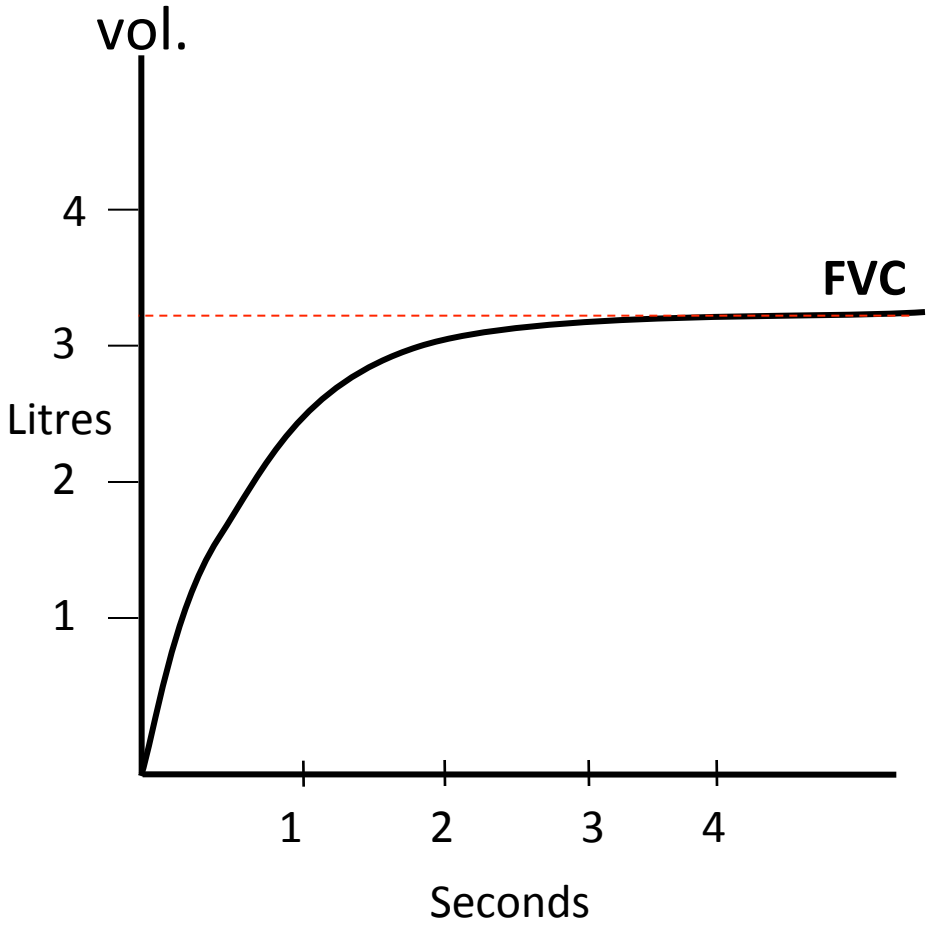
Forced Expiratory Volume in 1 second (FEV_1)

The maximum volume of air in litres, expelled from the lungs in the first second of a forced expiration, starting from full inspiration



Forced Vital Capacity (FVC)

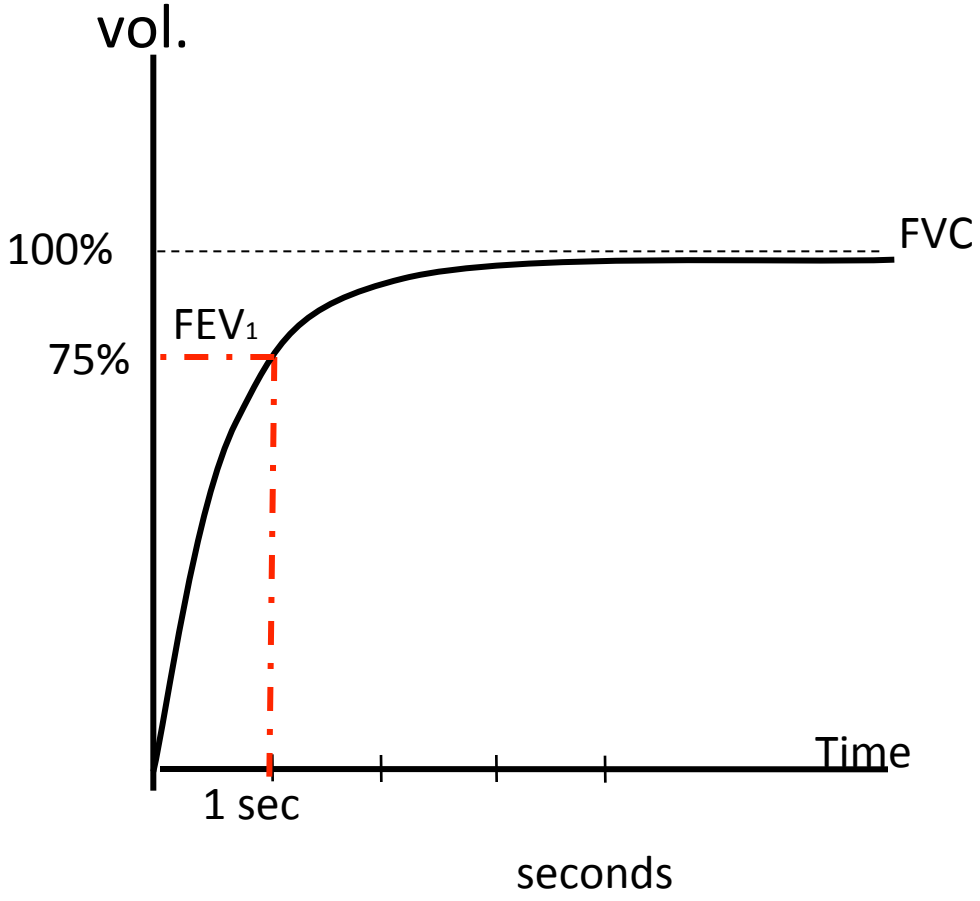
The maximum volume of air in litres that can be exhaled from the lungs during a forced expiration following maximum inspiration



FEV1% or FEV1/FVC Ratio

The percentage of air that is expelled from the lungs in the first second of a forced vital capacity, starting from full inspiration

Sometimes written as FER (Forced Expiratory Ratio)



FEV_1/VC ratio

- In patients with airflow obstruction air trapping may occur during a forced expiratory manoeuvre, causing the VC to be greater than the FVC.

- In this case the FEV_1/VC ratio rather than the FEV_1/FVC should be calculated as it is a more reliable indicator of airflow obstruction

Spirometry Interpretation

	Normal	Obstructed	Restricted	Combined
FVC	***>80% (pred)***	**>80%**	***< 80%***	**< 80%**
FEV1	***>80% (pred)***	**< 80%**	***< 80%***	**< 80%**
FEV1/FVC	***>70%***	**<70%**	***>70%***	**<70%**

CLASSIFICATION OF AIRFLOW OBSTRUCTION IN COPD[1,2]

	Postbronchodilator FEV1/FVC	FEV1 % predicted
Mild* (Stage 1)	<0.7	≥80%
Moderate (Stage 2)	<0.7	50–79%
Severe (Stage 2)	<0.7	30–49%
Very severe (Stage 2)	<0.7	<30%

1. NICE CG101 (2010)
2. Global Initiative for Chronic Obstructive Lung Disease, GOLD (2008)

* must also be symptoms to diagnose COPD (NICE)

** or FEV1<50% with respiratory failure (NICE, GOLD)

Some restrictive disorders to consider

- Kyphoscoliosis
- Muscular Dystrophy Problems
- Arthritis
- Pleural Problems
- Interstitial Lung Disease
- Obesity
- Drugs

Method

- Basics (name, age, sex, race, height and BMI)
- Date test undertaken
- Any comments from the spirometrist
- Quality of Test / Trace
- Ratio of FEV1 / FVC – is it obstructive
- FEV1 and FVC – severity of disease or normal?
- Post bronchodilator – any change?
- Conclusion of test – what does it mean?

Let’s have a go

Interpretation of the 3 Main parameters

- FVC 97% Predicted
- FEV1 99% Predicted
- FEV1/FVC ratio 80%

- Normal

- FVC 54% Predicted
- FEV1 56% Predicted
- FEV1/FVC ratio 80%

- Restriction

- FVC 82% Predicted
- FEV1 61% Predicted
- FEV1/FVC ratio 51%

- Obstruction

- FVC 32% Predicted
- FEV1 34% Predicted
- FEV1/FVC ratio 87%

- Restriction

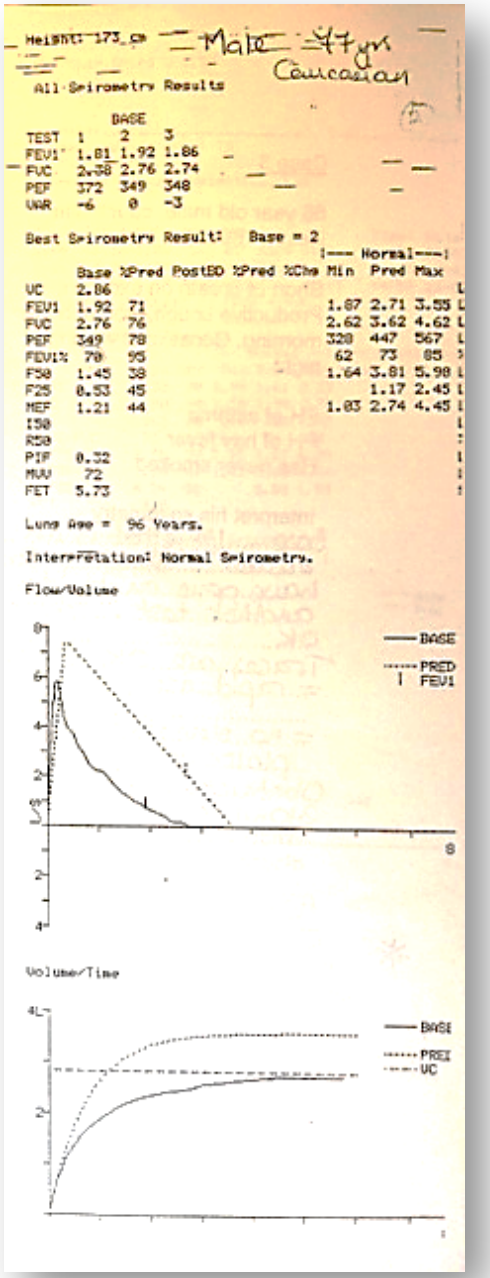
- FVC 134% Predicted
- FEV1 64% Predicted
- FEV1/FVC ratio 39%

- Obstruction

- FVC 78% Predicted
- FEV1 56% Predicted
- FEV1/FVC ratio 69%

- Combined or Mixed

Micro Medical Printout Report on this Spirometry



Height: 173 cm Male 47yrs Caucasian

All Spirometry Results

TEST	BASE 1	2	3
FEV1	1.81	1.92	1.86
FVC	2.38	2.76	2.74
PEF	372	349	348
VAR	-6	0	-3

Best Spirometry Result: Base = 2

	Base	%Pred	PostBD	%Pred	%Chg	Normal Min	Pred	Max
VC	2.86							
FEV1	1.92	71				1.87	2.71	3.55
FVC	2.76	76				2.62	3.62	4.62
PEF	349	78				328	447	567
FEV1%	70	95				62	73	85
F50	1.45	38				1.64	3.81	5.98
F25	0.53	45					1.17	2.45
MEF	1.21	44				1.83	2.74	4.45
I50								
E50								
PIF	0.32							
MVV	72							
FET	5.73							

Lung Age = 96 Years.

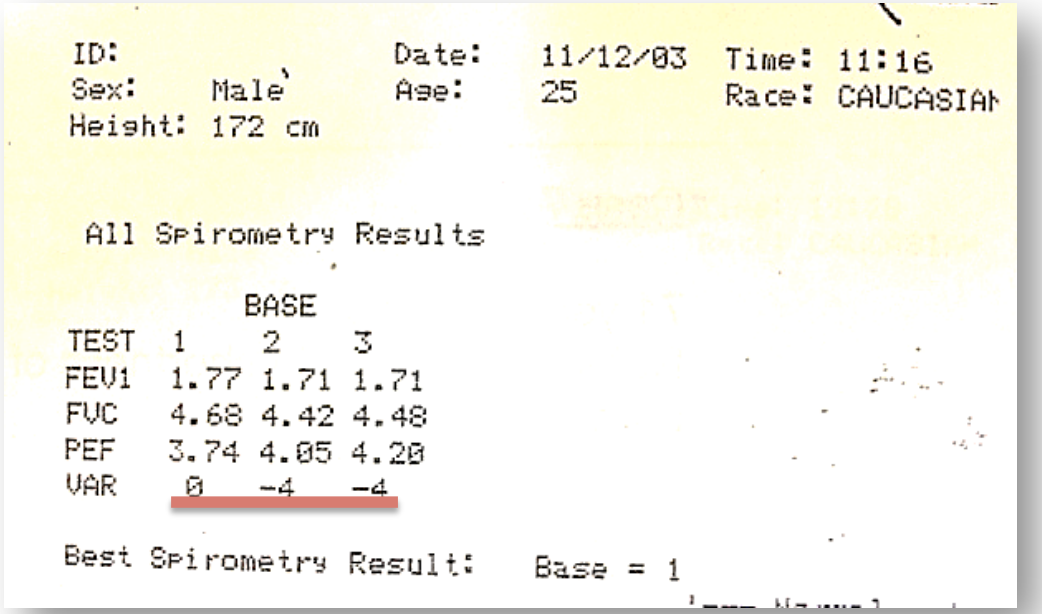
Interpretation: Normal Spirometry.

Flow/Volume

Volume/Time

Case A – Patient Demographics & Reproducible?

- 25yr Male
- Nocturnal cough and wheeze
- SOB & Cough on exertion
- Strong FH Asthma
- Smokes 20/day



ID: Date: 11/12/03 Time: 11:16
Sex: Male Age: 25 Race: CAUCASIAN
Height: 172 cm

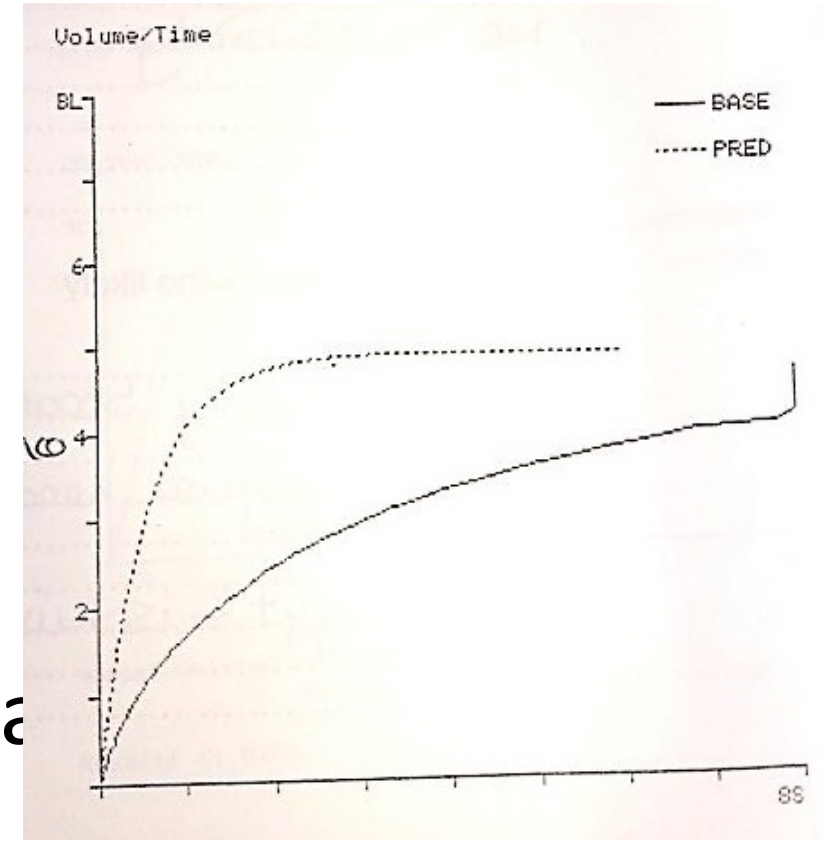
All Spirometry Results

	BASE		
TEST	1	2	3
FEV1	1.77	1.71	1.71
FVC	4.68	4.42	4.48
PEF	3.74	4.05	4.20
VAR	0	-4	-4

Best Spirometry Result: Base = 1

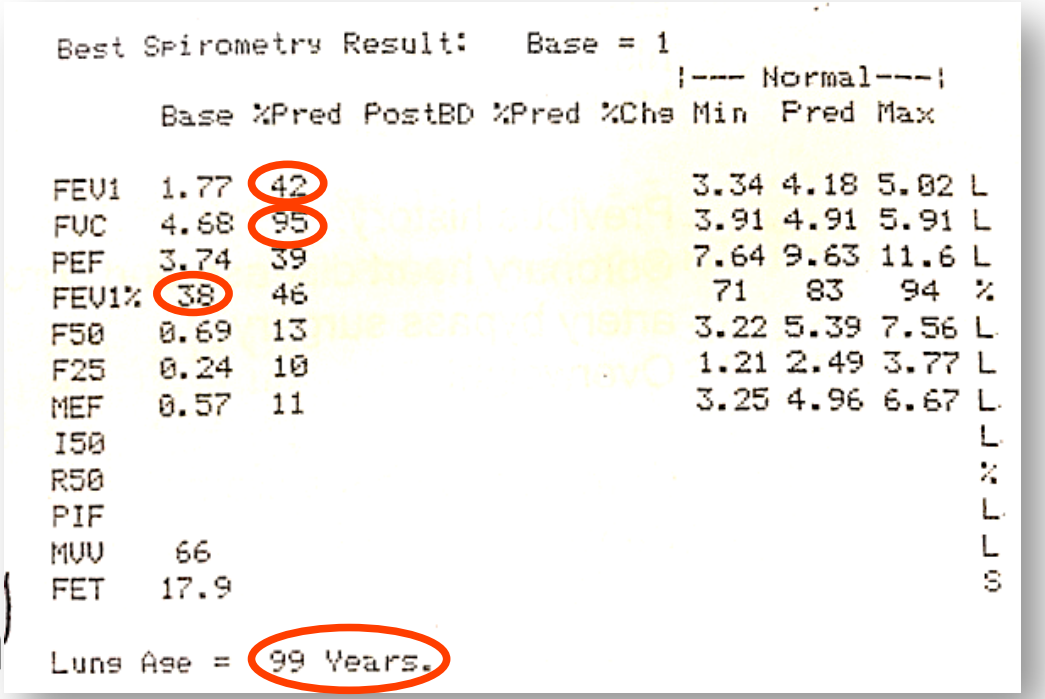
Case A – Traces Acceptable?

- 25yr Male
- Nocturnal cough and wheeze
- SOB & Cough on exertion
- Strong FH Asthma
- Smokes 20/day



Case A - Interpretation

- 25yr Male
- Nocturnal cough & wheeze
- SOB & cough on exertion
- Strong FH Asthm
- Smokes 20/day



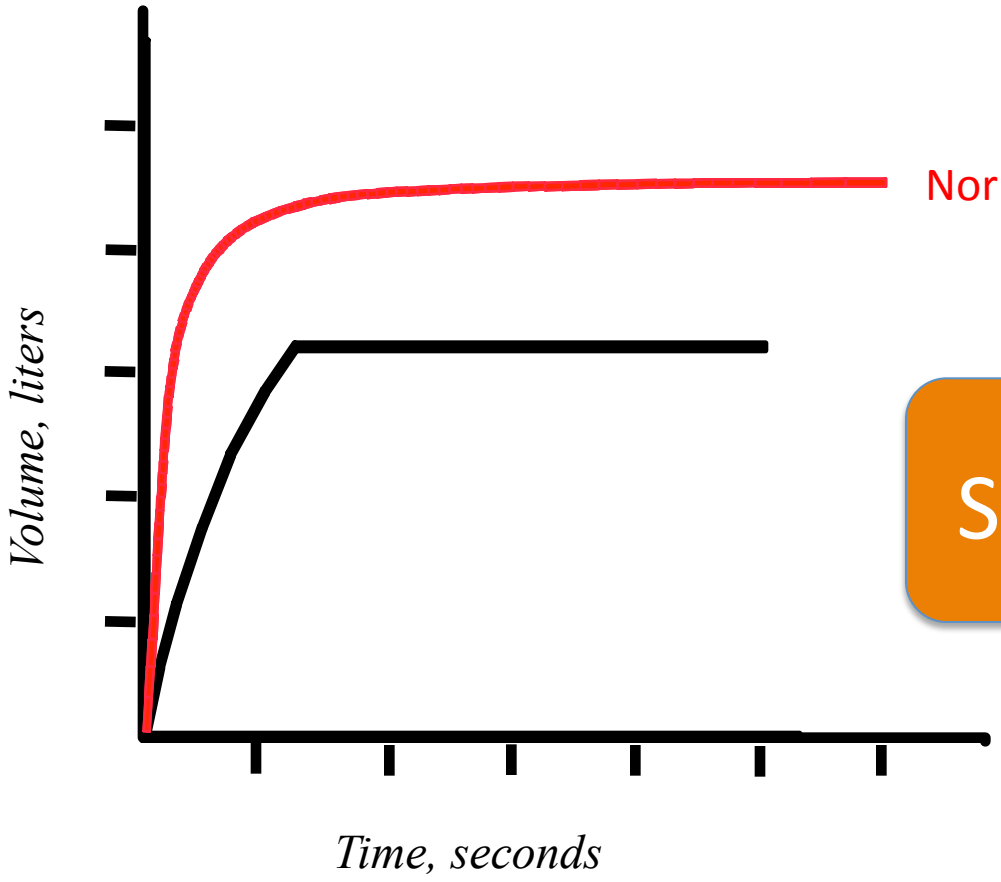
Best Spirometry Result: Base = 1

	Base	%Pred	PostBD	%Pred	%Chg	Normal Min	Normal Pred	Normal Max	
FEV1	1.77	42				3.34	4.18	5.02	L
FVC	4.68	95				3.91	4.91	5.91	L
PEF	3.74	39				7.64	9.63	11.6	L
FEV1%	38	46				71	83	94	%
F50	0.69	13				3.22	5.39	7.56	L
F25	0.24	10				1.21	2.49	3.77	L
MEF	0.57	11				3.25	4.96	6.67	L
I50									L
R50									%
PIF									L
MVV	66								L
FET	17.9								s

Lung Age = 99 Years.

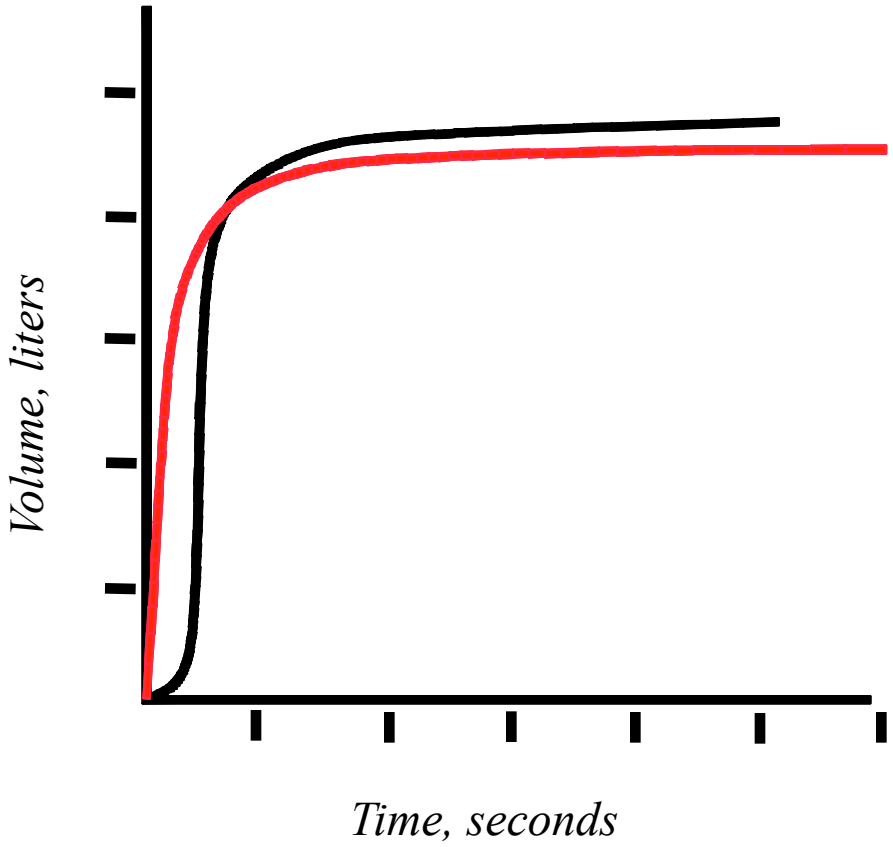
Troubleshooting

Unacceptable Trace



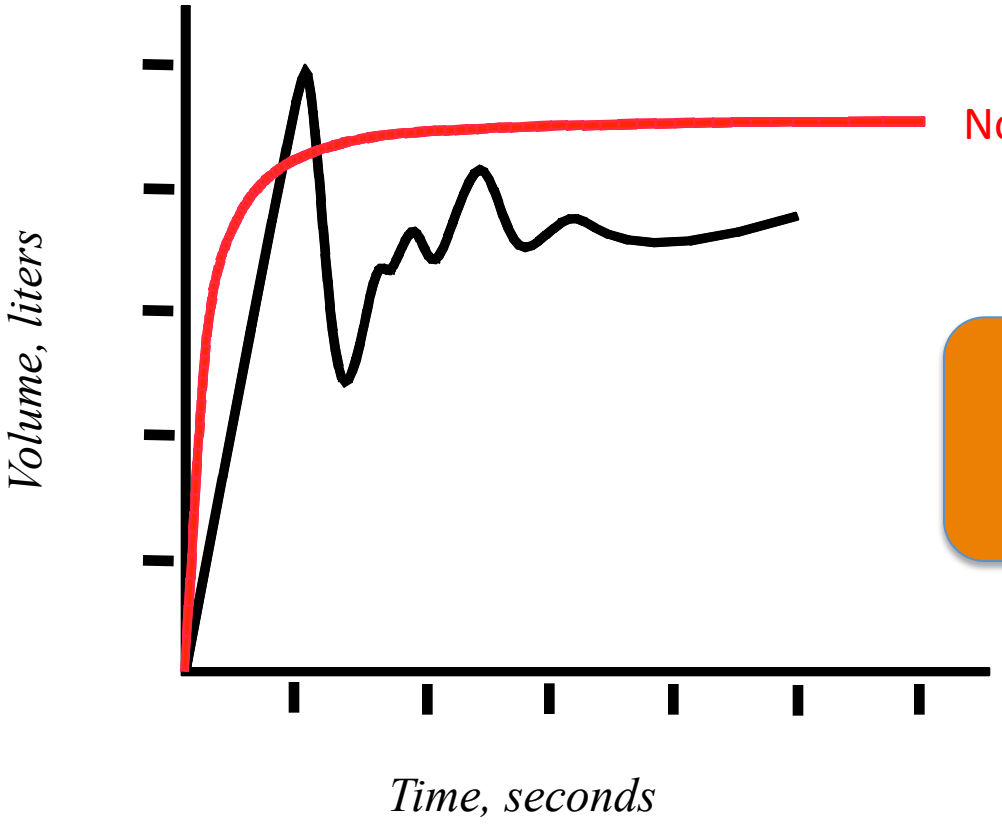
Stopped early

Unacceptable Trace



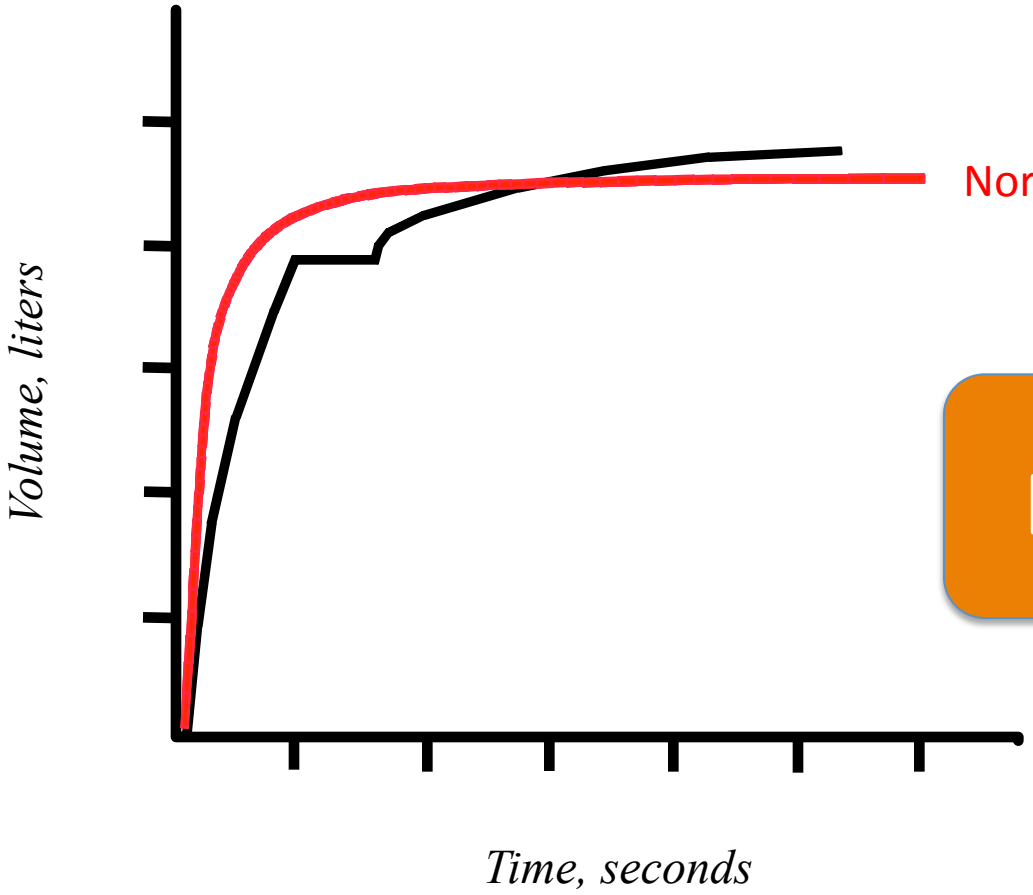
Slow start

Unacceptable Trace



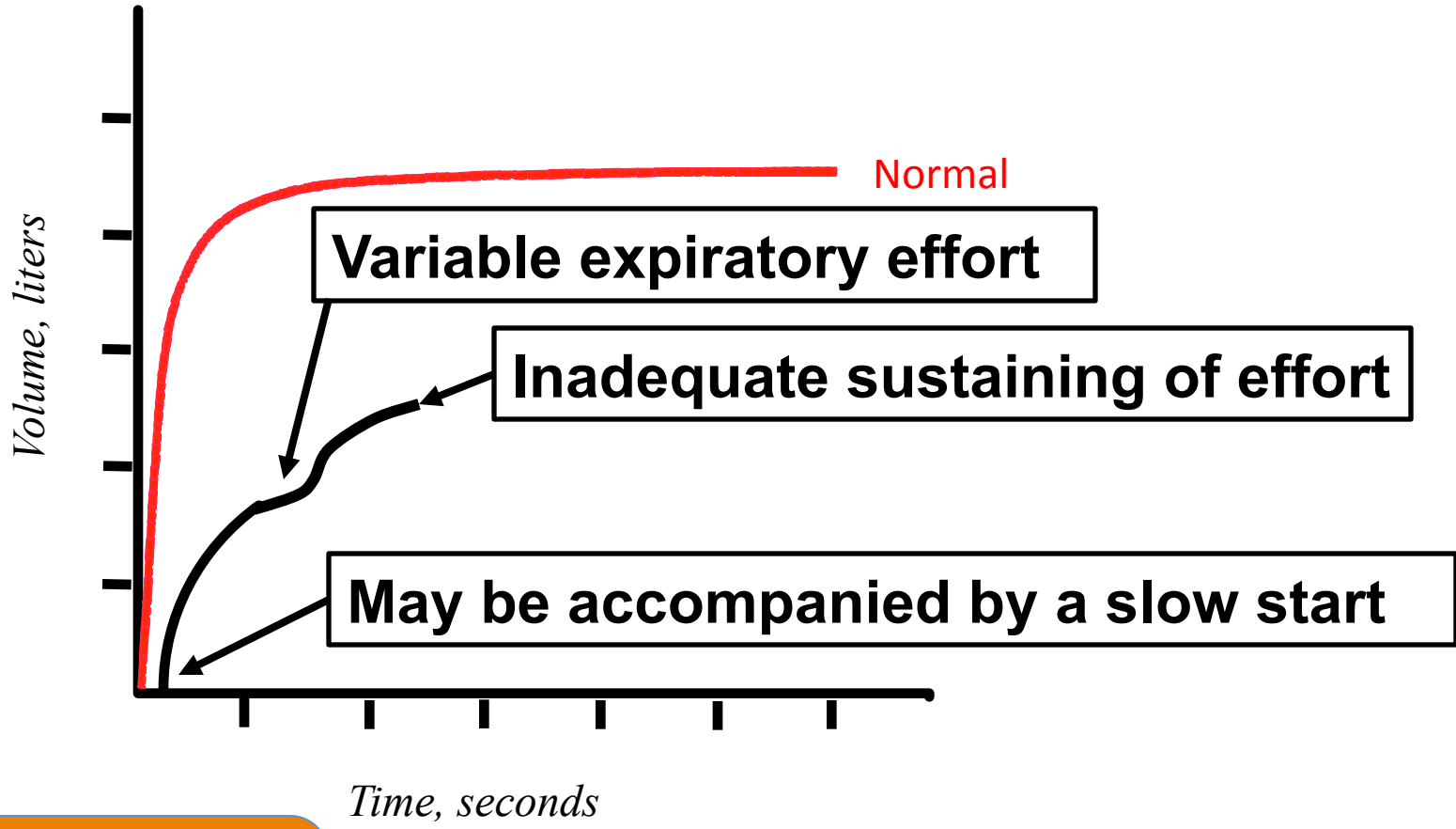
Coughing

Unacceptable Trace



Extra Breath

Unacceptable Trace



Poor effort

Report

- Basics (name, age, sex, race, height and BMI)
- Date test undertaken
- Any comments from the spirometrist
- **Quality of Test / Trace**
- **Ratio of FEV1 / FVC – is it obstructive?**
- **FEV1 and FVC – severity of disease or normal?**
- **Post bronchodilator – any change?**
- **Conclusion of test – what does it mean linked to the patient?**

Example report

- Quality is good (A) and trace appears normal
- FEV1/FVC is normal (pre and post broncho) suggesting no obstruction
- FEV1 is normal and FVC normal
- No change with bronchodilator
- *Clinical note in context eg.*
  - Patient has had cough for more than 3 weeks and would be suggested to have chest xray (or referral if haemoptysis)
  - Would be appropriate to consider BMI and contribution of weight
  - This appears to be normal – but advise re smoking, weight and with a prolonged cough – a chest xray would be appropriate

What is significant reversibility?

- BTS / SIGN (2011) – suggests 400ml improvement[1]
- GINA / GOLD – suggests a 12% increase or 200ml [2]
- NICE COPD (2010) suggests 400ml increase in FEV1 [2]

1- British Thoracic Society SIGN. SIGN 141: British Guideline on the Management of Asthma. Edinburgh: 2014.
2- Global Initiative for Asthma. Pocket Guide for Asthma Management and Prevention (for adults and children over 5 years). 2015;from www.ginasthma.org
2-National Collaborating Centre for Chronic Conditions COPD. Management of chronic obstructive pulmonary disease in adults in primary and secondary care (partial update). Clinical Guideline 101. London2011

False Diagnoses

- Chest xray diagnosed COPD
- Magical clinician diagnosed
  - Either the clinician who just knows without tests
  - Finds an entry somewhere in a record and believes it

Rare diagnoses

- HRCT diagnosed emphysema
- Normal FEV1 – frequent symptoms but abnormal FEV1/FVC ratio

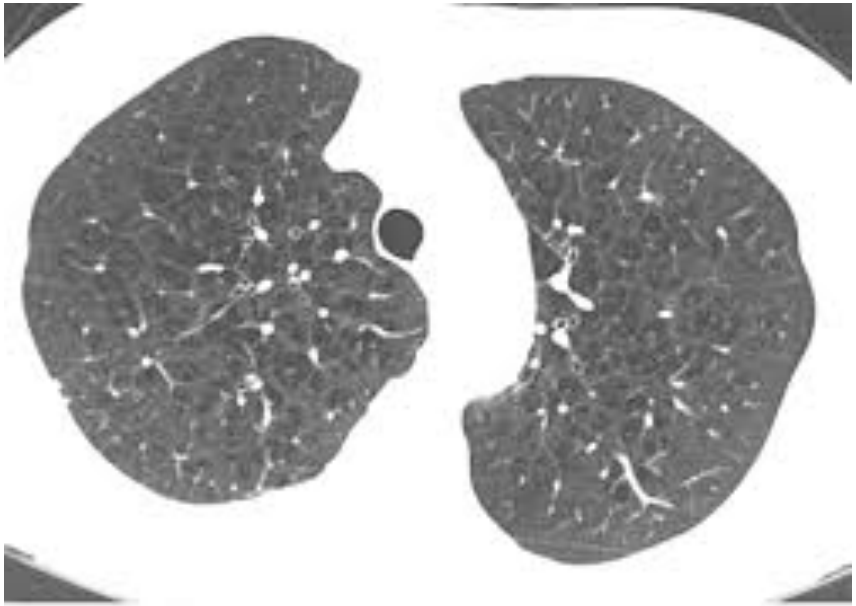


Figure 1. Centrilobular Emphysema in a Cigarette Smoker. Axial CT image through the upper lungs shows numerous well-defined lucencies, many of which are traversed by a central vessel.

COPD Update 2015

COPD chronic obstructive pulmonary disease

Positive microspirometry - Positive diagnostic spirometry – now what?

- Chest xray / full blood count
- Should be seen by experienced clinician to
  - **Exclude other causes or co-existing causes (e.g. atrial fibrillation/heart or other respiratory causes)**
  - Assess clinically further (pulse oximetry/MRC etc.)
- Make a positive diagnosis and treat positively

NICE Guidelines CG101 – Chronic Obstructive Pulmonary Disease (2010)

What is the point?

Intervention	Cochrane Review Supportive	National Guidance Supportive[1]
Steroids for exacerbation	Yes[2]	Yes
Antibiotic for exacerbation	Yes[3]	Yes
Influenza immunisation	Probably reduces mortality[4]	Yes
Pneumococcal vaccination	Probably reduces mortality[5]	Yes
Smoking cessation	Yes[6]	Yes
LAMA	Yes[7]	Yes
LABA/ICS	Yes[7]	Yes
Pulmonary rehabilitation	Yes[8]	Yes

ICS inhaled corticosteroid; **LABA** long-acting β_2-agonist; **LAMA** long-acting muscarinic antagonist; **QoL** quality of life

References: 1. NICE. Chronic obstructive pulmonary disease: Management of chronic obstructive pulmonary disease in adults in primary and secondary care (partial update). June 2010. Available at https://www.nice.org.uk/guidance/cg101 [Accessed Septemer 2015]; 2. Walters JA, et al. *Cochrane Database Syst Rev*. 2014;9:CD001288; 3. Vollenweider DJ, et al. *Cochrane Database Syst Rev*. 2012;12:CD010257; 4. Poole PJ, et al. *Cochrane Database Syst Rev*. 2006;1:CD002733; 5. Walters JA, et al. *Cochrane Database Syst Rev*. 2010;11:CD001390; 6. van der Meer RM, et al. *Cochrane Database Syst Rev*. 2003;2:CD002999; 7. Kew KM, et al. *Cochrane Database Syst Rev*. 2014;3:CD010844; 8. Puhan MA, et al. Cochrane Database Syst Rev. 2011;10:CD005305

Oxygen is a treatment for hypoxia

Oxygen is not a treatment for breathlessness

Currow D, Agar M, Smith J, Abernethy A. Does palliative home oxygen improve dyspnoea? A consecutive cohort study. Palliative Medicine. 2009;23(4):309-16

Atar D. Should oxygen be given in myocardial infarction? BMJ. 2010;340(jun17_2):c3287

Scullion J, Gaduzo S, Restrick L, Davison A, Holmes S, Williams S. Rationalising oxygen use to improve patient safety and to reduce waste: The IMPRESS step-by-step guide. London: IMPRESS (BTS / PCRS-UK), 2010 September 2010

BMJ Open Respiratory Research

Microbial contamination of domiciliary nebulisers and clinical implications in chronic obstructive pulmonary disease

S Jarvis,[1] P W Ind,[1] C Thomas,[2] S Goonesekera,[2] R Haffenden,[3] A Abdolrasouli,[2] F Fiorentino,[4] R J Shiner[1]

Conclusions: Nebulisers contaminated with microorganisms are potential reservoirs delivering serious pathogens to the lung. Relationships between nebuliser contamination, clinical infection and exacerbations require further examination, but is a potential concern in elderly patients with COPD with comorbidities who fail to effectively maintain reasonable standards of nebuliser cleanliness.

Jarvis S, Ind PW, Thomas C, et al. Microbial contamination of domiciliary nebulisers and clinical implications in chronic obstructive pulmonary disease. *BMJ Open Respiratory Research.* 2014;1(1).

Nebulisers

- 44 nebuliser sets (73% were contaminated with micro-organisms)
- 30% isolated potentially pathogenic bacteria (inc. Pseudomonas aeroginosa, Staphylococcus aureus, multidrug resistant Serratia marcesans, Escherichia coli and multiresistant Klebsiella spp)
- Exacerbations higher in those with contamination (3.3 compared to 1.7)

Jarvis S, Ind PW, Thomas C, et al. Microbial contamination of domiciliary nebulisers and clinical implications in chronic obstructive pulmonary disease. *BMJ Open Respiratory Research.* 2014;1(1).

ORIGINAL ARTICLE

Number needed to treat in COPD: exacerbations versus pneumonias

Samy Suissa[1,2]

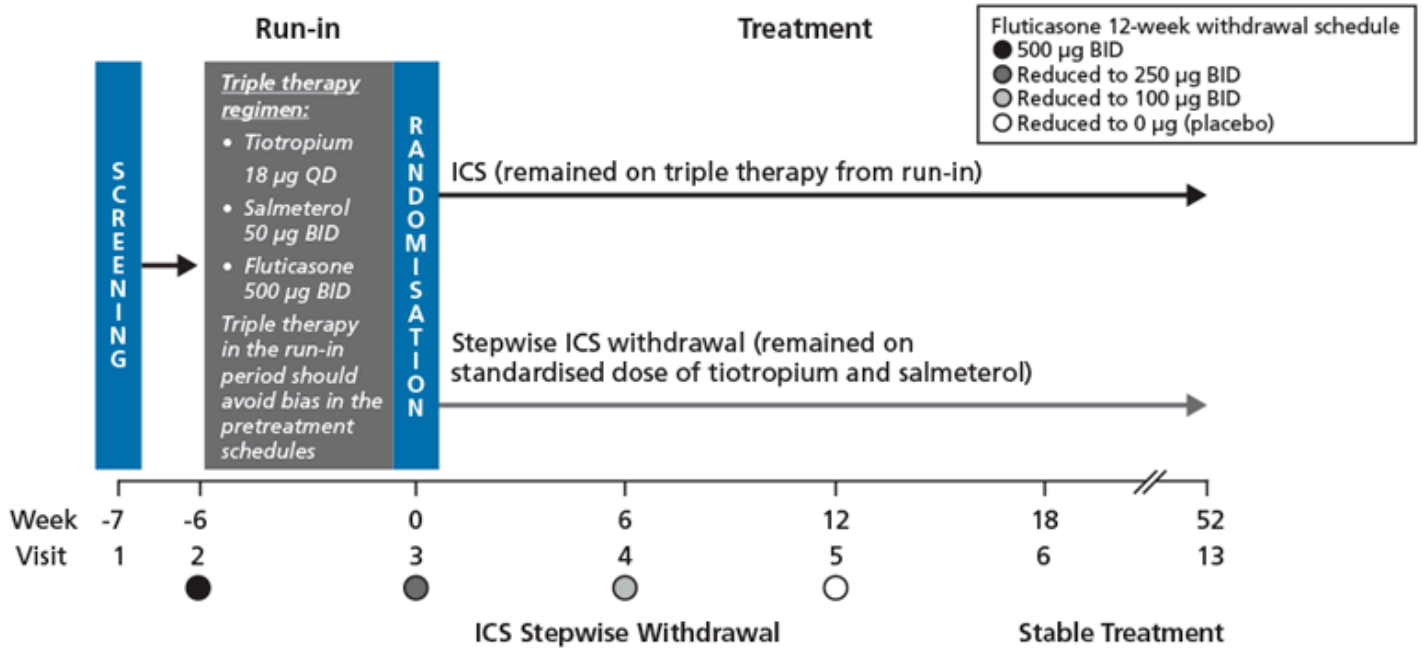
Inhaled corticosteroids in COPD: quantifying risks and benefits

Chris Cates

Suissa S. Number needed to treat in COPD: exacerbations versus pneumonias. Thorax. 2013;68(6):540-3
Cates C. Inhaled corticosteroids in COPD: quantifying risks and benefits. Thorax. 2013;68(6): 499-500

WISDOM Trial (n=2485)

- Clarify the need for continuous ICS in COPD
- Evaluate the effect of step wise reduction in ICS for people with severe / very severe COPD

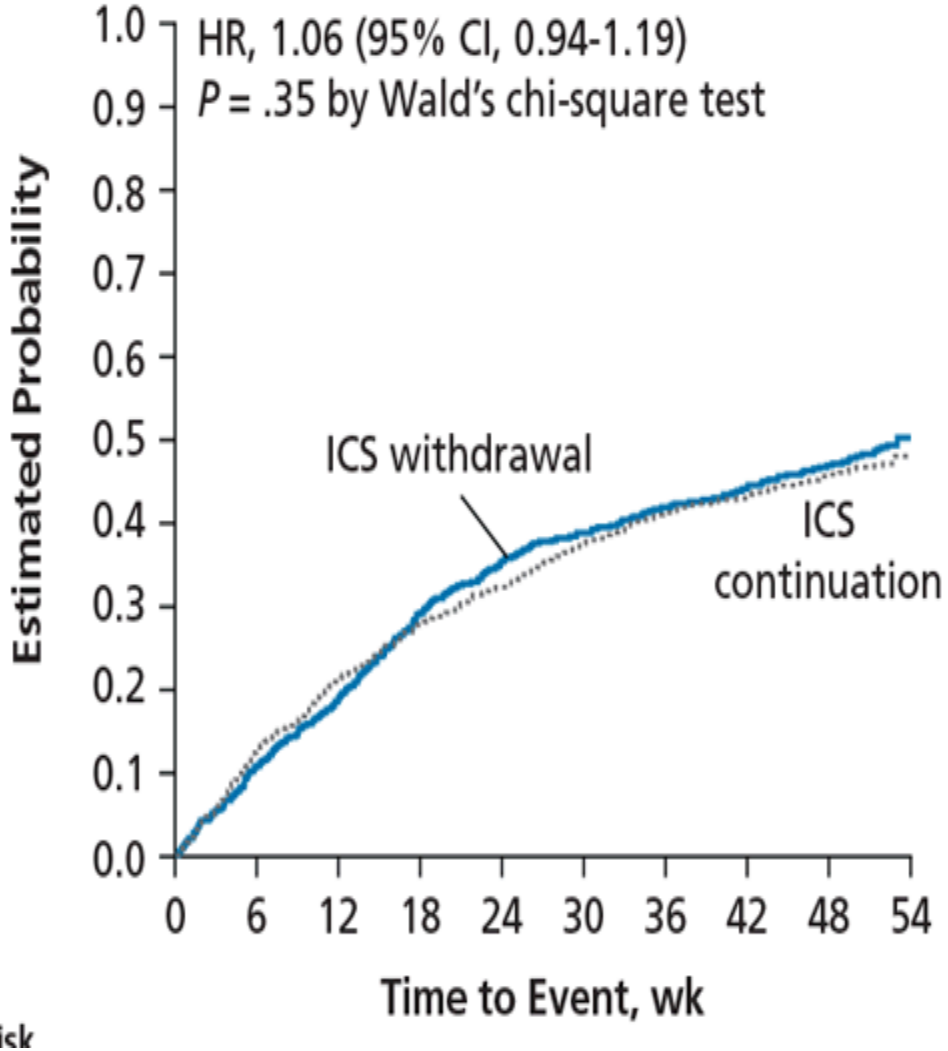


Magnussen H, Disse B, Rodriguez-Roisin R, et al. Withdrawal of Inhaled Glucocorticoids and Exacerbations of COPD. *New England Journal of Medicine.* 2014;371(14):1285-1294.

WISDOM: Patient Characteristics at Baseline

	ICS Continuation (n = 1,243)	ICS Withdrawal (n = 1,242)	Total (N = 2,485)
Male, n (%)	1,013 (81.5)	1,036 (83.4)	2,049 (82.5)
Age, y (± SD)	63.6 ± 8.6	64.0 ± 8.4	63.8 ± 8.5
Former smoker, n (%)	811 (65.2)	843 (67.9)	1,654 (66.6)
Duration of COPD, y (± SD)	7.75 ± 5.99	8.00 ± 6.47	7.87 ± 6.23
FEV_1 % predicted after BD, n (%)			
30% to 49% (GOLD 3)	760 (61.1)	761 (61.3)	1,521 (61.2)
<30% (GOLD 4)	473 (38.1)	474 (38.2)	947 (38.1)
Other category[a]	10 (0.8)	7 (0.6)	17 (0.7)
Available baseline lung function, n	1,223	1,218	2,441
FEV_1, L (± SD)	0.97 ± 0.36	0.98 ± 0.36	0.98 ± 0.36
FEV_1, % predicted (± SD)	34.2 ± 11.2	34.3 ± 10.8	34.2 ± 11.0

Magnussen H, Disse B, Rodriguez-Roisin R, et al. Withdrawal of Inhaled Glucocorticoids and Exacerbations of COPD. *New England Journal of Medicine.* 2014;371(14):1285-1294.



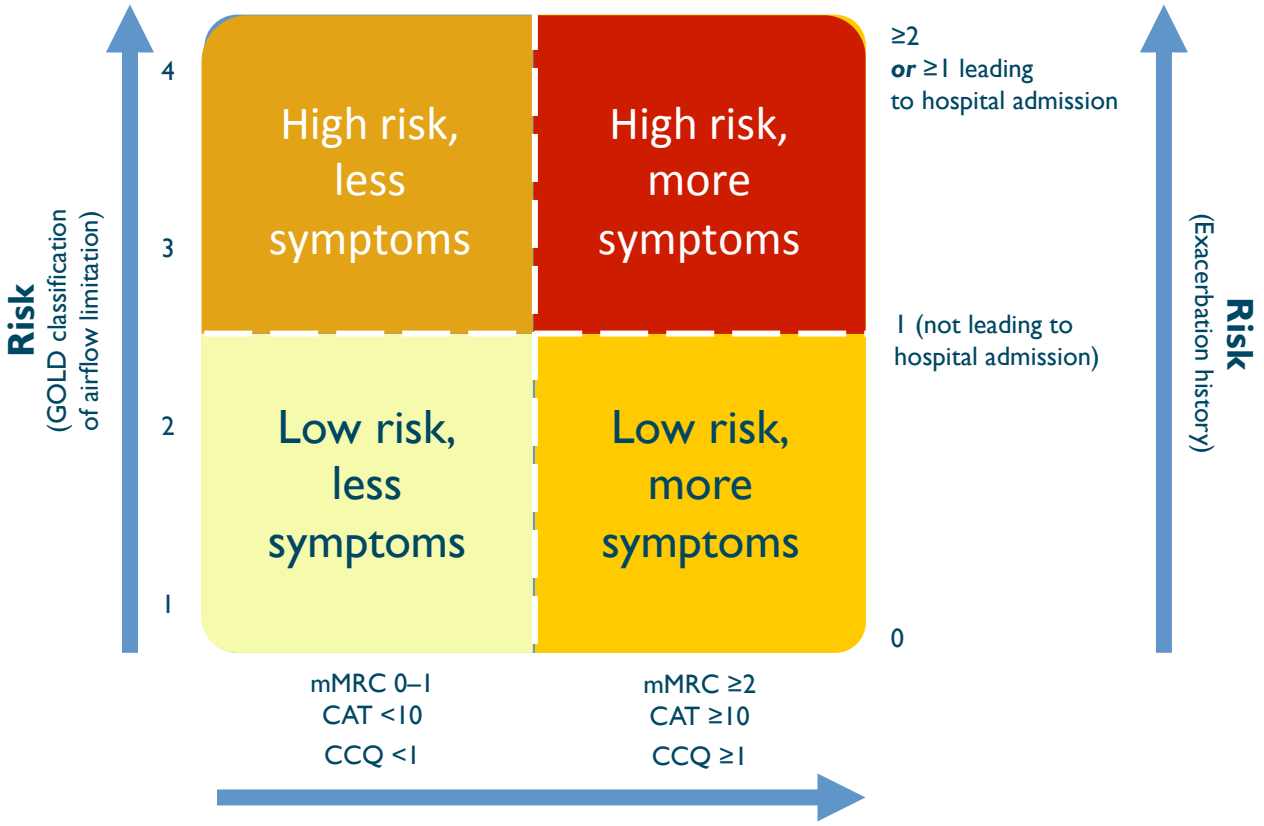
Magnussen H, Disse B, Rodriguez-Roisin R, et al. Withdrawal of Inhaled Glucocorticoids and Exacerbations of COPD. *New England Journal of Medicine*. 2014;371(14):1285-1294.

Conclusions

- risk of moderate or severe exacerbations was similar
- greater decrease in lung function during the final step of glucocorticoid withdrawal (43ml)

Evidence to consider reduction of steroid dose in patients on higher dose ICS (whch would help with patient safety on higher dose ICS)
Some evidence to consider GOLD guidelines (non exacerbator group) with caution and think of ACOS

GOLD 2014:
Symptom/risk evaluation of COPD



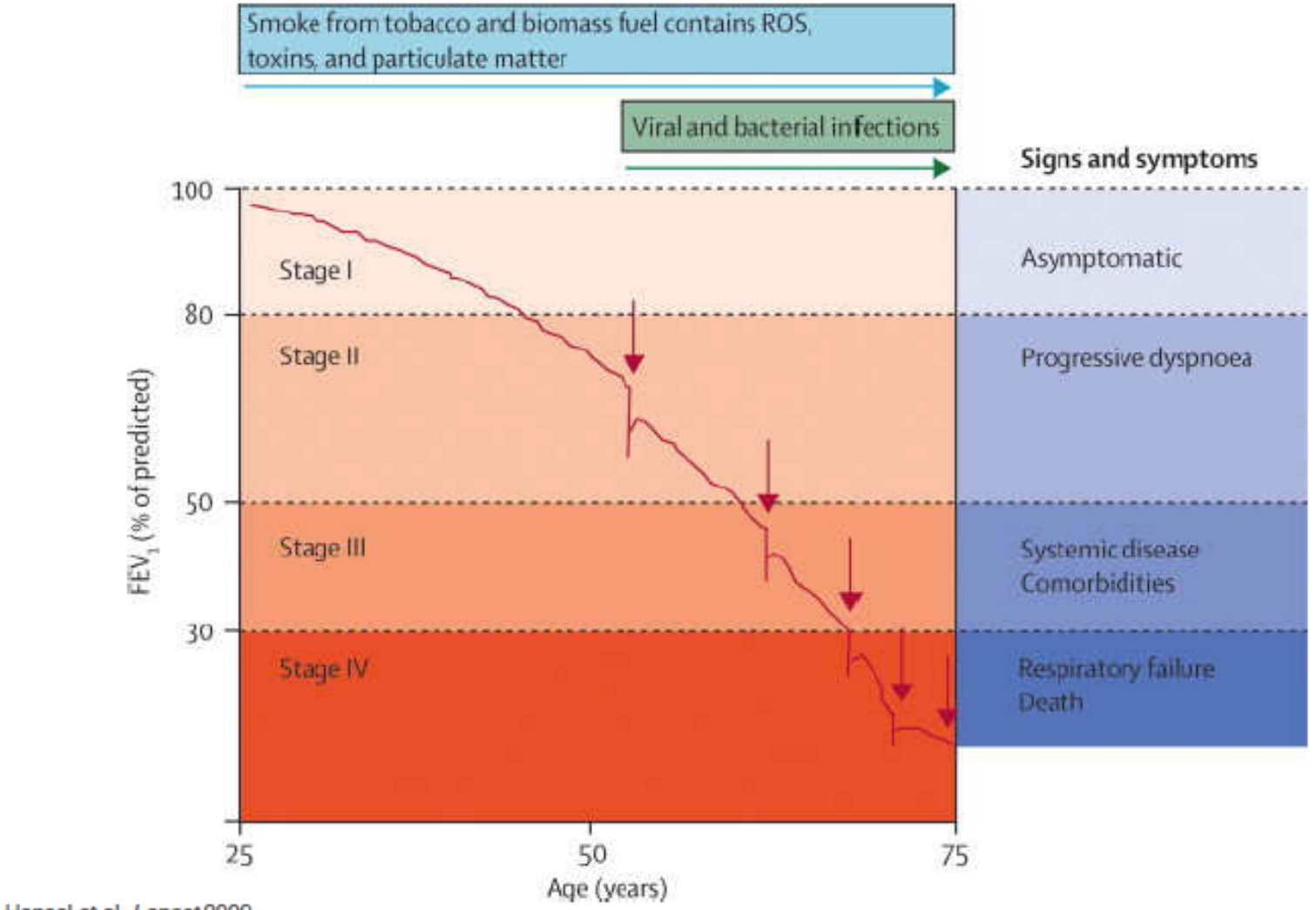
Reference: GOLD. Global Strategy for the Diagnosis, Management and Prevention of COPD, Jan 2015. Available at http://www.goldcopd.org/ [Accessed July 2015]

Inhaler Therapy Tips in COPD

- Uses devices the patient can use
- If no exacerbations – bronchodilate
- If exacerbations or any reversibility or previous asthma – inhaled corticosteroid and bronchodilation
- Use low dose inhaled corticosteroid if possible
- Don’t forget exercise / smoking cessation / influenza and co-morbidities

GOLD. Global strategy for the diagnosis, management and prevention of Chronic Obstructive Pulmonary Disease. 2014

Exacerbations increase decline in lung function



Hansel et al. *Lancet* 2009

Exacerbation[1]

- Average number of exacerbations per year in major trials of people with specialist follow up (TORCH[2] / UPLIFT[3]) is around 0.8 / year
- Treat after 48hr (breathless and cough / discoloured phlegm)
- Symptoms should be improving in 7d, but last often 21 – 35 days plus
- If no improvement or worse – clinical review **not more antibiotics / steroids**
- If improving – reassure part of expected improvement

1- Aaron SD, Donaldson GC, Whitmore GA, Hurst JR, Ramsay T, Wedzicha JA. Time course and pattern of COPD exacerbation onset. Thorax. 2012;67(3):238-43.
2- Calverley P, Anderson J, Celli B, Ferguson G, Jenkins C, Jones P, et al. Salmeterol and fluticasone proprionate and survival in chronic obstructive pulmonary disease. N Engl J Med. 2007;356:775 - 89.
3- Tashkin DP, Celli B, Senn S, Burkhart D, Kesten S, Menjoge S, et al. A 4-Year Trial of Tiotropium in Chronic Obstructive Pulmonary Disease. N Engl J Med. 2008;359(15):1543-54

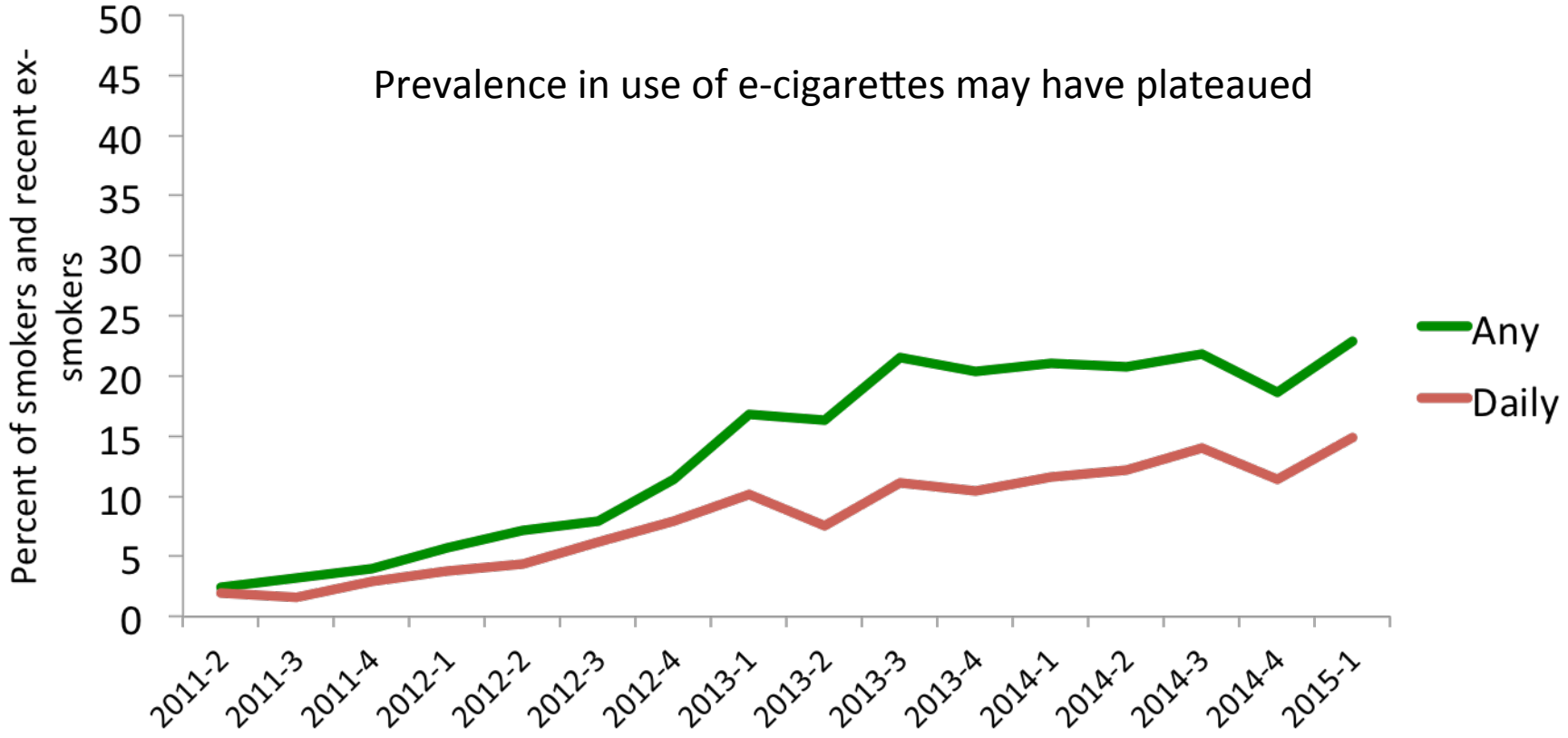
Treatment

- Prednisolone 30mg for 7 days (some use 40mg for 5d – as good as 14d; trials in NICE and Cochrane are 7- 14 days)
- Amoxicillin 500mg tds for 1 week (or local recommendations)
- Long term steroids – not indicated
- Long term antibiotics – specialist initiated

Leuppi JD, Schuetz P, Bingisser R, Bodmer M, Briel M, Drescher T, et al. Short-term vs conventional glucocorticoid therapy in acute exacerbations of chronic obstructive pulmonary disease: the REDUCE randomized clinical trial. Jama. 2013;309(21):2223-31

A pot pourri of other respiratory tips

Prevalence of electronic cigarette use: smokers and recent ex-smokers is rising

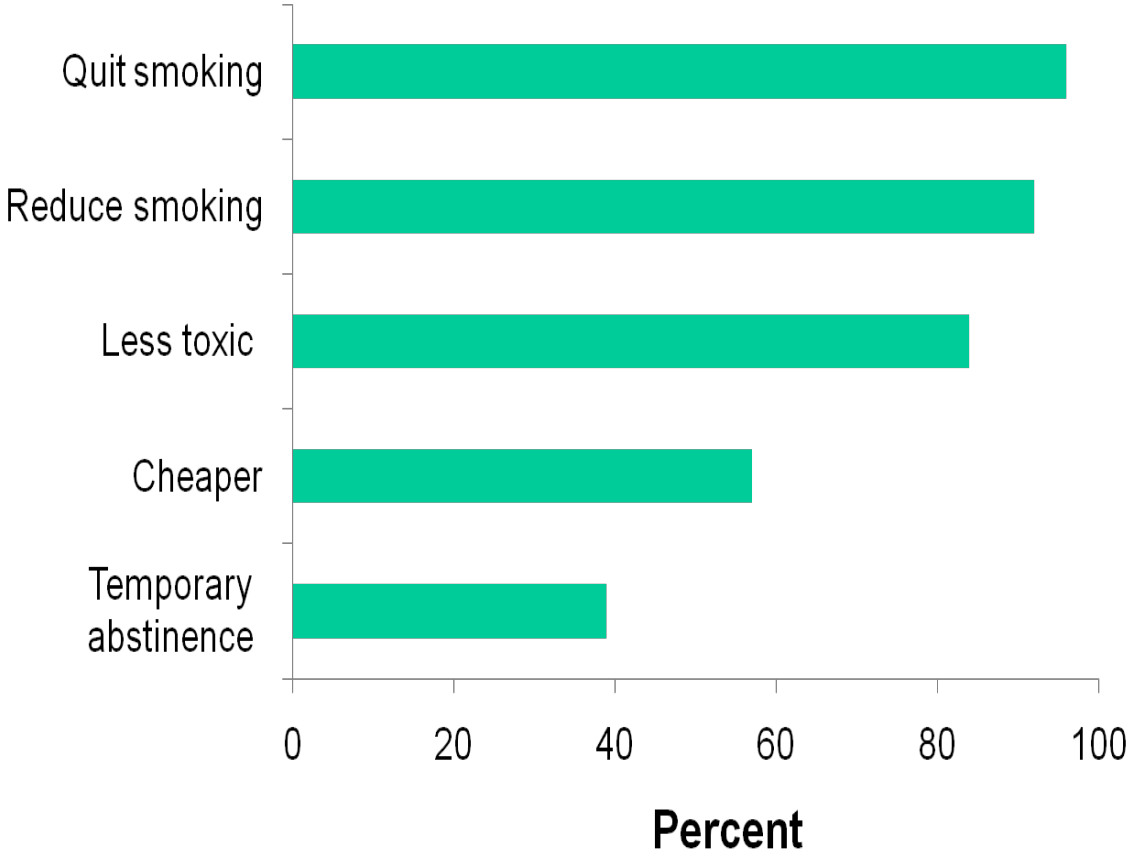


N=16529 adults who smoke or who stopped in the past year; increase $p<0.001$

Tobacco v Electronic cigarettes

Tobacco	Electronic cigarettes
Death and disease	
Kills one in two lifetime users	No evidence of serious harm from short term use
Secondhand exposure	
Secondhand smoke linked to death and disease in adults and children	No evidence of serious harm from secondhand vapour
Use in childhood	
Among 11-15 year olds • 10% have tried smoking • 4% are regular smokers	Among 11-15 year olds • 5% have tried an electronic cigarette • 0% are regular electronic cigarette users
Fires	
Smoking is the largest cause of fatal house fires in England	Some fires have been reported due to faulty chargers

Why are people using e- cigarettes?



Electronic cigarette: users profile, utilization, satisfaction and perceived efficacy

Etter and Bullen, Addiction 2011 (online)

Would you prescribe e-cigarettes?

NHS choices
Your health, your choices

Some types of e-cigarettes to be regulated as medicines

Behind the Headlines

Wednesday June 12 2013

More and more people are using e-cigarettes

Update – 21st August 2015

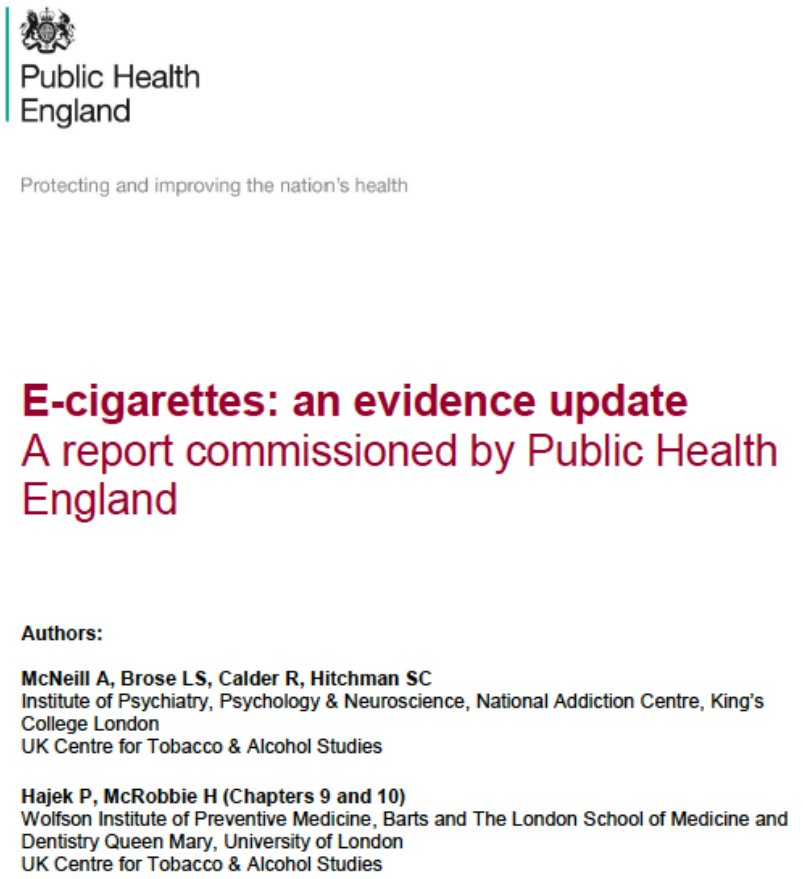
Public Health England has recently published an evidence review about e-cigarettes. The main finding of the review is that e-cigarettes are 95% safer than cigarettes and are an effective quitting aid.

Read more about their review.

Electronic cigarettes are to be licensed and regulated as an aid to quit smoking from 2016, it has been announced.

Ashton JR. Regulation of electronic cigarettes. BMJ. 2014;349

Public Health England (Aug 2015)


Public Health England

Protecting and improving the nation's health

E-cigarettes: an evidence update

A report commissioned by Public Health England

Authors:

McNeill A, Brose LS, Calder R, Hitchman SC
Institute of Psychiatry, Psychology & Neuroscience, National Addiction Centre, King's College London
UK Centre for Tobacco & Alcohol Studies

Hajek P, McRobbie H (Chapters 9 and 10)
Wolfson Institute of Preventive Medicine, Barts and The London School of Medicine and Dentistry Queen Mary, University of London
UK Centre for Tobacco & Alcohol Studies

- Key findings include:
- the current best estimate is that e-cigarettes are around 95% less harmful than smoking
- nearly half the population (44.8%) don't realise e-cigarettes are much less harmful than smoking
- there is no evidence so far that e-cigarettes are acting as a route into smoking for children or non-smokers

McNeill A, Brose LS, Calder R, Hitchman SC. E-cigarettes: an evidence update: A report commissioned by Public Health England. London: Department of Health, 2015

Not everyone agreed though…

- *Support (in part) from*
  - Royal College of Physicians of London
  - ASH UK
- *Opposition from*
  - British Medical Association
  - UK Faculty of Public Health,
  - US Centers for Disease Control and Prevention,
  - American Lung Association, the World Health Organization,
  - European Commission,

- E-cigarettes are new …If we researched traditional cigarettes for 5 years how much problem would we find?
- Should we encourage nicotine addiction?

McKee M, Capewell S. Evidence about electronic cigarettes: a foundation built on rock or sand? BMJ. 2015;351.

Are e-cigarettes an effective intervention for smoking cessation?

- 38 studies included in the systematic review; (20 studies with control groups)
- Odds of quitting cigarettes were 28% lower in those who used e-cigarettes compared with those who did not use e-cigarettes

Kalkhoran S, Glantz SA. E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis. The Lancet Respiratory Medicine. 2015.

Pleural Effusion

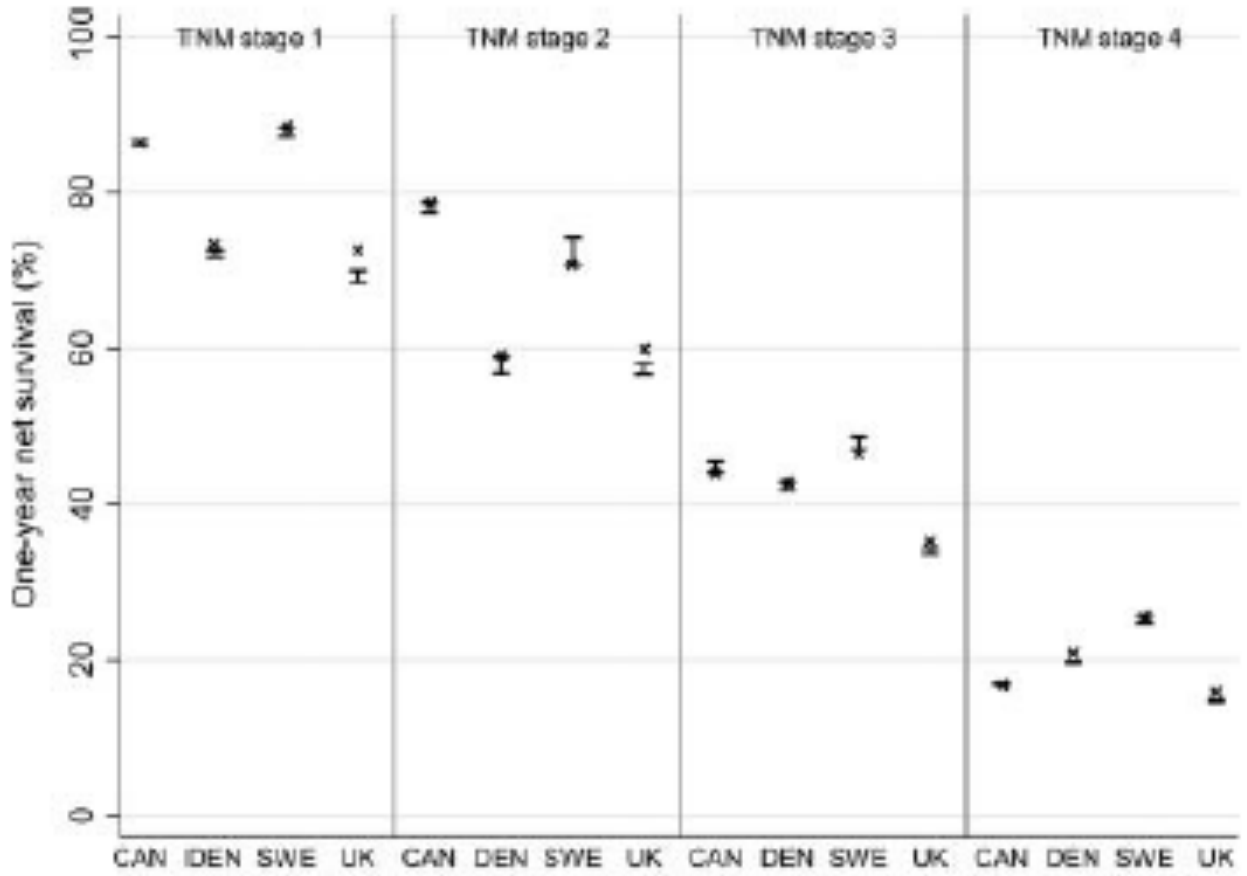
- An undiagnosed unilateral pleural effusion, without a history suggestive of acute infection, should be considered malignant until proved otherwise[1]
- Bilateral effusions are usually due to cardiac, renal, or hepatic impairment—treatment of the cause will usually improve effusions without the need for intervention[1]

1 - Bhatnagar R, Maskell N. The modern diagnosis and management of pleural effusions. *BMJ.* 2015;351

NICE Lung Cancer Guidelines (2012)

- There are more than 39,000 new cases of lung cancer
  in the UK each year
- Only about 5.5% of lung cancers are currently cured
- About 90% of lung cancers are caused by smoking

One year survival in four countries



Walters S, Maringe C, Coleman MP, et al. Lung cancer survival and stage at diagnosis in Australia, Canada, Denmark, Norway, Sweden and the UK: a population-based study, 2004–2007. *Thorax.* 2013;68(6):551-564

Likelihood ratios for lung cancer

- **Haemoptysis - LR+ 13**
- **Loss of weight - LR+ 6.2**
- **Loss of appetite - LR+ 4.8**
- **Dyspnoea - LR+ 3.6**
- **Chest or rib pain - LR+ 3.3**
- **Finger clubbing - LR+ 55**
- **Abnormal spirometry - LR+ 8.6…careful!**
- **Thrombocytosis - LR+ 8.9**

Chest xray does not exclude cancer!

- Stapley et al (2006): `*Nearly a quarter of chest X-rays requested from primary care in lung cancer patients are negative*`

- Aalokken et al (2014)*: `Current X-ray examinations capture only 20% of lung cancer cases*`

Refer if haemoptysis – even if cxr normal!!!

Diagnosis of Diseases of Chronic Airflow Limitation:

Asthma COPD and Asthma - COPD Overlap Syndrome (ACOS)

Based on the Global Strategy for Asthma Management and Prevention and the Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease.

2014

	Asthma	COPD	ACOS
Age at onset	Usually childhood	Usually >40 years	Usually >40 years but with long history
Pattern of Symptoms	Variable	Chronic exertional breathlessness	Persistent but with considerable variation
Lung function	Current and/or historical variable airflow limitation	FEV1 may be improved by therapy, but post-BD FEV1/FVC < 0.7 persists	Airflow limitation not fully reversible, but often with current or historical variability
Chest xray	Usually normal	Severe hyperinflation & other changes of COPD	Similar to COPD
Time Course			
Past history	Many have allergies and a history of asthma in childhood, and/ or family history of asthma	History of exposure to noxious particles and gases (mainly tobacco smoking and biomass fuels)	Frequently a history of doctor-diagnosed asthma (current or previous), allergies and a family history of asthma, and/or a history of noxious exposures

Respiratory Study Morning
Inspiring Excellence in Primary Care

Steve Holmes