A/Prof Jim Reid

Acting Dean of Dunedin School of Medicine

University of Otago

Office Spirometry Made Easy - Concurrent Workshop Repeated

Saturday, 17 August 2013	Start 11:00am	Duration: 55mins	Monet
	Start 12:05pm	Duration: 55mins	Monet

SPIROMETRY in GENERAL PRACTICE

Jim Reid

Faculty of Medicine

Dunedin School of Medicine

SPIROMETRY in GENERAL PRACTICE

- **Would you manage hypertension without a sphygmomanometer???**
- **Would you manage diabetes without a glucometer???**

SPIROMETRY in GENERAL PRACTICE

PEAK EXPIRATORY FLOW RATE (PEFR)

- **Measures flow in large airways**
- **Of limited use in COPD**
- **Relationship between FEV1 and PEFR is poor in COPD (closer in asthma)**

SPIROMETRY in GENERAL PRACTICE

Spirometry measures airflow and lung volumes, and is the preferred lung function test in COPD

SPIROMETRY in GENERAL PRACTICE

TERMINOLOGY

- **FEV1 = the amount of air maximally exhaled in 1st second of exhalation**
- **FVC = the total volume of air that can be exhaled with maximum force, from maximum inhalation to maximal exhalation**

SPIROMETRY in GENERAL PRACTICE

- FVC & FEV1 expressed as volumes (litres)
- Also expressed as % of predicted values
- Predicted values dependent on age, height, gender, BMI, and race.
- Ratio FEV1/FVC expressed as a percentage

SPIROMETRY in GENERAL PRACTICE

Factors that influence normal values

- **Height - tall people have larger lungs**
- **Age - Respiratory function declines with age**
- **Sex - Lung volumes smaller in females**
- **Race - Peculiarly studies show Blacks and Asians as a whole have smaller lung volumes (-12%) No studies for Maoris and Pacific People.**
- **Posture - little difference between sitting and standing. Reduced in supine position.**

SPIROMETRY in GENERAL PRACTICE

$$R \propto \frac{1}{r^4}$$

SPIROMETRY in GENERAL PRACTICE

OBSTRUCTION

- **FEV1 / FVC < 70%**
- **FEV1 < 80% of predicted value**
- **In severe COPD the FVC may be < 80% predicted - Much less in fact**

SPIROMETRY in GENERAL PRACTICE

Severity of Obstruction

FEV1	
Mild	>70% Predicted
Moderate	50 - < 69% Predicted
Severe	<50% Predicted

SPIROMETRY in GENERAL PRACTICE

RESTRICTION

- **Both FEV1 and FVC < 80% BUT the FEV1/FVC ratio is normal or high**

SPIROMETRY in GENERAL PRACTICE

Severity of Restriction

FVC	
Mild	>65 - 80% predicted
Moderate	>50 - 65% predicted
Severe	<50% predicted.

SPIROMETRY in GENERAL PRACTICE

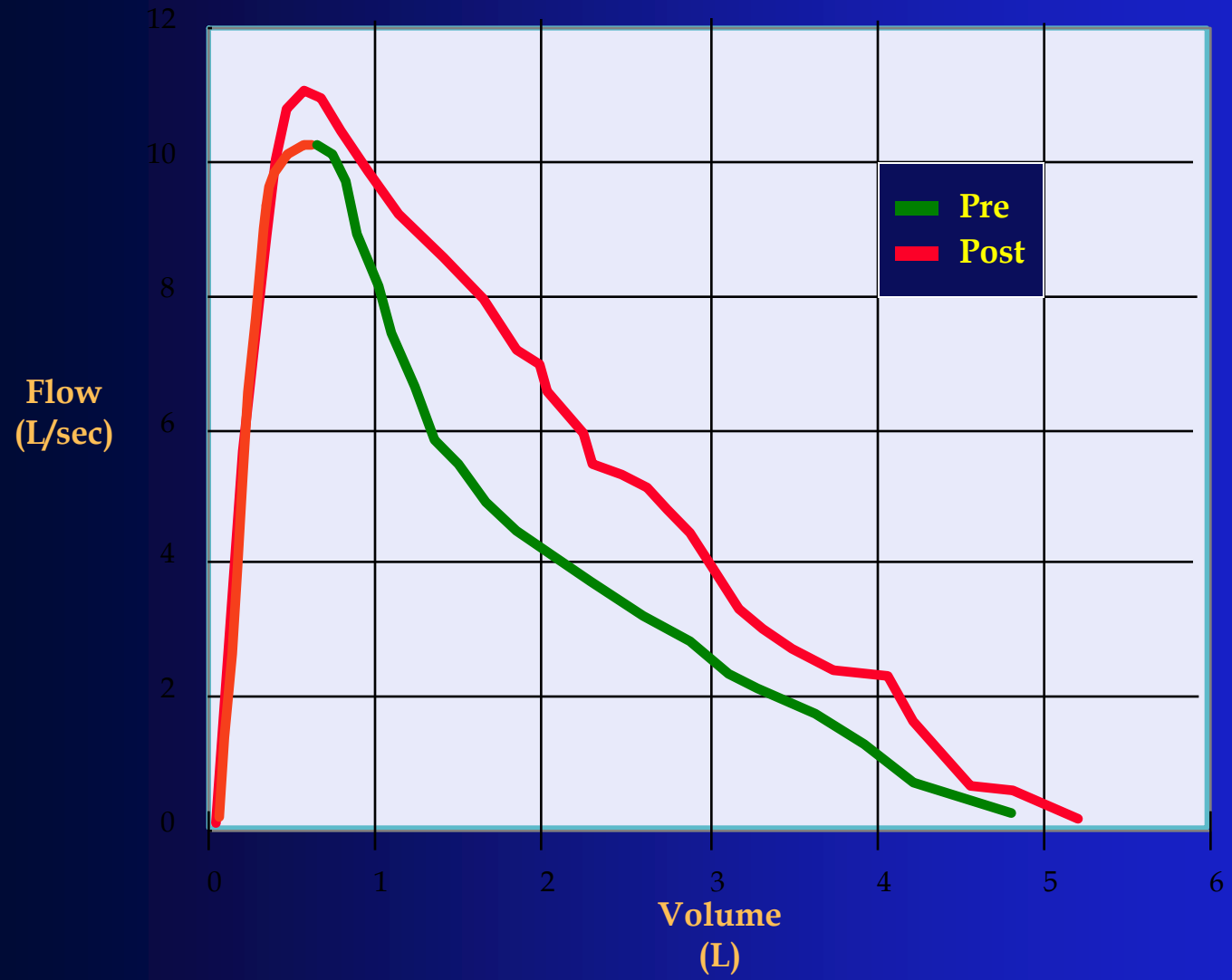
Asthma

- **Both FEV1 & FVC are reduced, but can demonstrate reversibility of at least 12%.**

Flow / Volume Curve

- X axis represents volume
- Y axis represents flow rate
- Shape depends on mechanical properties of lung.

Flow / Volume Curve



SPIROMETRY in GENERAL PRACTICE

Volume / time curve

- Must be smooth
- Must plateau

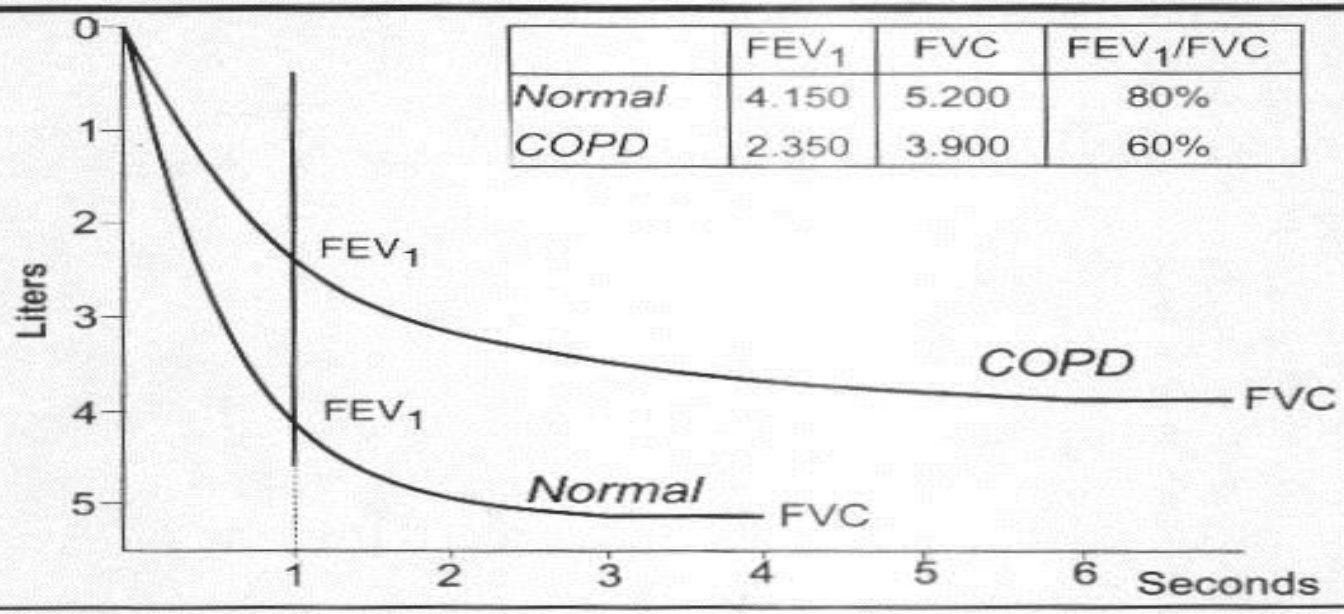
ie Spirometry is only worth doing if it is done properly

COPD DIAGNOSIS

Vol / Time Curve

Figure 2: Example of Spirometric Tracings and Calculation of FEV_1, FVC, and FEV_1/FVC Ratio

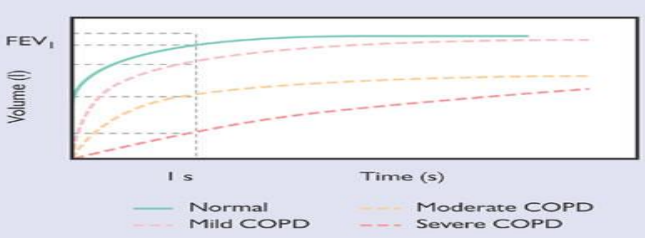
	FEV_1	FVC	FEV_1/FVC
Normal	4.150	5.200	80%
COPD	2.350	3.900	60%



Patients with COPD typically show a decrease in both FEV_1 and FEV_1/FVC. The degree of spirometric abnormality generally reflects the severity of COPD. However, both symptoms and spirometry should be considered when developing an individualized management strategy for each patient.

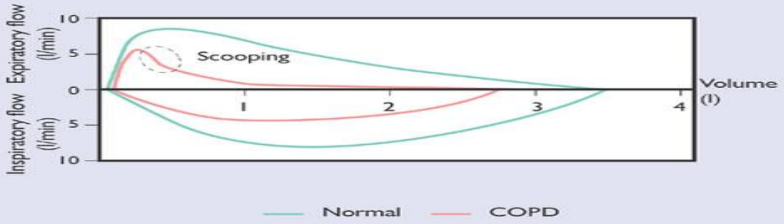
SPIROMETRY

Spirograms in COPD of varying severity



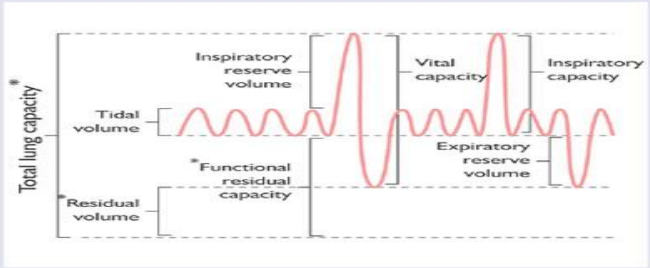
Forced vital capacity (FVC) plateau can take > 12 s

Flow volume loop: single breath forced maneuver



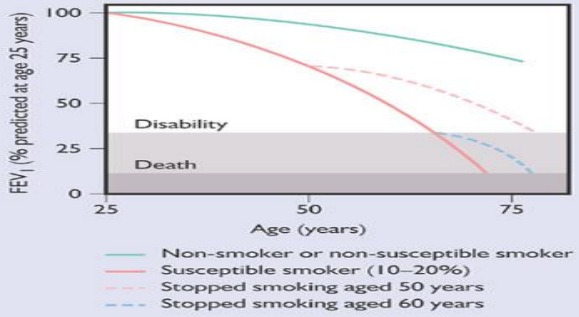
Pneumotachograph: 'scooping' caused by expiratory airway collapse

Lung volumes



* Total lung capacity, residual volume and functional residual capacity are measured by plethysmography

Natural history: decline in FEV_1 with age



Fletcher C, Peto R. *Br Med J* 1977;1:1645–8

SPIROMETRY in GENERAL PRACTICE

John, 42 years, is an area sales manager. “Chesty as a child” - Smoker - 10 pack years. He suffers from frequent “chest infections”.

Spirometry

FEV1 = 3.24 (76% pred)

FVC = 4.82 (91% pred)

FEV1/FVC = 67%

Post bronchodilator

FEV1 = 4.17 (29% improvement)

SPIROMETRY in GENERAL PRACTICE

Brian - 65 yrs. Cough + SOB. Smoker 20 pack years

Spirometry

FEV1 = 1.67 (57% pred)	**Reduced**
FVC = 2.07 (55% pred)	**Reduced**
FEV1 / FVC = 81%	**Normal**
Reversibility 6%	

SPIROMETRY in GENERAL PRACTICE

Rose 55 yrs. Smoker for 30 years - 45 Pack years. Increasing SOB. Smoker's cough

Spirometry

FEV1 = 1.39 (56% pred)	**Reduced**
FVC = 2.53 (86% Pred)	**Normal**
FEV1/FVC = 55%	**Reduced**
Reversibility = 5%	**Nil significant**

SPIROMETRY in GENERAL PRACTICE

Mel 50 years. Cough and SOB. Smoker 10 pack years.

Spirometry

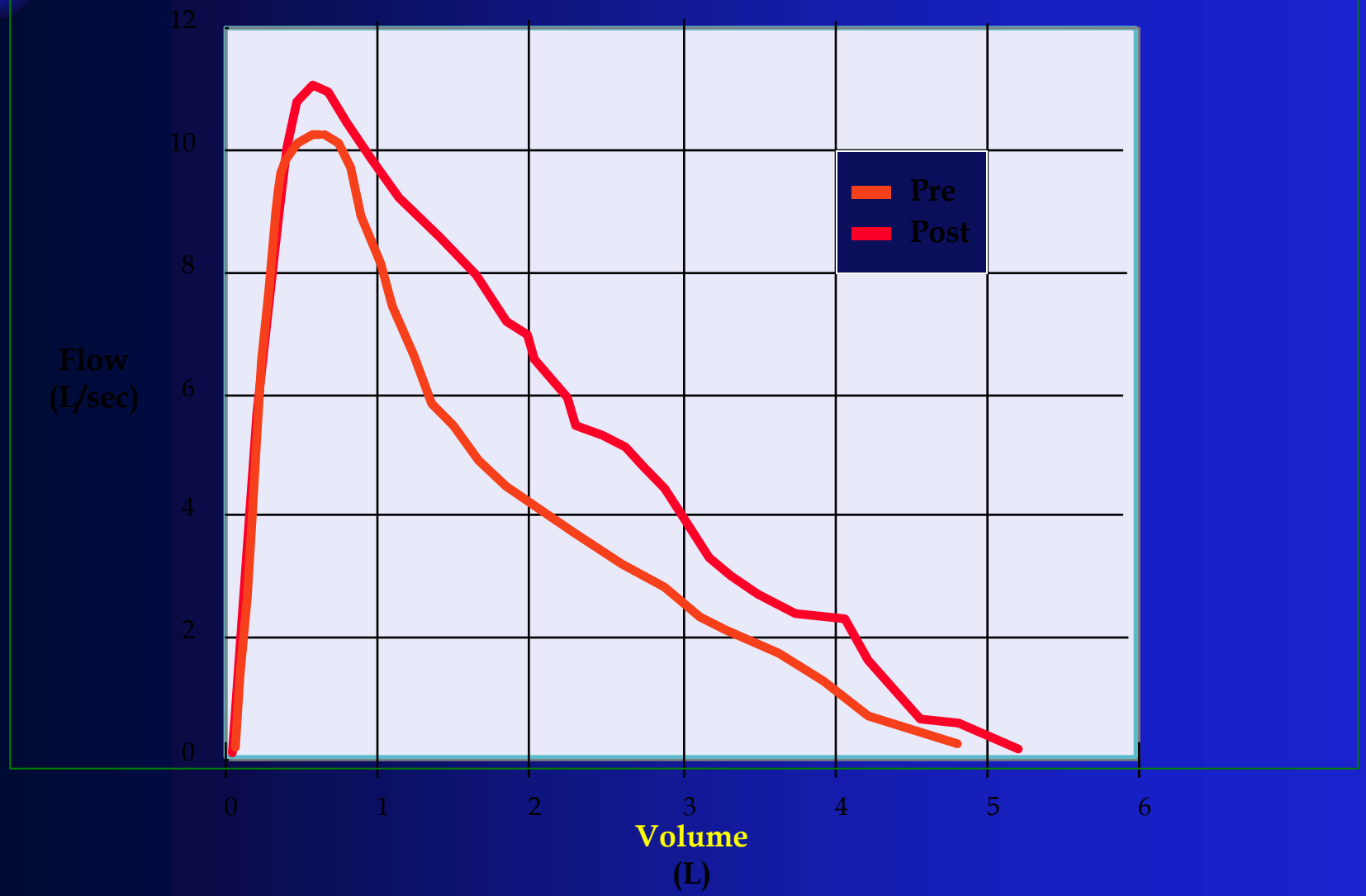
FEV1 = 1.6	**(60% pred)**	**Reduced**
FVC = 2.0	**(70% Pred)**	**Normal**
FEV1/FVC	**80%**	**Normal**

Post Bronchodilator 15% Reversibility

SPIROMETRY in GENERAL PRACTICE

- 18 year old male
- Presented with SOBOE
- HX of childhood asthma
- This prompted his office visit
- Also has family HX of allergies

Case #1: Spirometry Results



Case #1: Spirometry

	PRE		POST	
	Meas.	%	Meas.	Change
FVC	5.35L	99%	5.67L	6%
FEV_1	3.84L	86%	4.60L	20%
FEV_1/FVC	71.8%		81%	

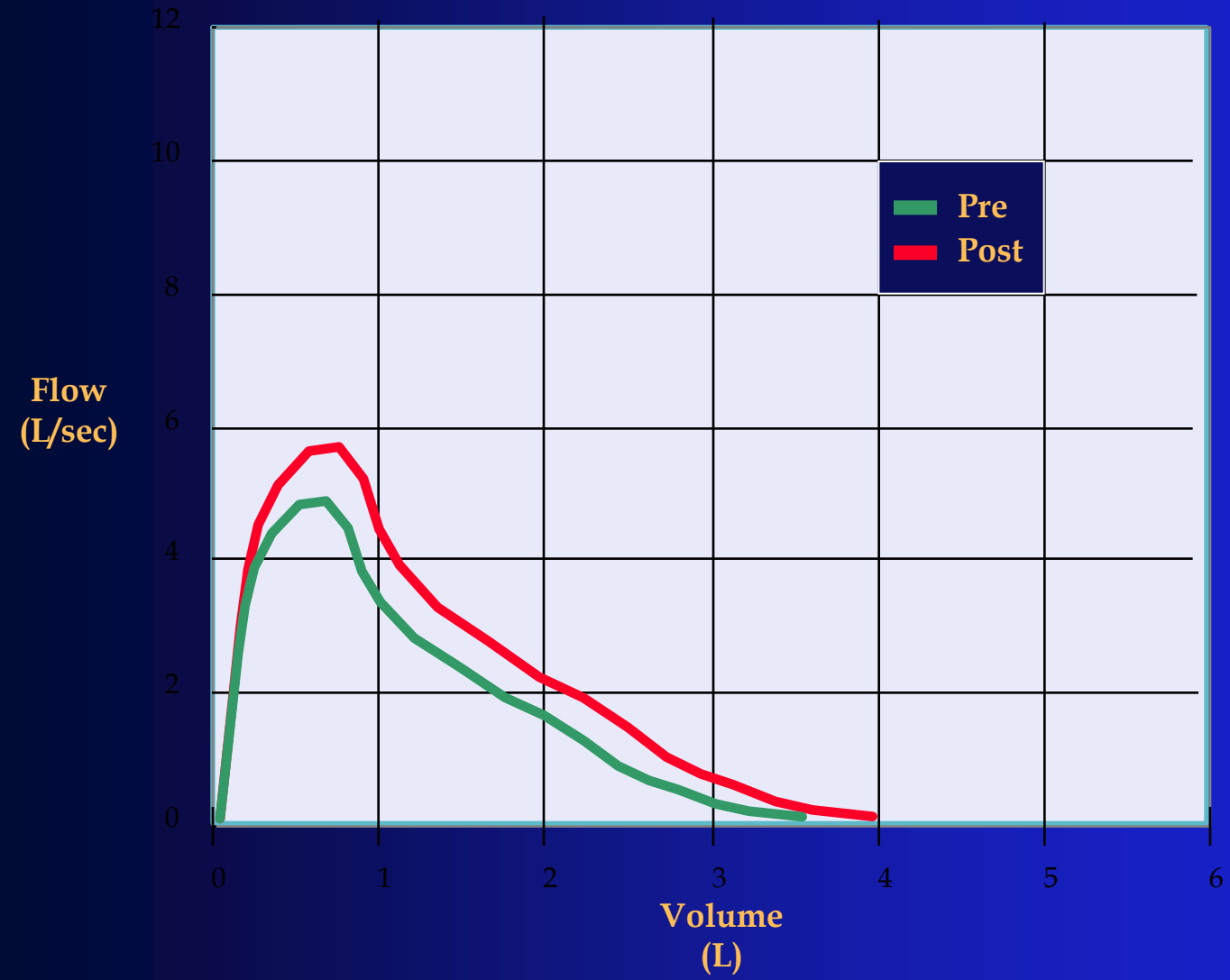
Case #1: Diagnosis

- Asthma

Case #2: History

- 44 year old woman
- cc: fatigue with dry cough, SOBOE
- Past HX:
  - **Ex-smoker**
  - **Chronic asthma**
  - **A few extrinsic allergies**
- Family HX = positive for emphysema

Case #2: Spirometry Results



Case #2: Spirometry

	PRE		POST	
	Meas.	%	Meas.	Change
FVC	4.65L	109%	4.85L	4%
FEV_1	2.60L	79%	2.80L	8%
FEV_1/FVC	56%		58%	

Case #2: Diagnosis And Treatment

- Query Moderate COPD
- Needs
  - Full PFTs
  - CXR

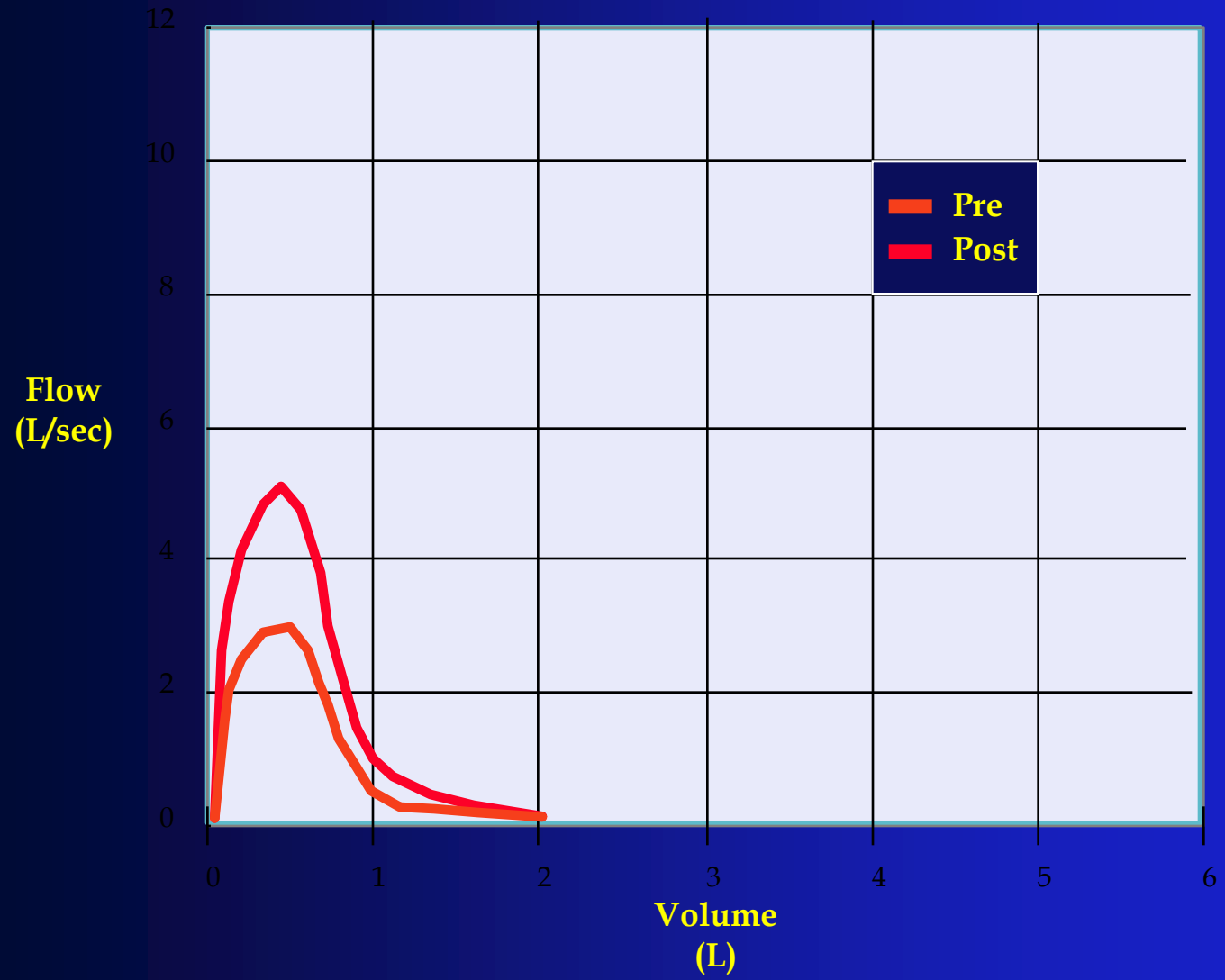
Case #3: History

- 39 year old woman
- Smoker
- ++Extrinsic allergies
- SOBOE with white sputum x 1 week

Case #3: History

- 3 visits to the ER in previous 2 days
- No previous measure of airflow(ie PEFR
- or Spirometry).
- Treated with Antibiotics
- Little improvement
- Family history is positive for asthma

Case #3: Spirometry Results



Case #3: Spirometry

	PRE		POST	
	Meas.	%	Meas.	Change
FVC	1.75L	49%	2.50L	43%
FEV_1	1.10L	39%	1.50L	36%
FEV_1/FVC	63%		60%	

CASE #3: Diagnosis

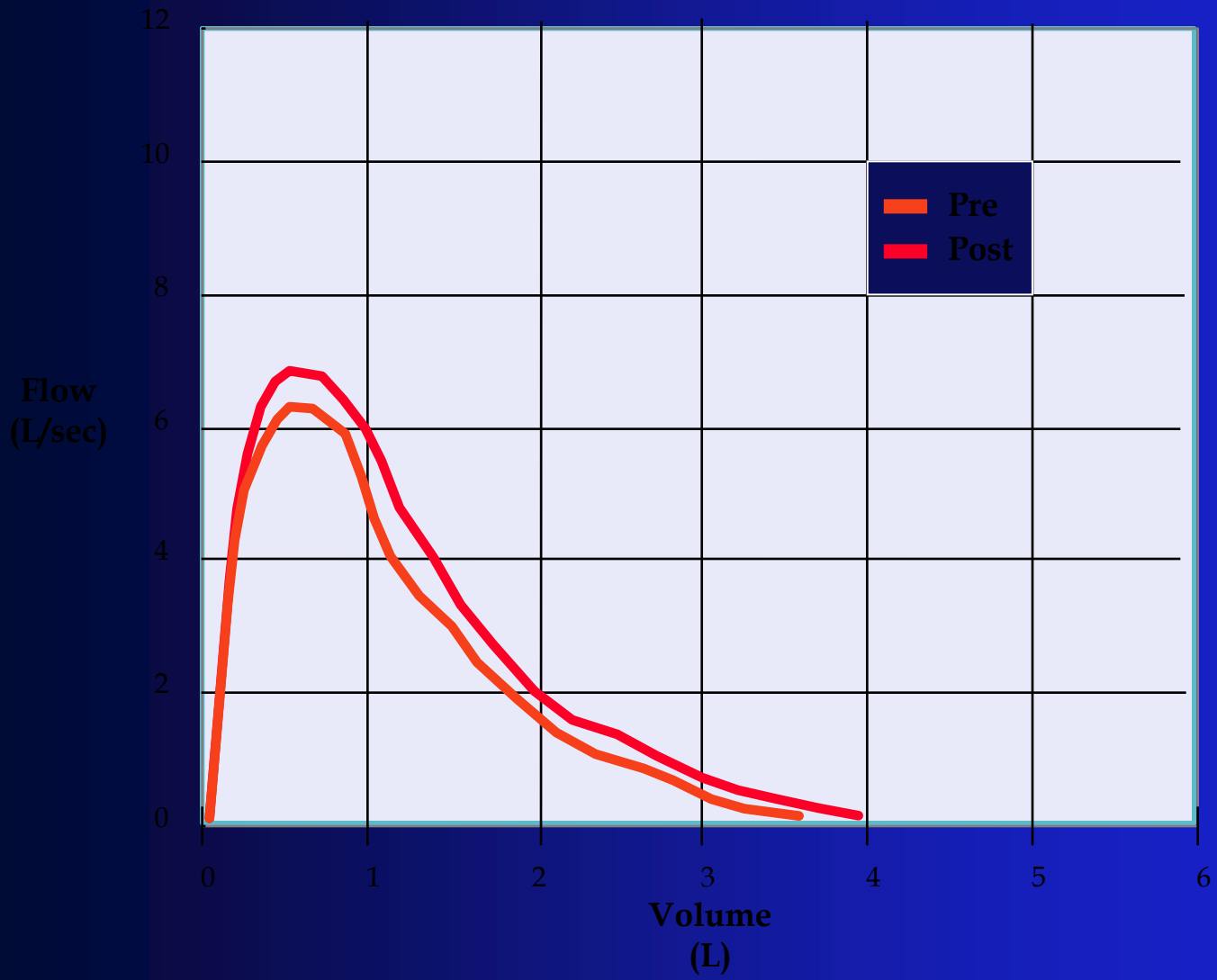
- Reversible obstruction
- Does not reverse to normal-Why?

Severe untreated asthma or COPD

Case #4: History

- 32 year old man
- Recent pneumonia with persistent SOBOE
- No wheezing
- No sputum production

Case #4: Spirometry Results

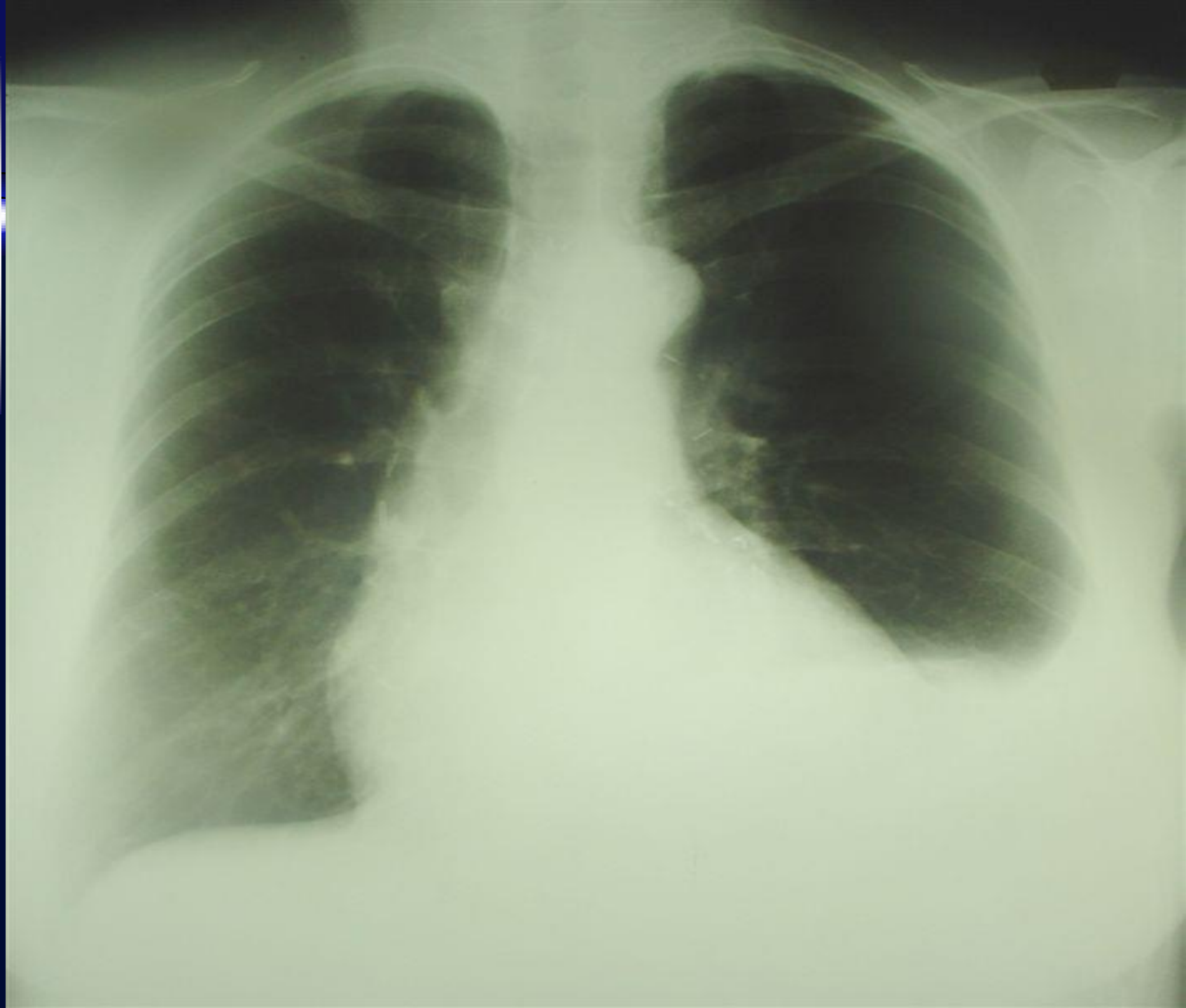


Case #4: Spirometry

	PRE		POST	
	Meas.	%	Meas.	Change
FVC	2.87L	52%	3.00L	5%
FEV_1	2.38L	56%	2.50L	5%
FEV_1/FVC	83%		83%	

Case #4: Diagnosis And Treatment:Moderate Restriction

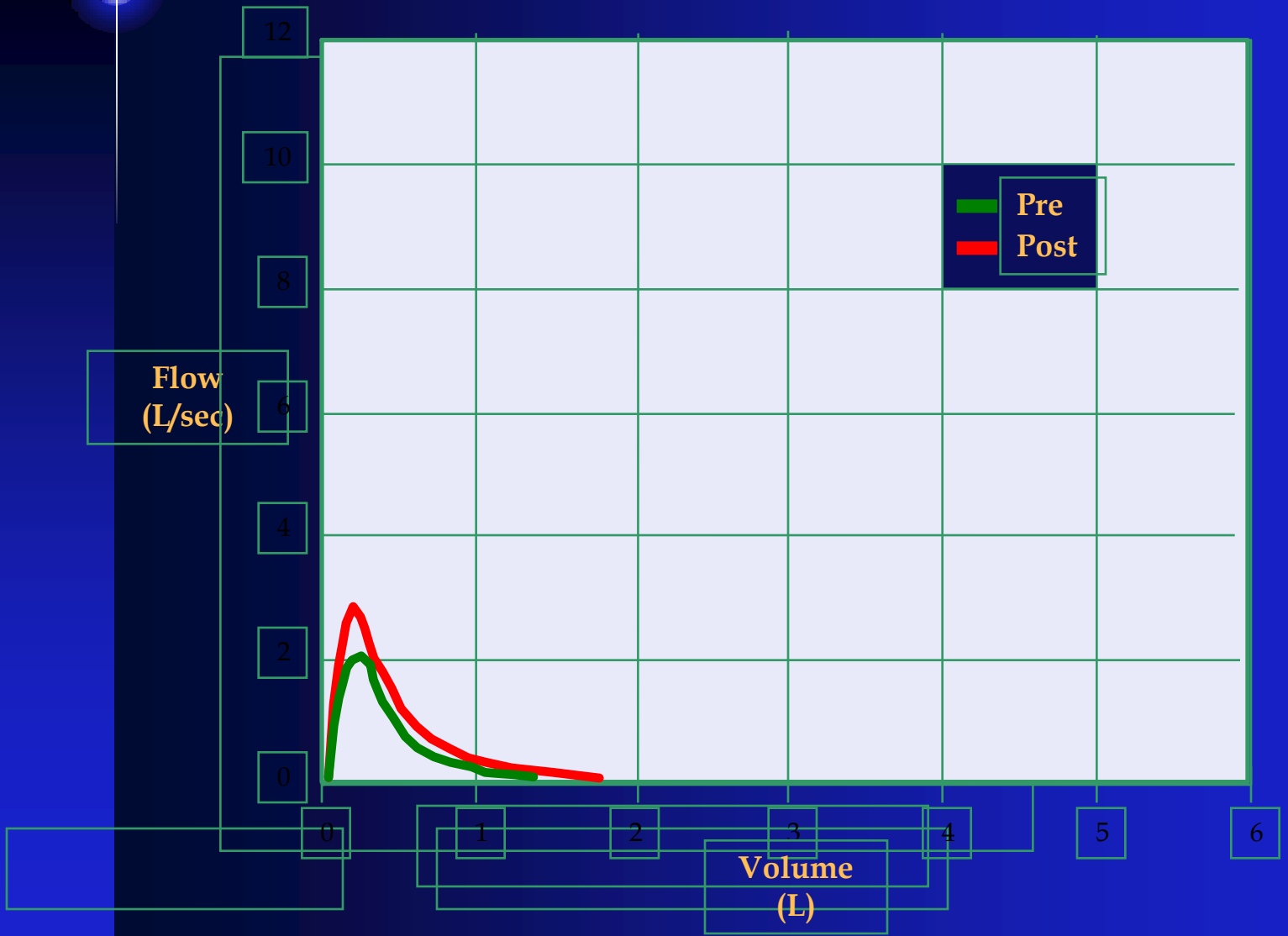
- ? Further pulmonary function tests to confirm etiology
- Many potential causes
- This case: Restriction with decreased residual volume and Normal CO diffusion capacity
- Diaphragmatic eventration/paralysis due to old MVA
- Moral: Look at the x-Ray



Case # 5: History

- 52 Year old woman
- SOBOE X 4 years
- Limited to walking less than 1 block
- No hemoptysis
- History of breast cancer

Case #5: Spirometry Results



Case #5: Spirometry

	PRE		POST	
	Meas.	%	Meas.	Change
FVC	1.36L	42%	1.92L	41%
FEV_1	0.60L	22%	0.86L	43%
FEV_1/FVC	44%		45%	

Case #5: Diagnosis And Treatment: COPD+/- Asthma

- CXR?
- Treat for asthma or COPD?
- Steroid trial?
- Pulmonary Rehab

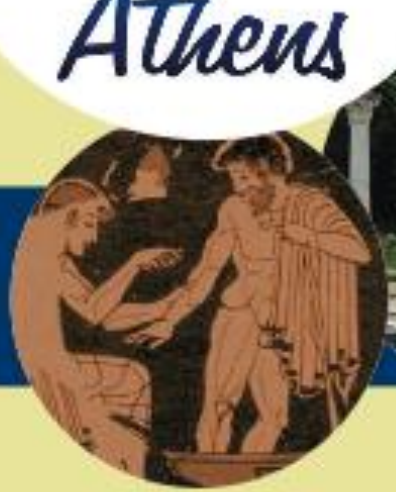
7th World Conference of the International Primary Care Respiratory Group (IPCRG)

A Breath of Fresh Air: Multiple Morbidities and Integration
21-24 May 2014

Hilton Hotel, Athens

- Internationally-renowned primary care speakers
- Symposia on primary care case-finding, diagnosis and management
- Cutting-edge real life primary care research from the leading respiratory units around the world
- Practical workshops to update your skills for everyday practice
- Opportunities to network with like-minded colleagues from around the world – we expect at least 45 countries

7thIPCRG
WORLD CONFERENCE
21ST - 24TH MAY 2014
Athens



Contact e-mail address **ipcrg2014@mci-group.com**

www.ipcrg2014.org

The IPCRG is a charity registered in Scotland, working internationally. It is in collaborative relations with WONCA and is the WONCA Europe respiratory Special Interest Group.
The 2014 conference is supported by ELEGEIA, the Greek Association of General Practitioners.

Like Edinburgh…but with sun and more focus on multiple morbidity including mental health

- 974 participants plus
- 180 webcast live audience: Chile (2 venues), Argentina, India and Spain plus
- 200 downloads
- 45 countries
- 22 aided by IPCRG bursary
- 15 from Bangladesh
- 63 from Russia
- 112 AHPs
- 20 doctors in training
- 18 hours CME accreditation

Multiple Morbidities and Integration

Our respiratory "community" plus

- Prof Stewart Mercer, Glasgow: multiple morbidity and inequalities
- Dr Andy McEwen, UCL, and National Centre for Stop Smoking Training
- Prof Annemie Schols, Maastricht
- Nikos Papodopolous
- Prof Jan De Maeseneer, Ghent

Integration with other international teams

- More patient engagement eg EFA
- More high-level therapist presentation
- EAACI session on respiratory allergy
- WONCA sessions on mental health
- WONCA session on rural health
- WONCA SIG on heart failure

Familiar format, but fewer scheduling clashes

- Unopposed plenary symposia
- Sponsored symposia embedded in conference
- Primary care speakers with notable exceptions
- Choice between education workshops or research sessions
- New: posters
  - Shorter oral presentations
  - Facilitated
  - Good for those uncomfortable in English and new to presenting
- Time for networking at lunch and no late finishes

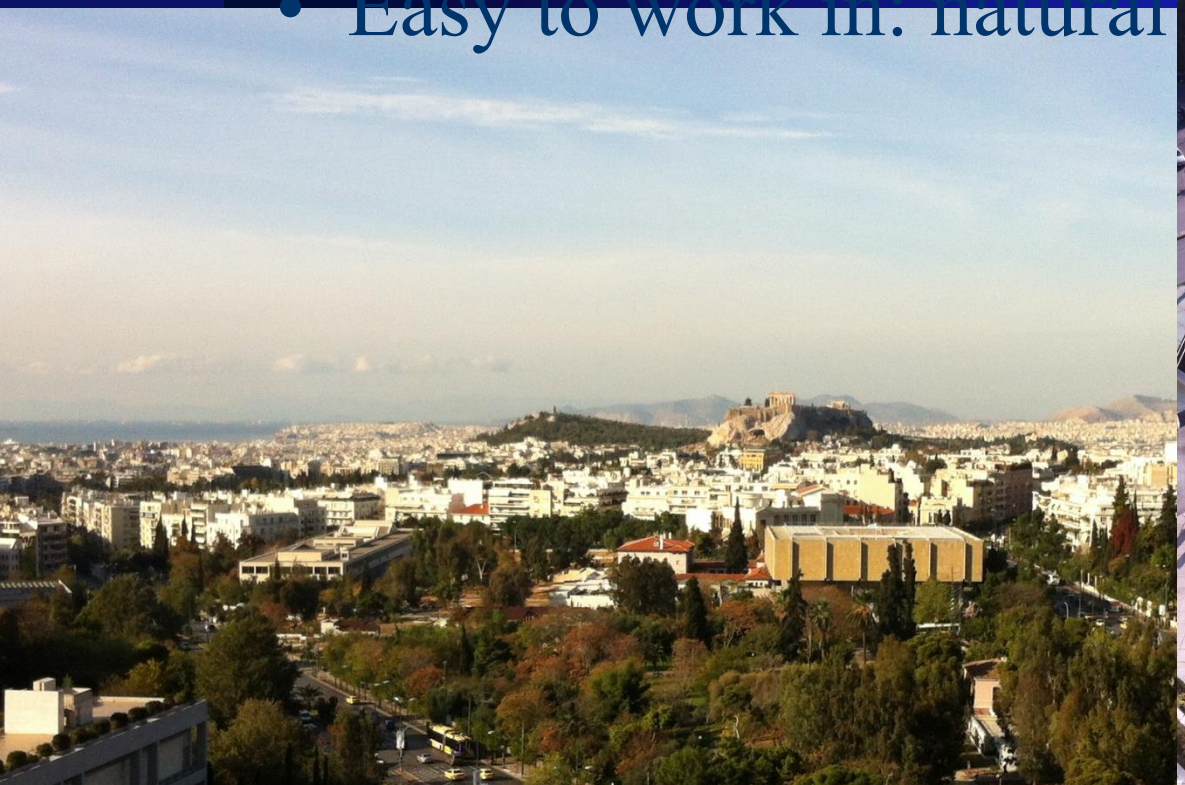
Designed by Scientific Programme Committee

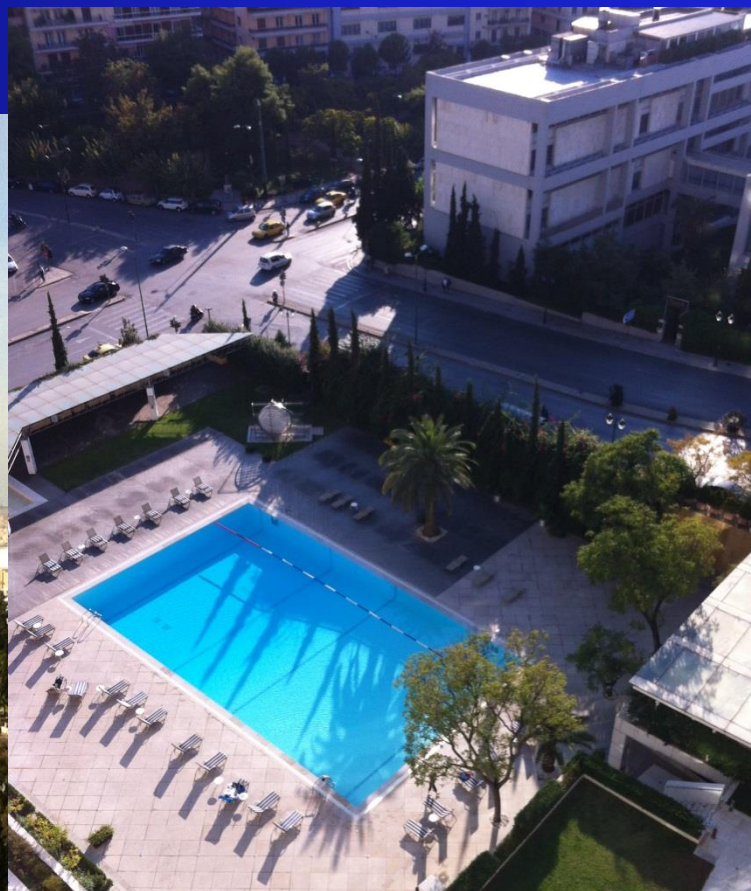
- Ioanna Tsiligianni (chair)
- Christos Lionis (abstract chair)
- Miguel Roman, Nick Zwar (plenaries)
- Niels Chavannes, Tan Tze Lee (sponsored plenaries)
- Jim Reid, Antonio Infantino (workshops)

+ International Advisory Panel – many of you!

Athens Hilton Hotel

- Easy to get to
- Easy to get around
- Easy to work in: natural





Easy to get to

- 5 minutes from Metro Stop
- 20 minutes by foot to Plaka, Acropolis and the new Acropolis museum.
- 35 minutes from the airport by taxi or metro
- Various museums with 10 minutes walking distance

Dates to put in diary

- **Registration opens**: 10 September 2013
- **Abstract submission opens**: 10 September 2013
- **Abstract submission last day**: 10 January 2014
- **Early registration last day**: 19 February 2014
- Same abstract system as Uppsala
- Same and improved registration system as Uppsala

Assistance for other languages

Un soplo de aire fresco: Atención integral y de las co-morbildades

- Ponentes de renombre internacional
- Simposium sobre detección precoz, diagnóstico y tratamiento
- Investigación de vanguardia en la vida real dirigida por líderes mundiales en atención primaria
- Talleres para poner al día los conocimientos necesarios para la consulta
- Una oportunidad para crear redes con otros colegas de todo el mundo – esperamos asistentes de más de 45 países

Um sopro de ar fresco: Morbidades múltiplas e Integração

- Oradores de cuidados de saúde primários famosos a nível internacional
- Simpósios sobre deteção de casos, diagnóstico e gestão clínica em cuidados primários
- A vanguarda da investigação de vida real em cuidados de saúde primários das principais unidades respiratórias de todo o mundo
- Oficinas práticas para atualizar as suas aptidões para a prática diária
- Oportunidades para estabelecer redes de trabalho com colegas de todo o mundo - esperamos pelo menos 45 países

Un Respiro di Aria Fresca: Comorbidità e Integrazione

- Relatori di fama internazionale provenienti dal setting delle cure primarie
- Simposi su case-finding, diagnosi e management nelle cure primarie
- Risultati delle più avanzate ricerche "real life" nelle cure primarie a cura di esperti dell'ambito respiratorio provenienti da tutto il mondo
- Workshop pratici per l'aggiornamento delle tue abilità per la pratica quotidiana
- Opportunità di confronto fra pari con colleghi di tutto il mondo – prevediamo da almeno 45 paesi

Μια ανάσα φρέσκου αέρα: Πολλαπλές νοσηρότητες και ολοκληρωμένη φροντίδα

- Διεθνούς φήμης ομιλητές από το χώρο της πρωτοβάθμιας φροντίδας υγείας
- Συμπόσια σχετικά με την ανίχνευση, διάγνωση και διαχείριση των αναπνευστικών νοσημάτων στην πρωτοβάθμια φροντίδα υγείας
- Παρουσίαση ερευνών στην πρωτοβάθμια φροντίδα υγείας από τις κορυφαίες παγκοσμίως αναπνευστικές μονάδες
- Πρακτικά εργαστήρια για να αναβαθμίσετε τις δεξιότητες σας στην καθημερινή κλινική πράξη
- Ευκαιρίες για να επικοινωνήσετε με ομοδεάτες συναδέλφους από όλο τον κόσμο – αναμένεται συμμετοχή από τουλάχιστον 45 χώρες

7thIPCRG WORLD CONFERENCE 21ST - 24TH MAY 2014 Athens

to search, type and hit enter Search



Welcome | General Information | Programme | Registration | Abstract Submission

- Internationally-renowned primary care speakers
- Symposia on primary care case-finding, diagnosis and management
- Cutting-edge real life primary care research from the leading respiratory units around the world • Practical workshops to update your skills for everyday practice
- Opportunities to network with like-minded colleagues from around the world – we expect at least 45 countries

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Welcome

A Breath of Fresh Air: Multiple Morbidities and Integration

News

www.ipcrg2014.org