A Refresher on PFT Concepts & Interpretation

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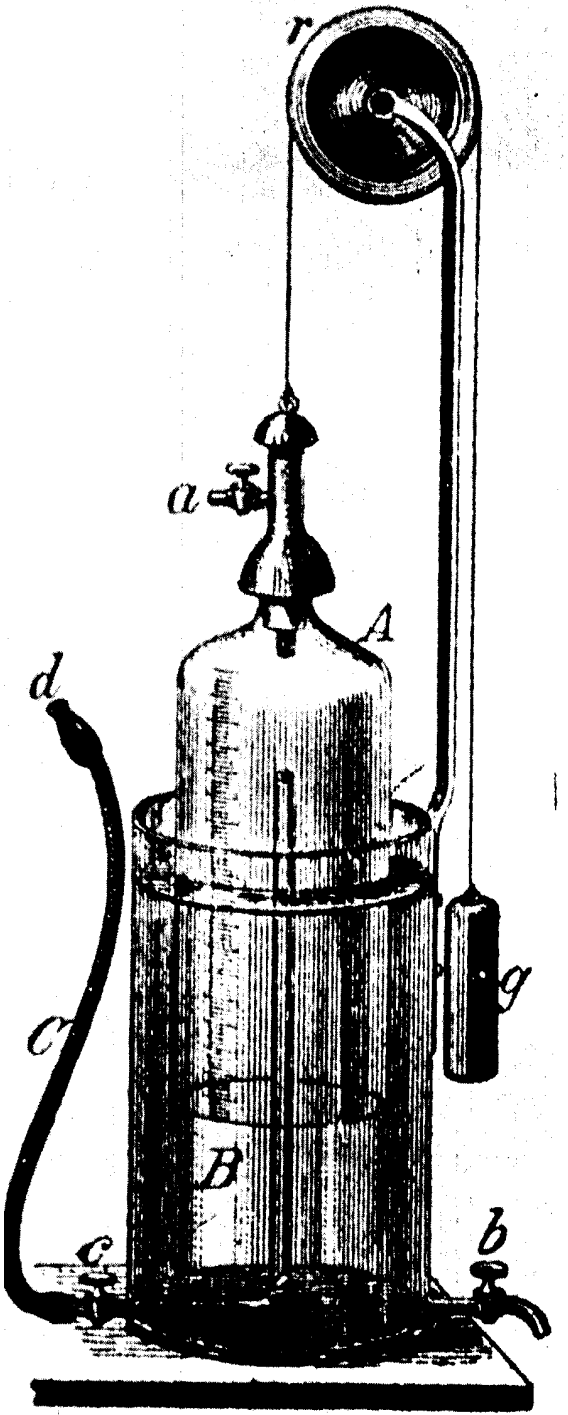


Learning Objectives

As a result of this course, participants will be able to:

1) **Interpret** a basic spirometry and complete PFT report
2) **Categorize patients** as having either an obstructive or restrictive (or mixed) condition
3) Conclude a generalized **clinical implication** based upon an interpretation of report

Disclaimer:

During the presentation, various drug names, pulmonary functions devices, and companies may be referenced or pictured. I am in no way affiliated with or compensated by any of the mentioned companies/corporations or their products.

******I would, however, not be opposed to the idea of making medications more affordable for our patients by decreasing the amount of profits/"kickbacks" to affiliated companies, corporations, or their representatives☺***

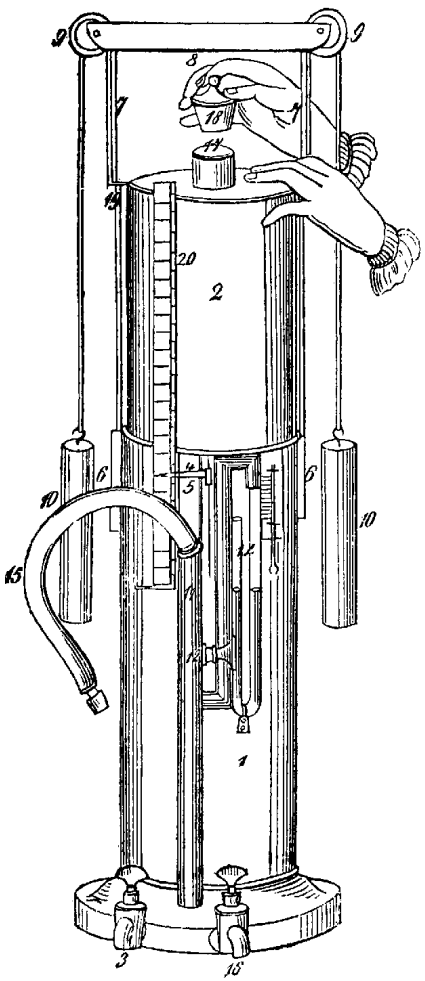
History of PFT

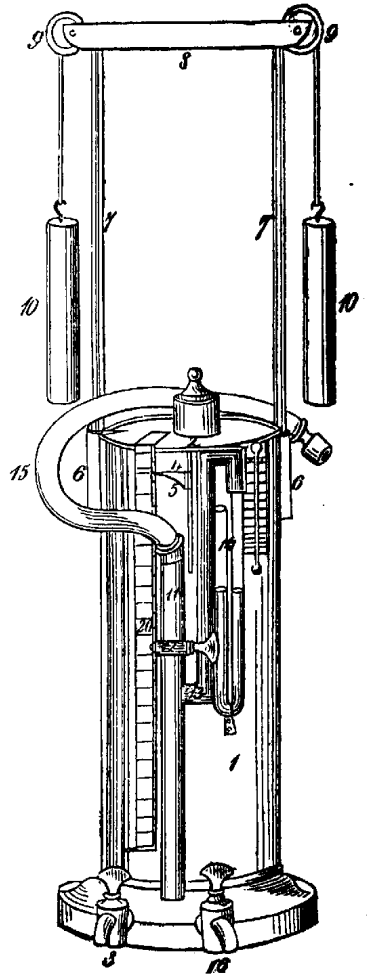
Aelius Claudius Galen

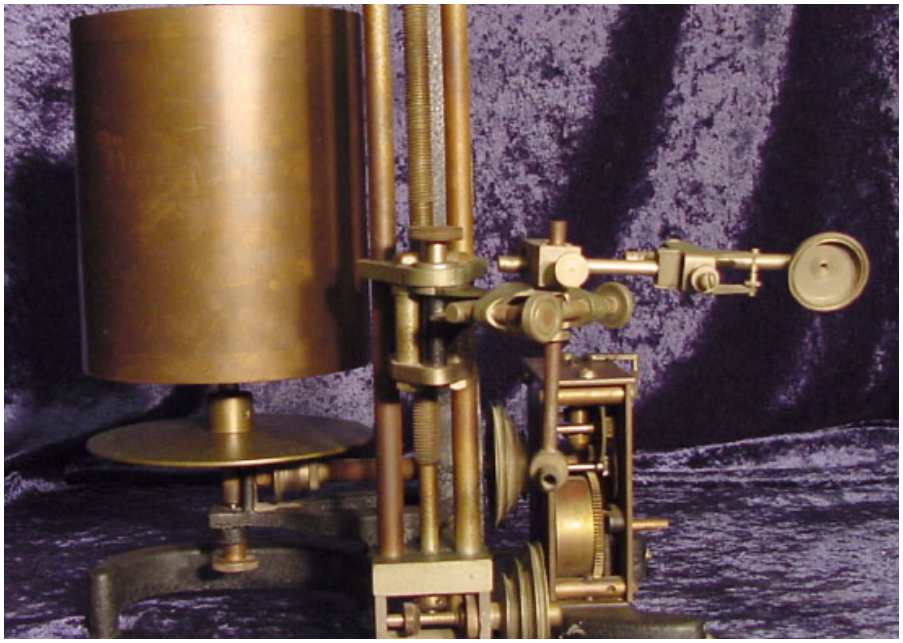
*Mid 100's A.D.

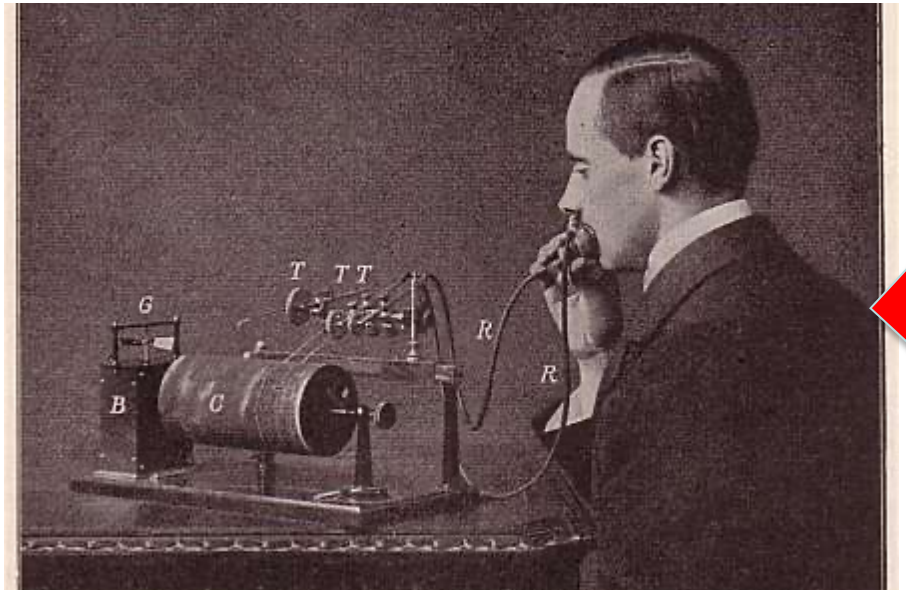
John Hutchinson

*1800s





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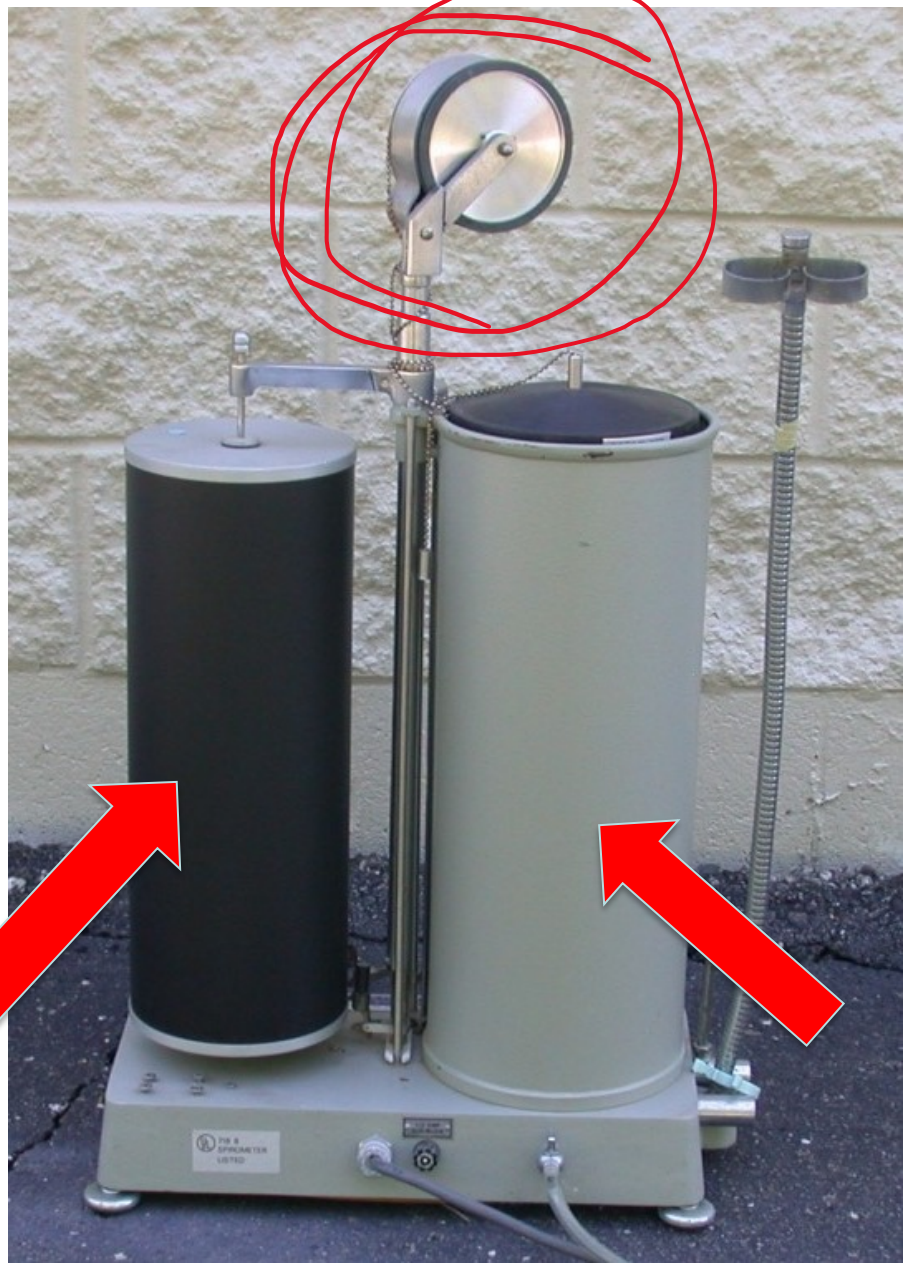
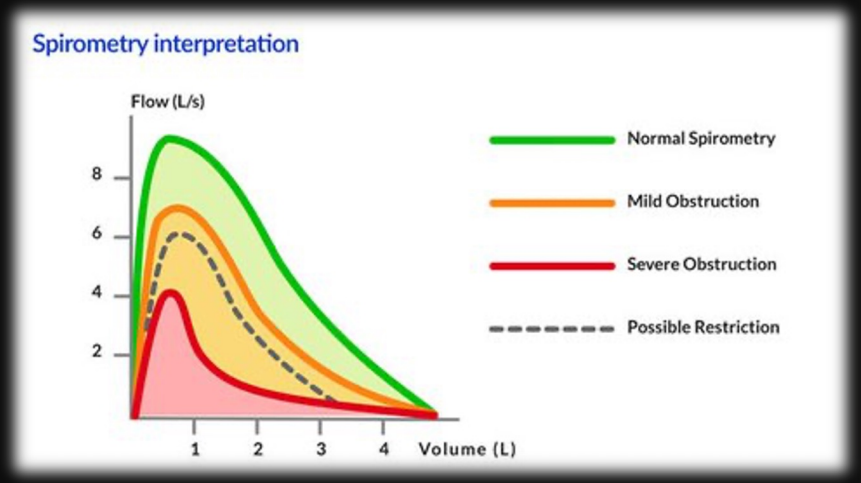


Where are we now?

What is Spirometry?

Flow (L/sec) = **Volume** (L) / **Time** (sec)




EasyOne

AMERICAN THORACIC SOCIETY DOCUMENTS

Standardization of Spirometry 2019 Update

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Brian L. Graham, Irene Steenbruggen, Martin R. Miller, Igor Z. Barjaktarevic, Brendan G. Cooper, Graham L. Hall, Teal S. Hallstrand, David A. Kaminsky, Kevin McCarthy, Meredith C. McCormack, Cristine E. Oropez, Margaret Rosenfeld, Sanja Stanojevic, Maureen P. Swanney†, and Bruce R. Thompson; on behalf of the American Thoracic Society and the European Respiratory Society

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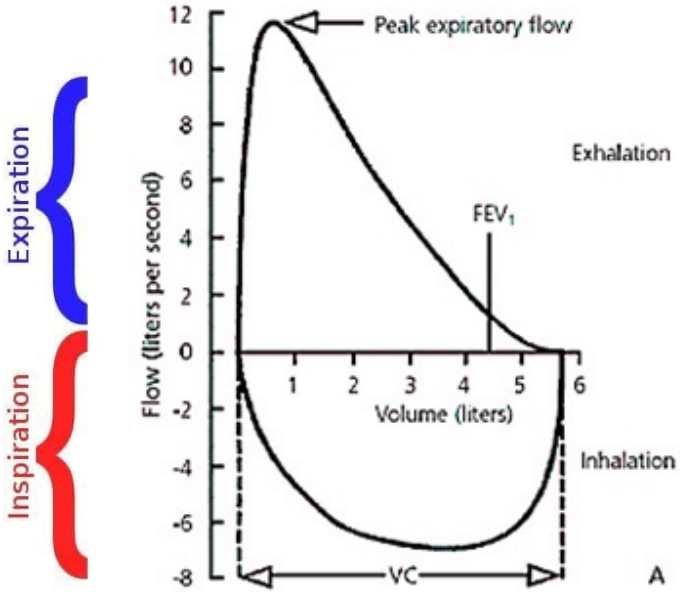

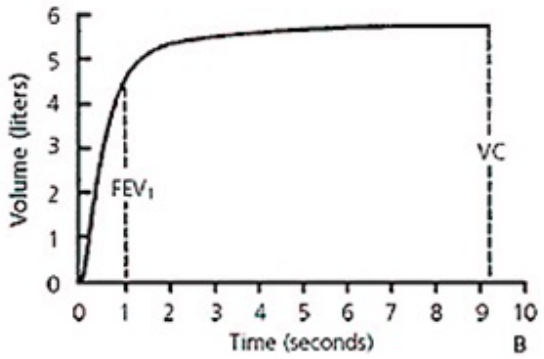

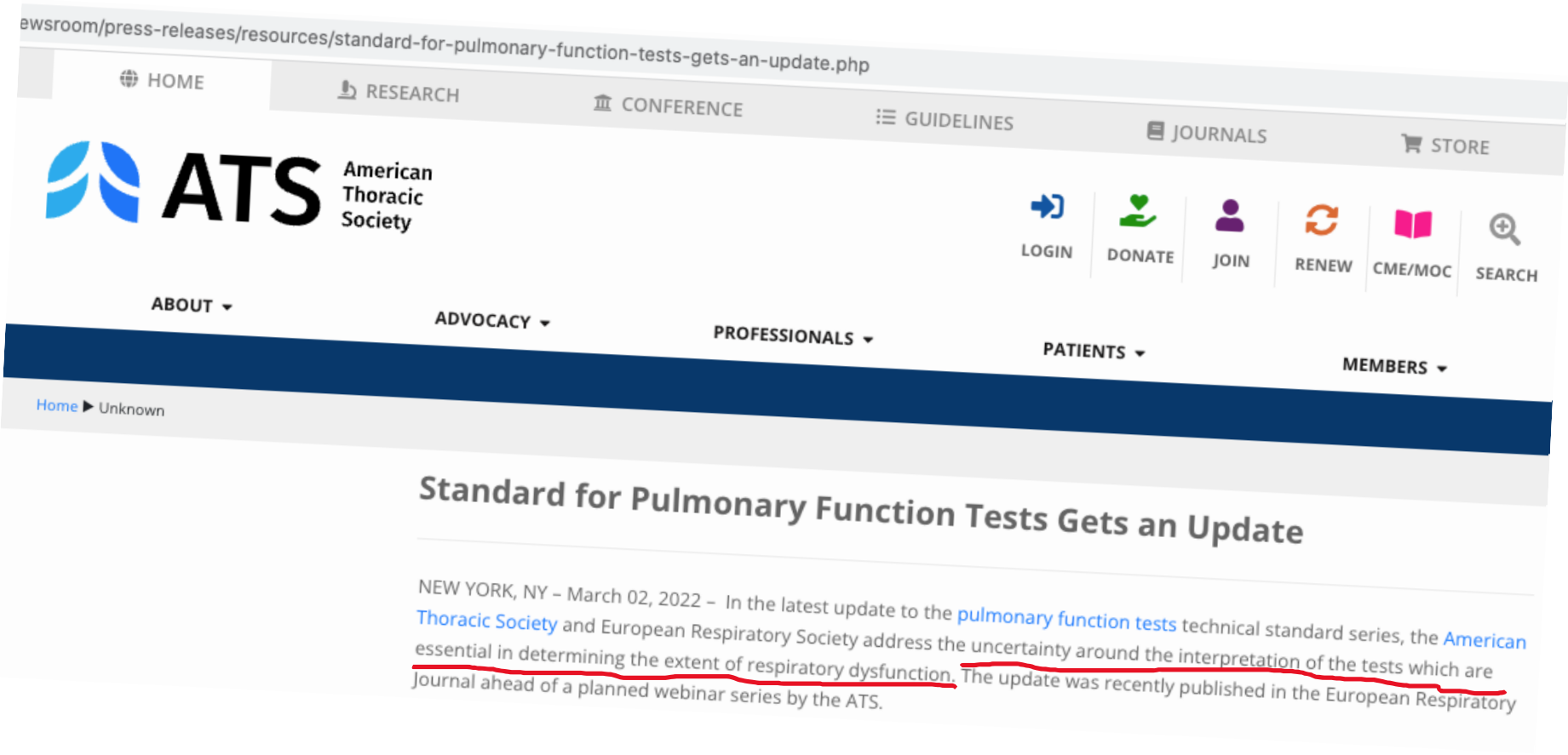
ewsroom/press-releases/resources/standard-for-pulmonary-function-tests-gets-an-update.php
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Standard for Pulmonary Function Tests Gets an Update
NEW YORK, NY – March 02, 2022 – In the latest update to the pulmonary function tests technical standard series, the American Thoracic Society and European Respiratory Society address the uncertainty around the interpretation of the tests which are essential in determining the extent of respiratory dysfunction. The update was recently published in the European Respiratory Journal ahead of a planned webinar series by the ATS.

EUROPEAN RESPIRATORY *journal*

FLAGSHIP SCIENTIFIC JOURNAL OF ERS

Early View

Task force report

ERS/ATS technical standard on interpretive strategies for routine lung function tests

Sanja Stanojevic, David A. Kaminsky, Martin Miller, Bruce Thompson, Andrea Aliverti, Igor Barjaktarevic, Brendan G. Cooper, Bruce Culver, Eric Derom, Graham L. Hall, Teal S. Hallstrand, Joerg D. Leuppi, Neil MacIntyre, Meredith McCormack, Margaret Rosenfeld, Erik R. Swenson

Eur Respir J 2021

EUROPEAN RESPIRATORY JOURNAL
ERS OFFICIAL DOCUMENTS
S. STANOJEVIC ET AL.

ERS/ATS technical standard on interpretive strategies for routine lung function tests

Sanja Stanojevic[1], David A. Kaminsky[2], Martin R. Miller[3], Bruce Thompson[4], Andrea Aliverti[5], Igor Barjaktarevic[6], Brendan G. Cooper[7], Bruce Culver[8], Eric Derom[9], Graham L. Hall[10], Teal S. Hallstrand[8], Joerg D. Leuppi[11,12], Neil MacIntyre[13], Meredith McCormack[14], Margaret Rosenfeld[15] and Erik R. Swenson[8,16]

Abstract

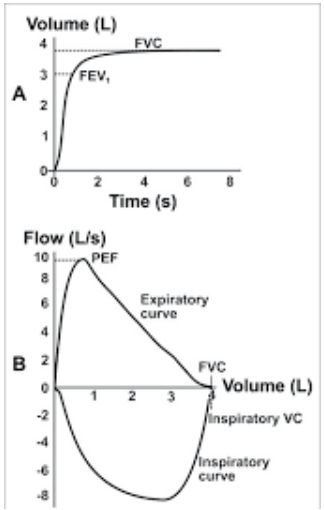
Background Appropriate interpretation of pulmonary function tests (PFTs) involves the classification of observed values as within/outside the normal range based on a reference population of healthy individuals, integrating knowledge of physiological determinants of test results into functional classifications and integrating patterns with other clinical data to estimate prognosis. In 2005, the American Thoracic Society (ATS) and European Respiratory Society (ERS) jointly adopted technical standards for the interpretation of PFTs. We aimed to update the 2005 recommendations and incorporate evidence from recent literature to establish new standards for PFT interpretation.

Methods This technical standards document was developed by an international joint Task Force, appointed by the ERS/ATS with multidisciplinary expertise in conducting and interpreting PFTs and developing international standards. A comprehensive literature review was conducted and published evidence was reviewed.

Results Recommendations for the choice of reference equations and limits of normal of the healthy population to identify individuals with unusually low or high results are discussed. Interpretation strategies for bronchodilator responsiveness testing, limits of natural changes over time and severity are also updated. Interpretation of measurements made by spirometry, lung volumes and gas transfer are described as they relate to underlying pathophysiology with updated classification protocols of common impairments.

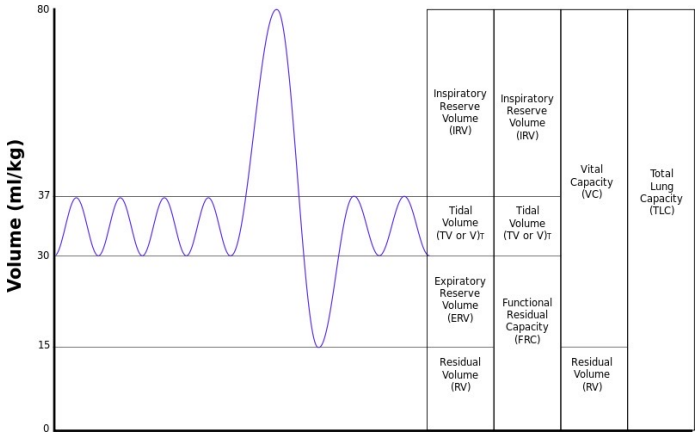
Conclusions Interpretation of PFTs must be complemented with clinical expertise and consideration of the inherent biological variability of the test and the uncertainty of the test result to ensure appropriate interpretation of an individual's lung function measurements.

Flows, **Volumes**, and Waveforms… oh my!



Spirometry

- Main Value:
  - FEV_1
  - FVC
  - FEV1/FVC ratio (aka. FEV_1%)
  - PEFR



Complete PFT

- Main Value:
  - TLC
  - FRC
  - RV
  - DLCO?

Why Spirometry?

- Simple, cost effective
  - **Baseline** lung function
  - Evaluate SOB
  - **Detect** pulmonary disease
  - **Monitor** therapeutics
  - **Evaluate** degree of impairment
  - Pre-op
  - **Surveillance** of occupational lung disease

Spirometry Values

- Forced Expiratory Volume, 1 sec (**FEV_1**)
- Forced Vital Capacity (**FVC**)
- **FEV_1/FVC**
- Forced Expiratory Flows
  - 25%
  - 75%
  - 25-75%
  - Max
    - Inspiratory & Expiratory

- **FEV_1 (L)**
- **FVC (L)**
- **FEV_1/FVC (%)**
- FEF 25% (L/sec)
- FEF 75% (L/sec)
- FEF 25-75% (L/sec)
- FEF Max (L/sec)
- FIVC (L)
- FIF Max (L/sec)

Again…

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Table 7. Summary of Acceptability, Usability, and Repeatability Criteria for FEV_1 and FVC

Acceptability and Usability Criterion	Required for Acceptability		Required for Usability	
	FEV_1	FVC	FEV_1	FVC
Must have BEV ⩽5% of FVC or 0.100 L, whichever is greater	Yes	Yes	Yes	Yes
Must have no evidence of a faulty zero-flow setting	Yes	Yes	Yes	Yes
Must have no cough in the first second of expiration*	Yes	No	Yes	No
Must have no glottic closure in the first second of expiration*	Yes	Yes	Yes	Yes
Must have no glottic closure after 1 s of expiration	No	Yes	No	No
Must achieve one of these three EOFE indicators:	No	Yes	No	No
1. Expiratory plateau (⩽0.025 L in the last 1 s of expiration)				
2. Expiratory time ⩾15 s				
3. FVC is within the repeatability tolerance of or is greater than the largest prior observed FVC†				
Must have no evidence of obstructed mouthpiece or spirometer	Yes	Yes	No	No
Must have no evidence of a leak	Yes	Yes	No	No
If the maximal inspiration after EOFE is greater than FVC, then FIVC − FVC must be ⩽0.100 L or 5% of FVC, whichever is greater‡	Yes	Yes	No	No

Repeatability criteria (applied to acceptable FVC and FEV_1 values)

Age >6 yr: The difference between the two largest FVC values must be ⩽0.150 L, and the difference between the two largest FEV_1 values must be ⩽0.150 L

Age ⩽6 yr: The difference between the two largest FVC values must be ⩽0.100 L or 10% of the highest value, whichever is greater, and the difference between the two largest FEV_1 values must be ⩽0.100 L or 10% of the highest value, whichever is greater

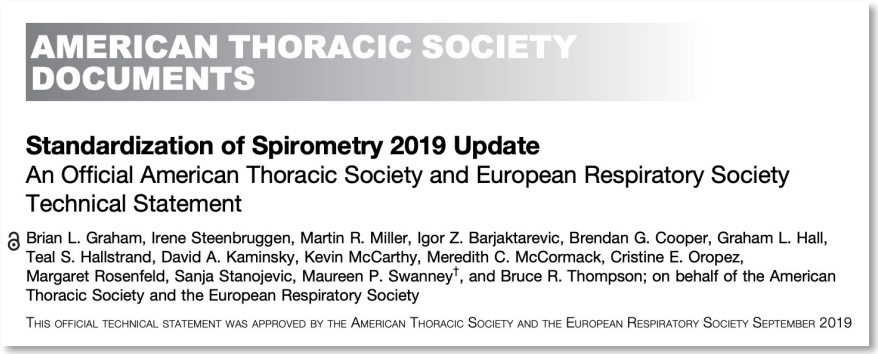
Definition of abbreviations: BEV = back-extrapolated volume; EOFE = end of forced expiration; $FEV_{0.75}$ = forced expiratory volume in the first 0.75 seconds; FIVC = forced inspiratory VC.

The grading system (Table 10) will inform the interpreter if values are reported from usable maneuvers not meeting all acceptability criteria.

*For children aged 6 years or younger, must have at least 0.75 seconds of expiration without glottic closure or cough for acceptable or usable measurement of $FEV_{0.75}$.

†Occurs when the patient cannot expire long enough to achieve a plateau (e.g., children with high elastic recoil or patients with restrictive lung disease) or when the patient inspires or comes off the mouthpiece before a plateau. For within-maneuver acceptability, the FVC must be greater than or within the repeatability tolerance of the largest FVC observed before this maneuver within the current prebronchodilator or the current post-bronchodilator testing set.

‡Although the performance of a maximal forced inspiration is strongly recommended, its absence does not preclude a maneuver from being judged acceptable, unless extrathoracic obstruction is specifically being investigated.



Key Updates

- A new list of relative contraindications was added.
- Spirometers are now required to meet International Organization for Standardization (ISO) 26782 standards, but with a maximum permissible accuracy error of ±2.5%.
- Device quality assurance procedures were updated.
- Operator training as well as attainment and maintenance of competency were addressed.
- The list of activities that patients should avoid before testing was updated.
- There is a focus on the use of devices that measure both expiration and inspiration.
- Maneuver acceptability and repeatability criteria were updated. The end of forced expiration (EOFE) was redefined.
- Requirements for spirometry systems to provide uniform cues and feedback to the operator were added.
- New withholding times for bronchodilators before bronchodilator responsiveness testing were developed.
- A new grading system for assessment of spirometry quality was developed.
- Standardized operator feedback options that promote synoptic reporting were developed.
- Preliminary findings derived from an international patient survey were presented.

ATS Official Documents

ATS Official Documents

- Document Development
- Guideline Implementation Tools

Statements, Guidelines & Reports

Official ATS Documents include clinical practice guidelines, policy statements, research statements, technical standards, and workshop reports, many of which are developed collaboratively with other professional societies.

- Clinical practice guidelines make recommendations for patient care. The recommendations are based upon a systematic review or pragmatic evidence synthesis, and then formulated and graded using the GRADE approach.
- Statements present the views of the ATS on issues related to public policy or research policy.
- Technical statements describe how to perform a test or procedure and describe the underlying evidence.
- Workshop reports describe conferences and workshops sponsored by the ATS.

Official ATS Documents are categorized by topic and available via the following links:

GUIDELINE IMPLEMENTATION TOOLS

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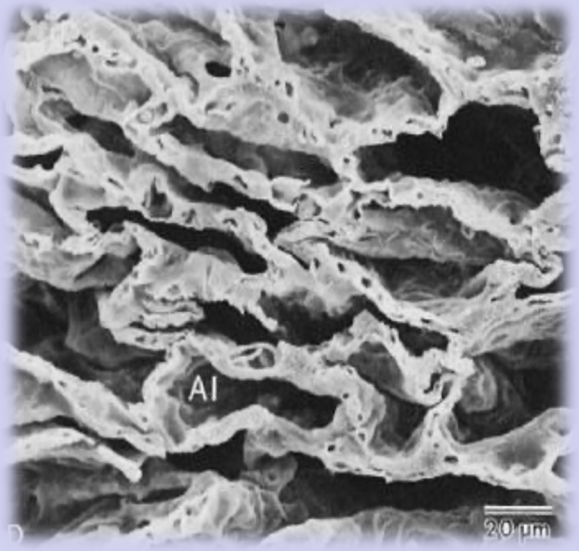
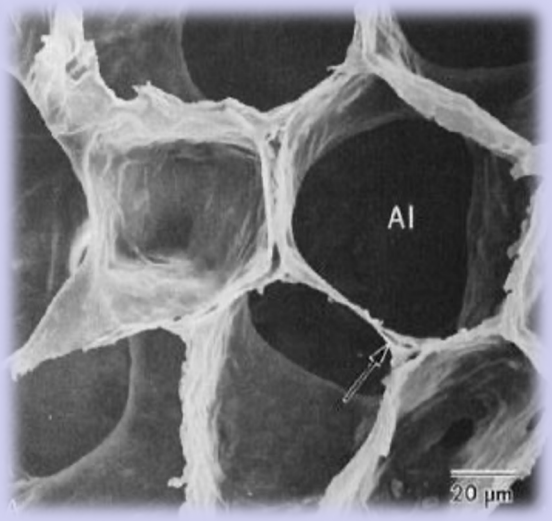
ENVIRONMENTAL & OCCUPATIONAL LUNG DISEASE
GUIDELINE METHODOLOGY
HEALTH CARE POLICY, ETHICS, & END-OF-LIFE CARE
INTERSTITIAL LUNG DISEASE
INTERVENTIONAL PULMONOLOGY

What is Normal?

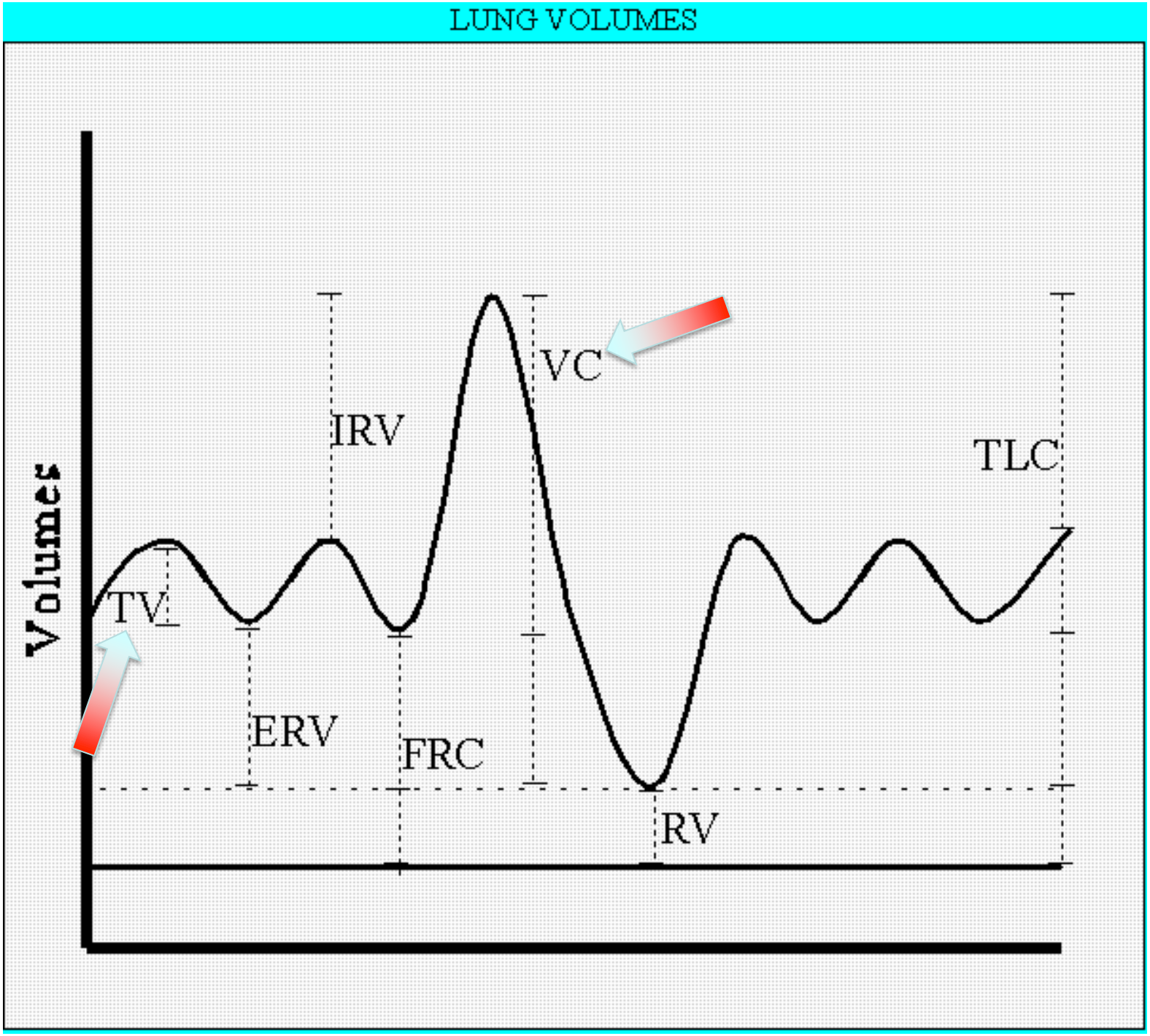
- Predicteds
- 80-120%





Predicteds

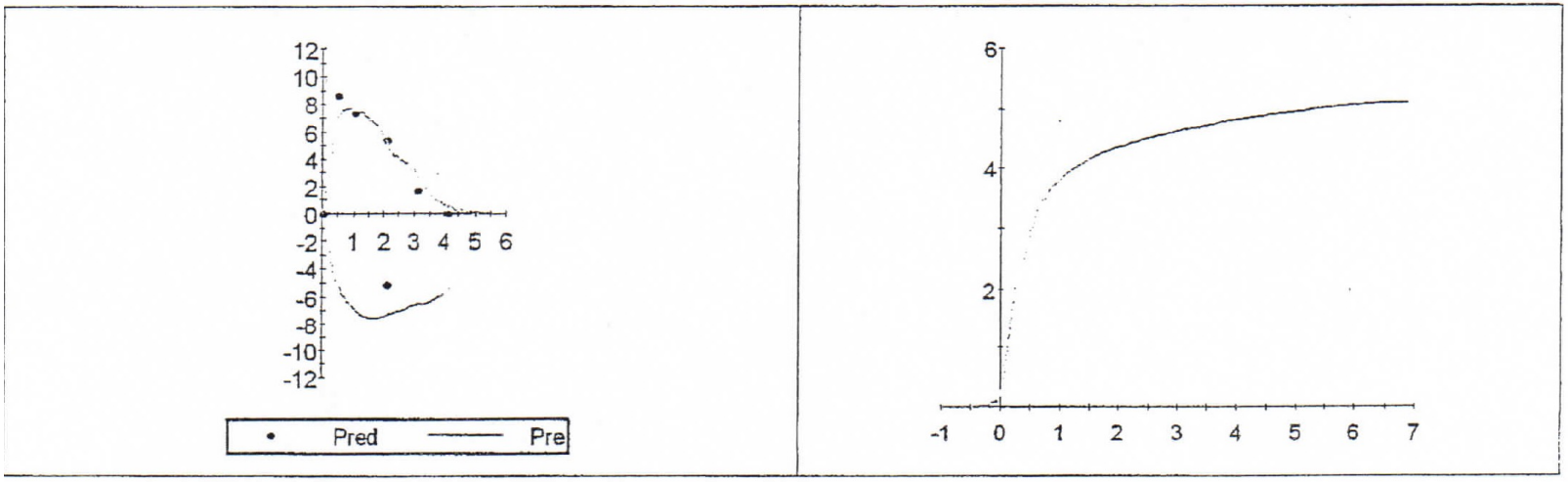
- NHANES III
  - –Age
  - –Sex
  - –Height
  - –Race
  - –(Weight)


LUNG VOLUMES
Volumes
TV
IRV
ERV
FRC
VC
RV
TLC

Tech:	Adger, Sandra	Height:	63.50	Age:	45	Room:	
Doctor:		Weight:	185.60	Sex:	Male	Race:	Caucasian

Diagnosis:
Dyspnea: Cough: Wheeze:
Tbco Prod: Yrs Smk: Pks/Day: Yrs Quit:
Medications:
Pre Test Comments:
Post Test Comments: Patient meets ATS standards for acceptibility and were reproducible.

	Pre-Ex			Post-Ex		
	Actual	Pred	%Pred	Actual	%Pred	%Chng
---- SPIROMETRY ----						
FVC (L)	5.10	4.14	123			
FEV1 (L)	3.82	3.29	116			
FEV1/FVC (%)	75	79	95			
FEF 25% (L/sec)	7.38	7.40	100			
FEF 75% (L/sec)	0.99	1.68	59			
FEF 25-75% (L/sec)	3.04	3.14	97			
FEF Max (L/sec)	8.76	8.63	102			
FIVC (L)	5.02					
FIF Max (L/sec)	7.56					



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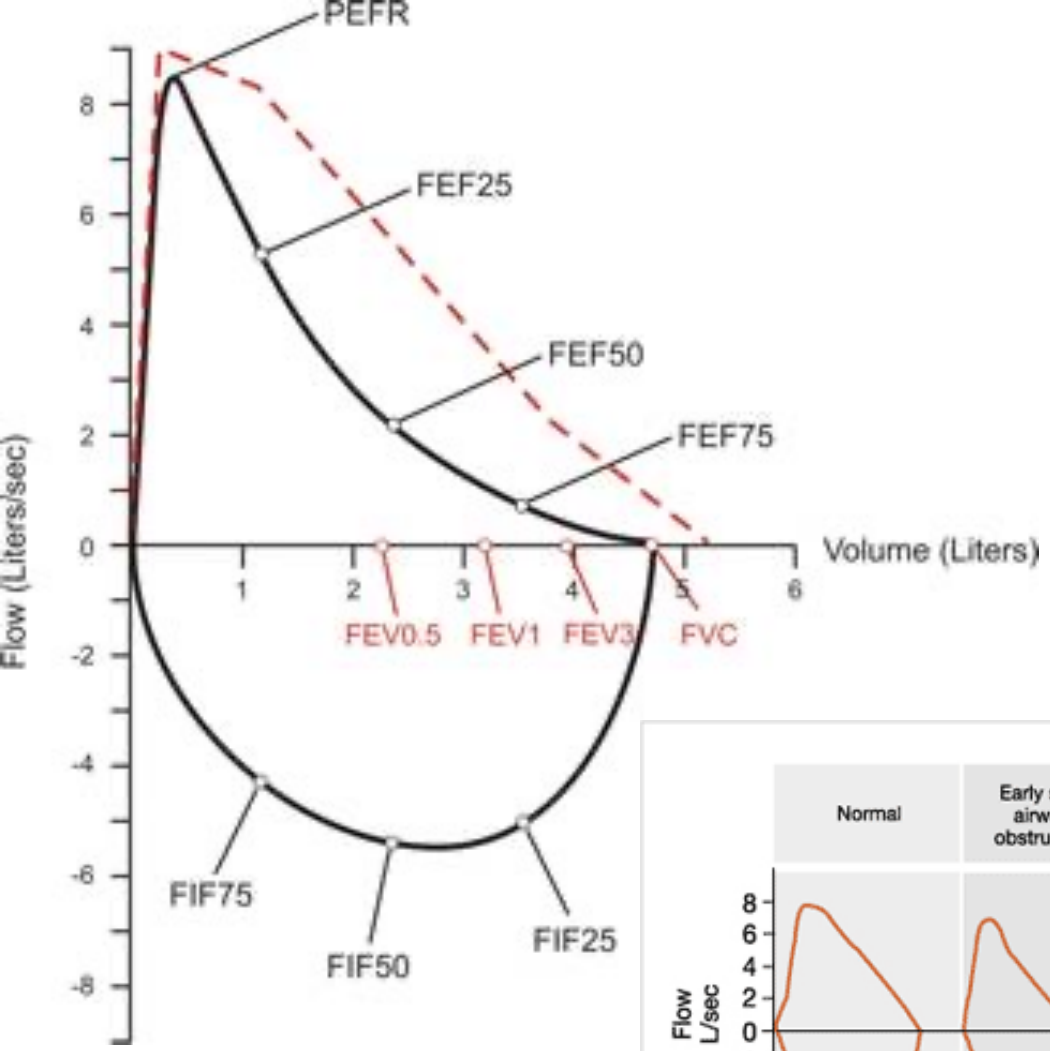
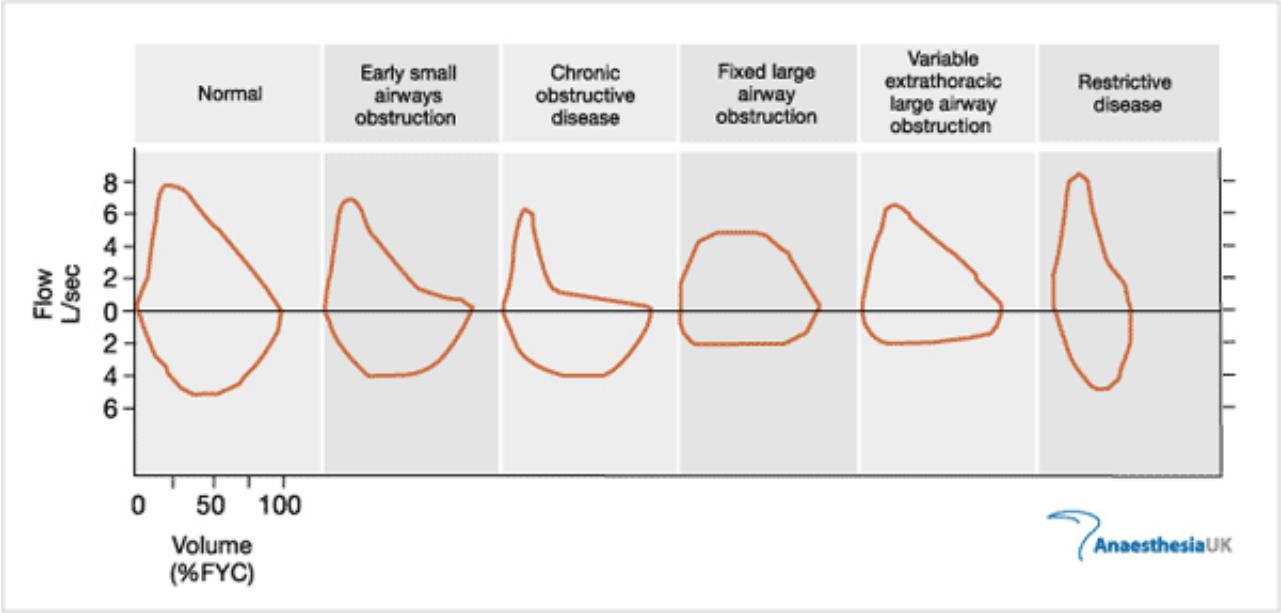
Flow Volume Loop





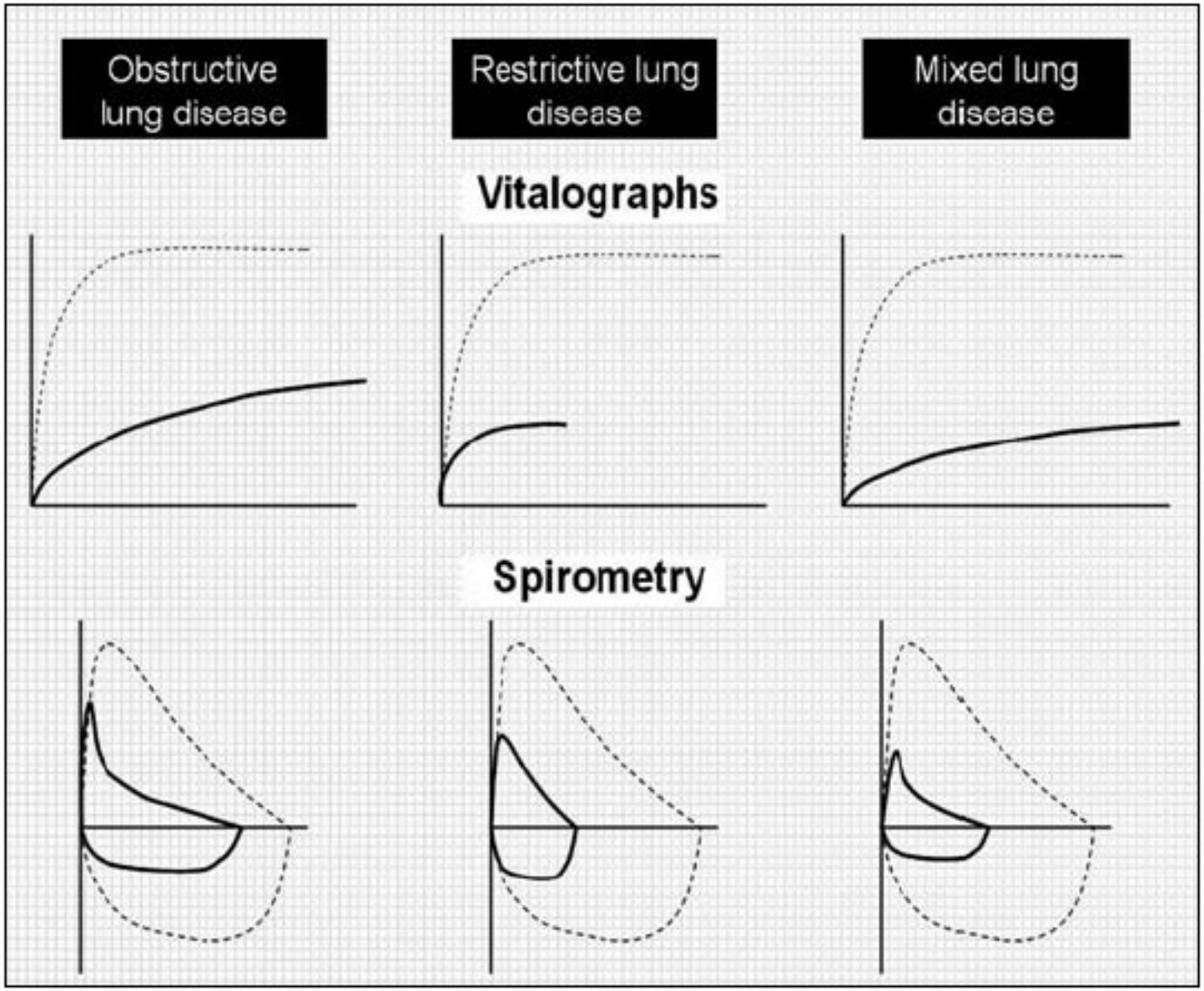
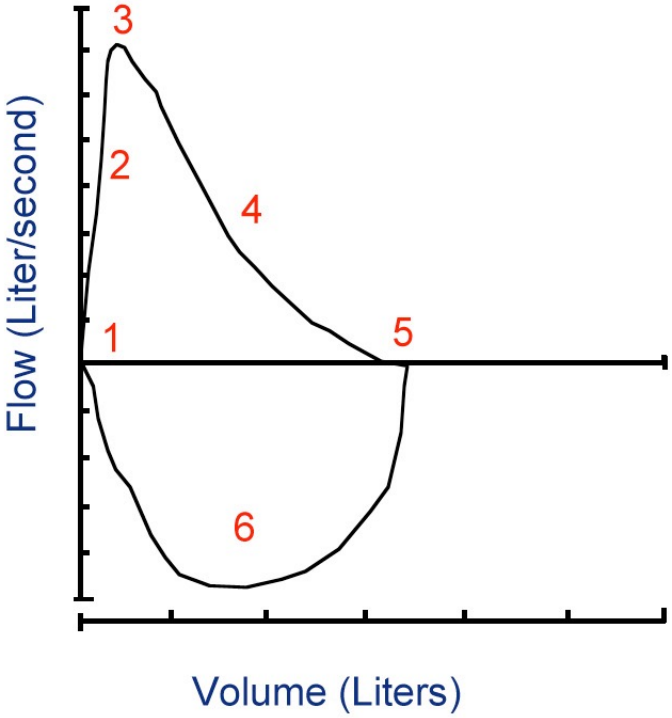
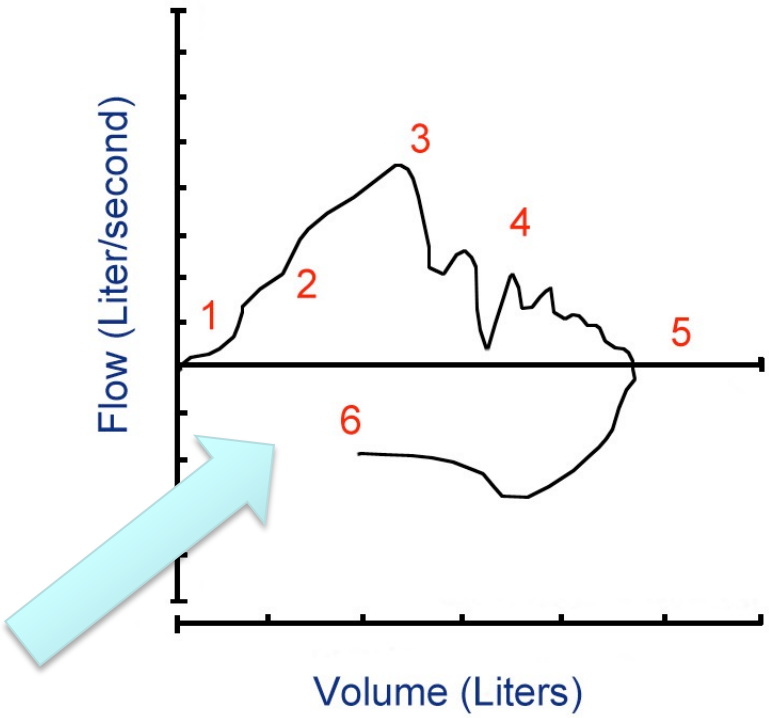


Figure 9. *Examples of typical spirometry loops seen with obstructive, restrictive and mixed (obstructive and restrictive) lung disease*

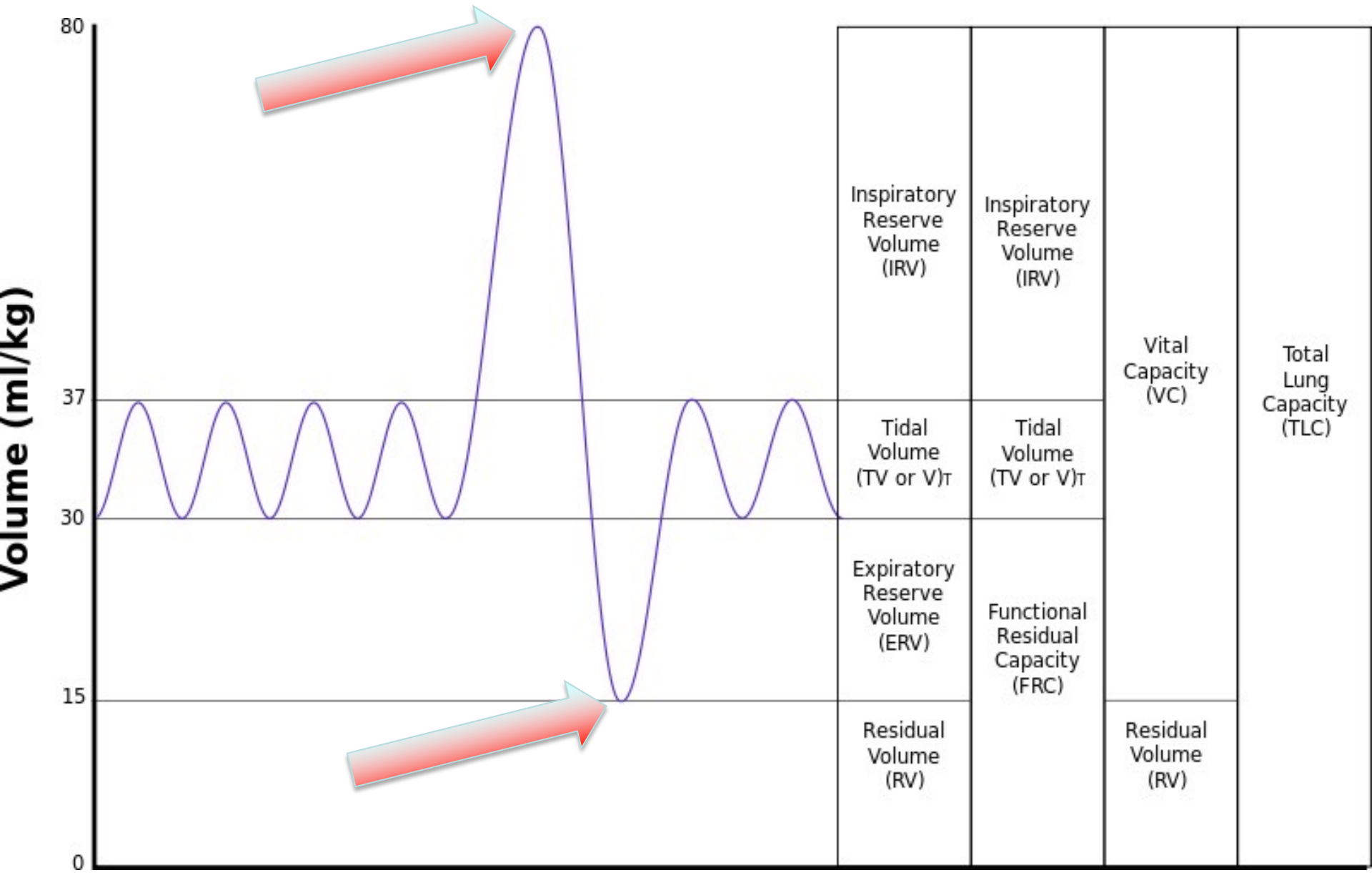
Flow-volume Characteristics of Acceptable and Unacceptable Spirometry

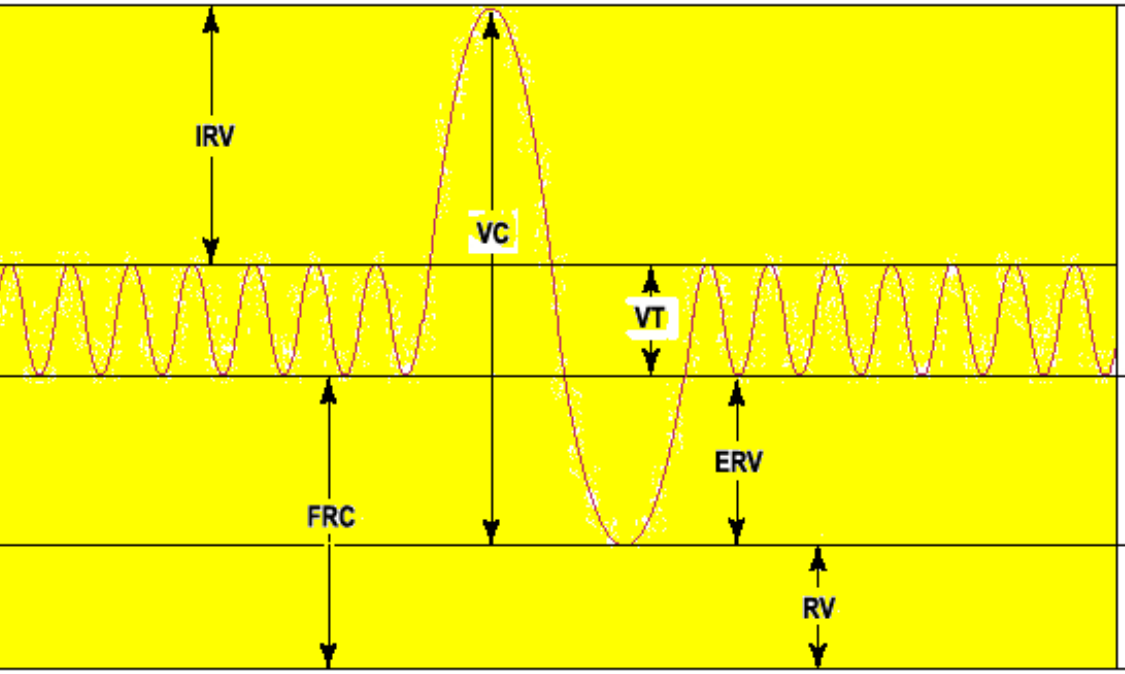


1. Instantaneous start of exhalation
2. Rapid rise in flow to peak flow
3. Sharp peak occurring early in exhalation
4. Smooth continuous fall in flow without interruptions
5. Gradual fall in low flow to IV
6. Smooth continuous inhalation to TLC
7. Reproducible shape



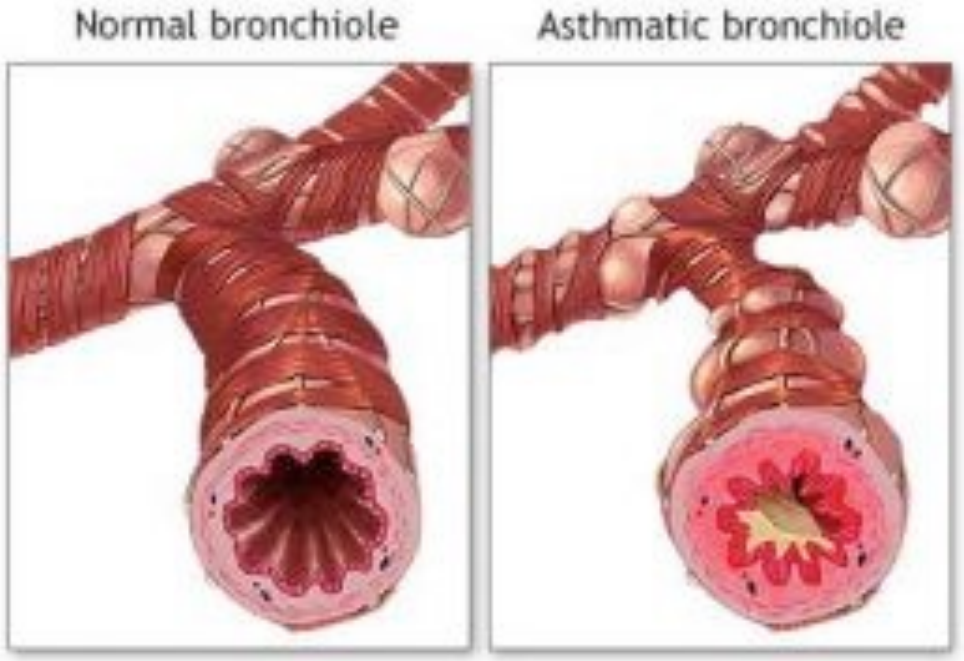
1. Slow start
2. Slow rise in flow
3. Broad late peak
4. Erratic flow (cough or vocal cord) dysfunction
5. Abrupt return to zero flow
6. Incomplete inhalation
7. Non-reproducible


Volume (ml/kg)
80
37
30
15
0
Inspiratory Reserve Volume (IRV)
Tidal Volume (TV or V)T
Expiratory Reserve Volume (ERV)
Residual Volume (RV)
Inspiratory Reserve Volume (IRV)
Tidal Volume (TV or V)T
Functional Residual Capacity (FRC)
Vital Capacity (VC)
Residual Volume (RV)
Total Lung Capacity (TLC)

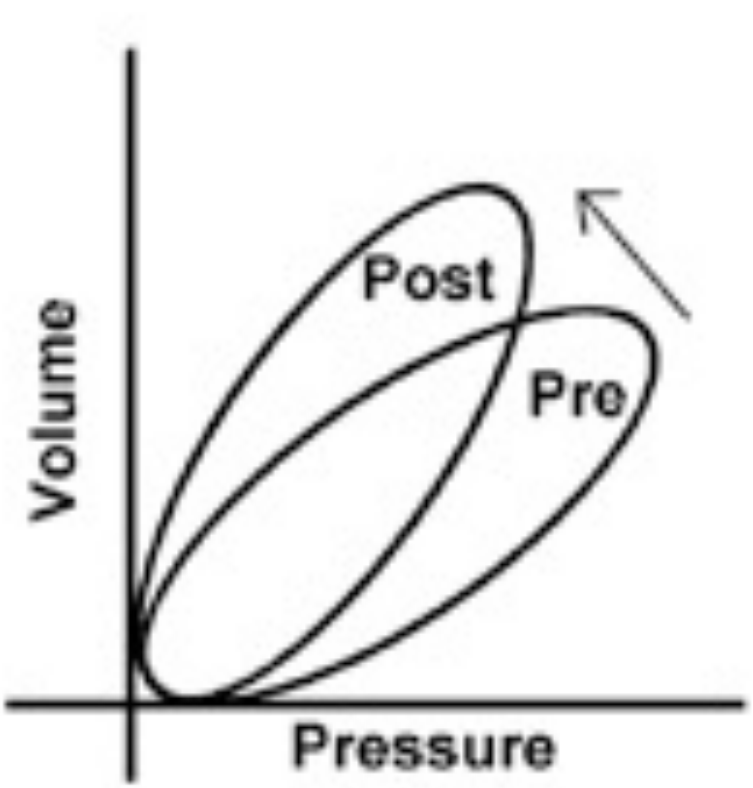


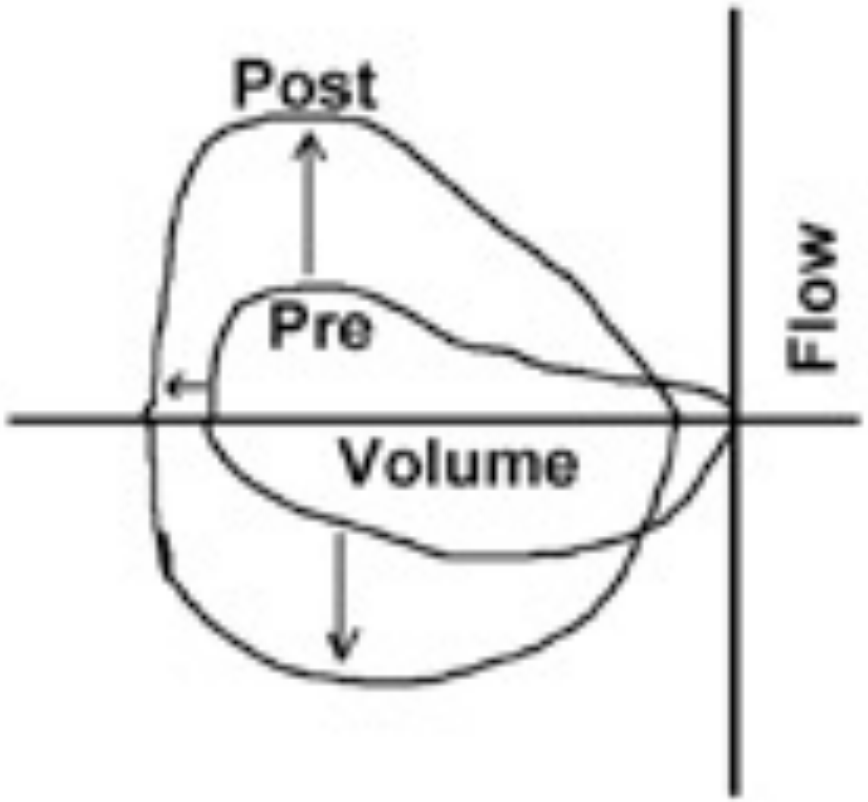
Inspiratory Capacity (IC)	Vital Capacity (VC)	Inspiratory Reserve Volume (IRV)	Total Lung Capacity (TLC)
		Tidal Volume (TV)	
Expiratory Reserve Volume (ERV)		Functional Residual Capacity (FRC)	
Residual Volume (RV)	Residual Volume (RV)		

Pre & Post Bronchodilator



Pre & Post Bronchodilator





Tech: GILMORE, TIM
Doctor:

Height: 65.00
Weight: 99.00

Age: 55
Sex: Female

Room:
Race: Black

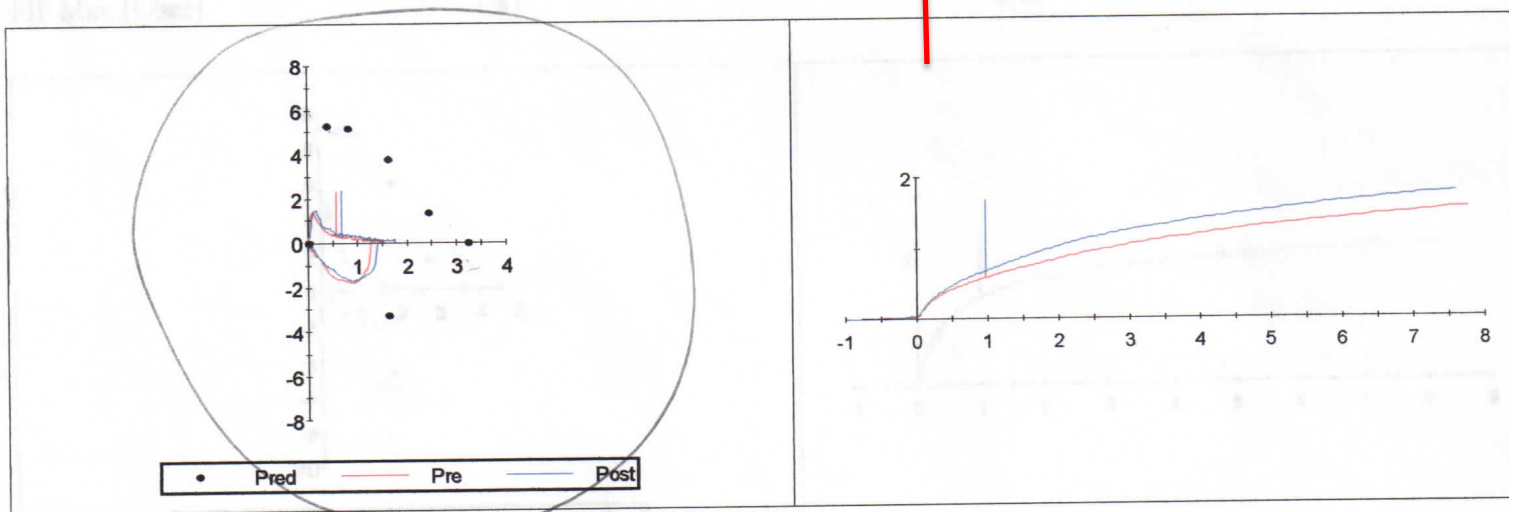
Diagnosis:
Dyspnea: After any exertion
Tbco Prod: Cigarette

Cough: Productive
Yrs Smk: 38.0

Wheeze:
Pks/Day: 1.0
Yrs Quit:

Medications:
Pre Test Comments:
Post Test Comments: PT. WITH GOOD EFFORT. SHE STATED 2P ALBUTEROL TAKEN WITH SPACER THIS A.M. (8:00). T. GILMORE, RRT, AE-C.

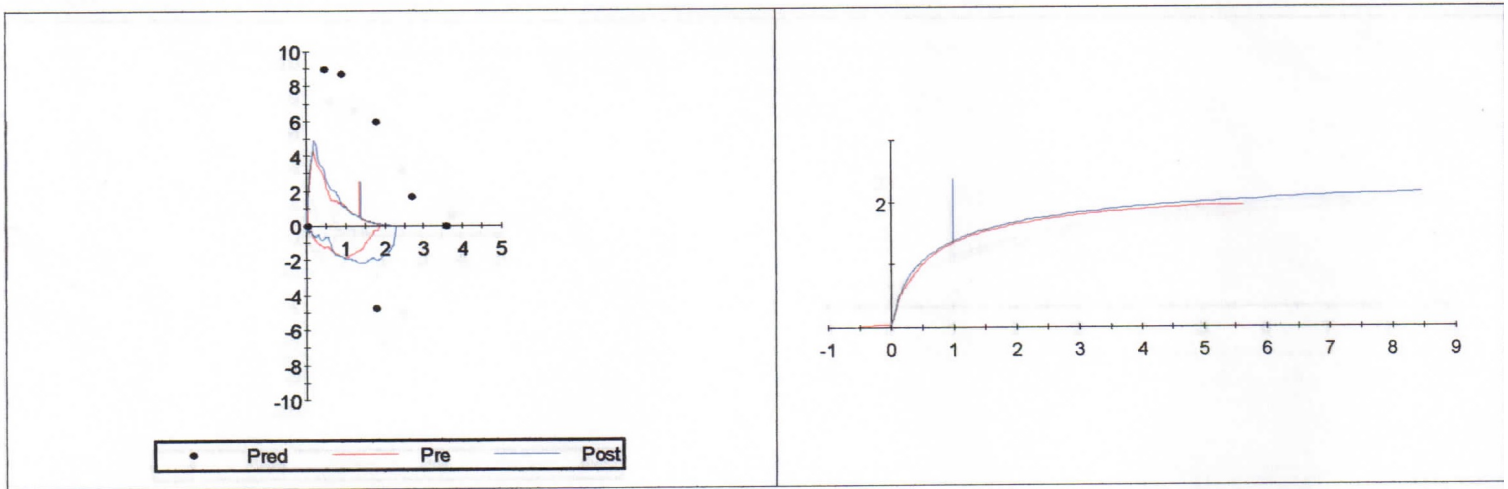
	Pre-Ex			Post-Ex		
	Actual	**Pred**	**%Pred**	**Actual**	**%Pred**	**%Chng**
---- SPIROMETRY ----						
FVC (L)	1.54	3.21	48	1.78	55	15
FEV1 (L)	0.59	2.62	23	0.69	26	16
FEV1/FVC (%)	39	82	47	39	47	1
FEF 25% (L/sec)	0.50	5.21	10	0.65	13	31
FEF 75% (L/sec)	0.12	1.33	9	0.21	16	67
FEF 25-75% (L/sec)	0.23	2.85	8	0.36	13	53
FEF Max (L/sec)	1.39	5.27	26	1.46	28	5
FIVC (L)	1.28			1.41		10
FIF Max (L/sec)	1.82			1.68		-8



Tech: GILMORE, TIM | Height: 66.00 | Age: 61 | Room:
Doctor: | Weight: 342.00 | Sex: Male | Race: Black

Diagnosis:
Dyspnea: No Dyspnea | Cough: Non-Productive | Wheeze: Rare
Tbco Prod: Cigarette | Yrs Smk: 44.0 | Pks/Day: 1.0 | Yrs Quit:
Medications:
Pre Test Comments: PT. DENIES SOB AND COUGH. HE STATES ALL HIS PROBLEMS BEGAN LAST NIGHT. HE STATED HE HAS WEANED HIMSELF DOWN TO 2 CIGARETTES/DAY.
Post Test Comments: GOOD PT. EFFORT. T. GILMORE, RRT, AE-C

	Pre-Ex			Post-Ex		
	Actual	**Pred**	**%Pred**	**Actual**	**%Pred**	**%Chng**
---- SPIROMETRY ----						
FVC (L)	2.00	3.55	56	2.16	61	8
FEV1 (L)	1.36	2.85	48	1.40	49	3
FEV1/FVC (%)	68	80	85	65	81	-5
FEF 25% (L/sec)	2.43	8.72	28	2.77	32	14
FEF 75% (L/sec)	0.33	1.68	20	0.35	21	6
FEF 25-75% (L/sec)	0.85	2.97	29	0.86	29	1
FEF Max (L/sec)	4.13	9.02	46	4.62	51	12
FIVC (L)	1.87			2.30		23
FIF Max (L/sec)	1.81			2.13		17



Considerations **of Bronchodilator Responsiveness Study**

*Be aware of last medication: broncho-active medication taken?

**A bronchodilator may be effective when administered properly

***A bronchodilator may not be effective for all patients

Bronchoprovocation Testing

- The goal = induce bronchospasm
- Irritant administered via nebulization

Bronchoprovocation Testing

- Irritant is inhaled via specific dosing
- Look for ‘conversion’
- 20%

Provocholine®
(methacholine chloride powder for inhalation)

Other AW Irritants

- Mannitol
- Histamine
- Hypertonic Saline (4.5%)
- Eucapnic Voluntary Ventilation
- Exercise Challenge

Mannitol

Tech:	Height: 67.50 in	Age: 69	Room: Pulm. Clinic
Doctor:	Weight: 179.00 lbs	Sex: Male	Race: Black

Diagnosis: Dyspnea

Dyspnea:

Cough: Wheeze:

Yrs Quit Pks/Day: Yrs Sm Tbco Prod:

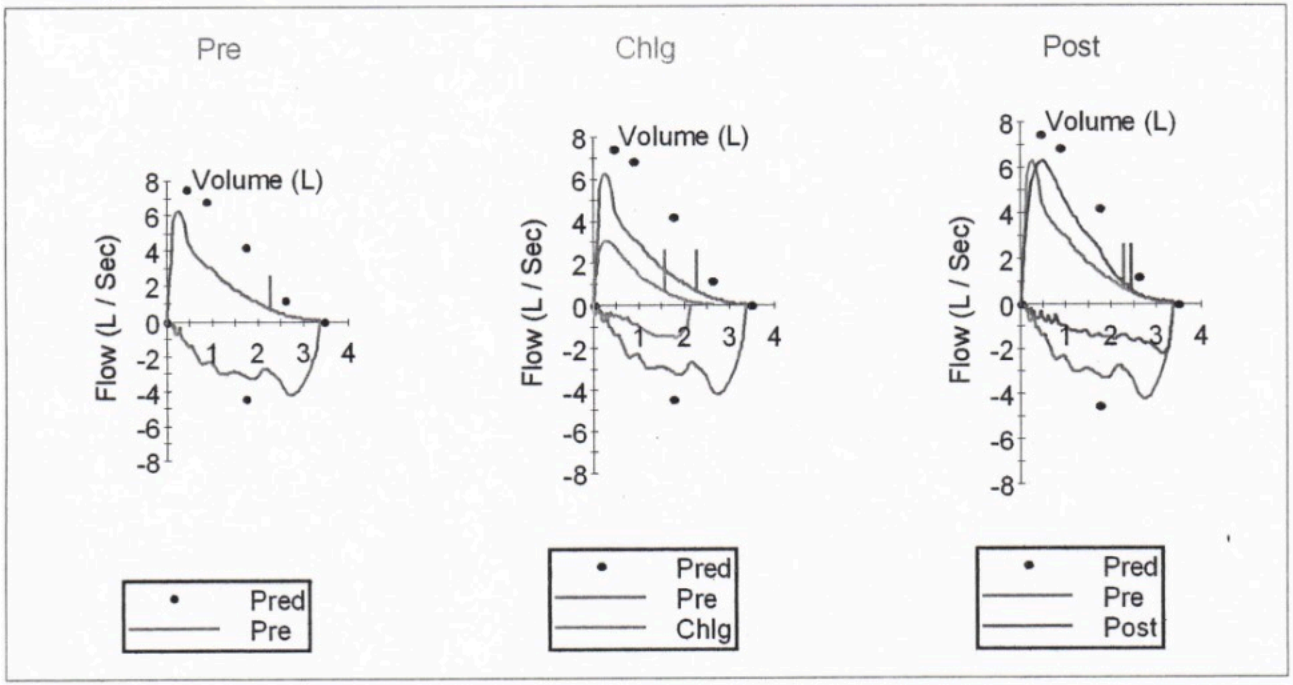
Medications:

Pre Test Comments

Post-Test Comments

Spirometry met ATS standards for acceptability, but were not reproducible for both pre/post efforts. MDI Albuterol x 4 puffs given via aerochamber. Patient tolerated well with nad noted. HR 80/80; BS Bilateral CTA p/p.

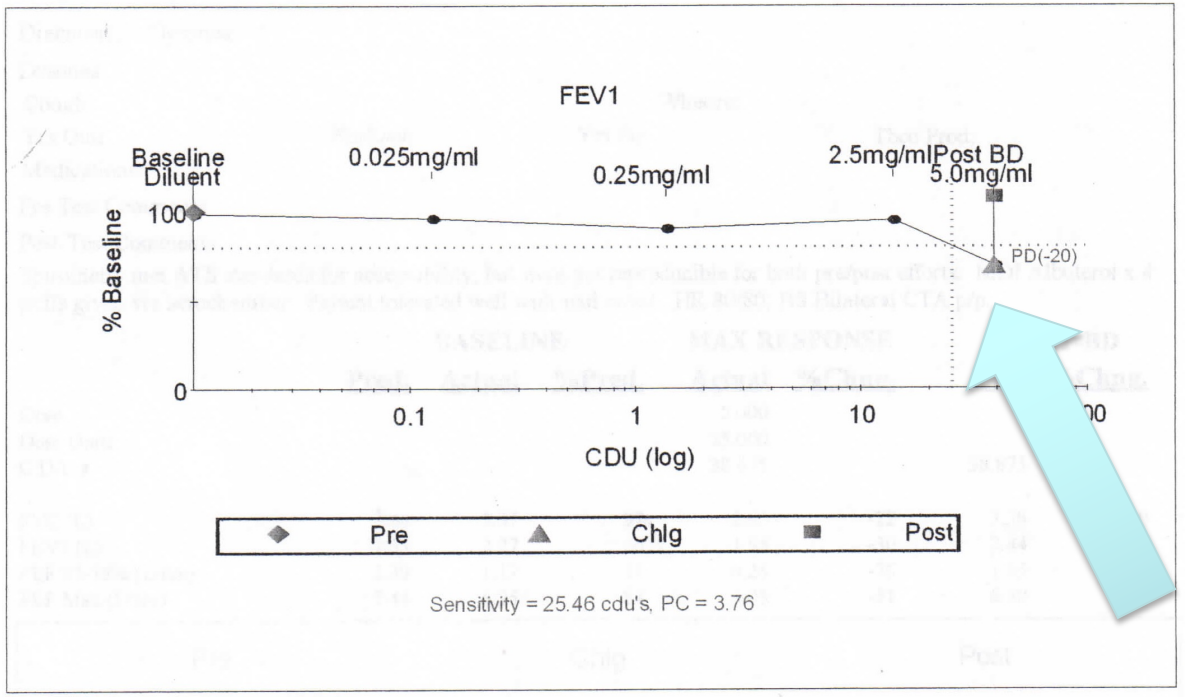
	BASELINE			MAX RESPONSE		POST-BD	
	Pred.	Actual	%Pred.	Actual	%Chng.	Post	%Chng.
Dose				5.000			
Dose Units				25.000			
C.D.U.s				38.875		38.875	
FVC (L)	3.48	3.37	97	2.63	-22	3.38	0
FEV1 (L)	2.63	2.27	86	1.58	-30	2.44	8
FEF 25-75% (L/sec)	2.30	1.17	51	0.28	-76	1.65	40
FEF Max (L/sec)	7.44	6.25	84	3.05	-51	6.30	1

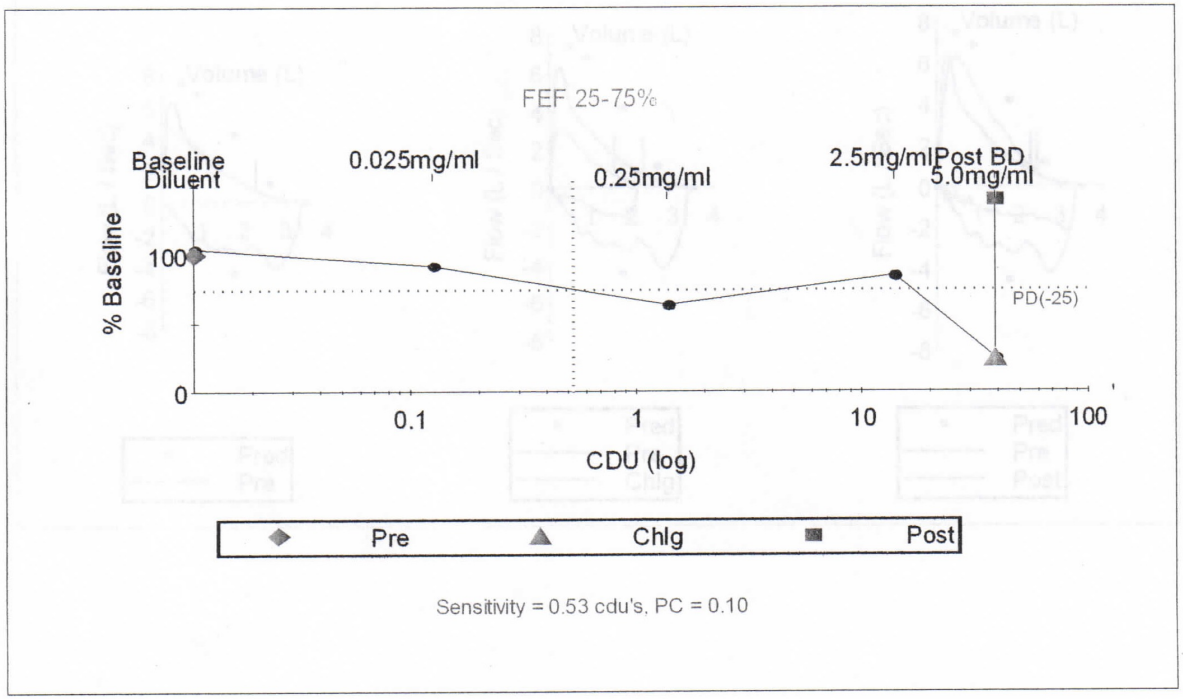


Name :	ID:	BSA:	1.94	Date:	2/5/2009
Tech:	Height: 67.50 in	Age:	69	Room:	Pulm. Clinic
Doctor:	Weight: 179.00 lbs	Sex:	Male	Race:	Black

Spirometry Tabular Report

Stage	Baseline	Diluent	0.025mg/ml	0.25mg/ml	2.5mg/ml	5.0mg/ml	Post BD
Dose	0.000	0.000	0.025	0.250	2.500	5.000	0.000
Dose Units	0.000	0.000	0.125	1.250	12.500	25.000	0.000
C.D.U.s	0.000	0.000	0.125	1.375	13.875	38.875	38.875
FVC (L)	3.37	3.16	3.12	2.90	3.10	2.63	3.38
%Change (L)	0	-6	-7	-14	-8	-22	0
FEV1 (L)	2.27	2.24	2.18	2.05	2.16	1.58	2.44
%Change (L)	0	-2	-4	-10	-5	-30	8
FEF 25-75% (L/sec)	1.17	1.23	1.08	0.75	1.00	0.28	1.65
%Change (L/sec)	0	5	-8	-36	-15	-76	40
FEF Max (L/sec)	6.25	4.59	5.34	4.37	5.20	3.05	6.30
%Change (L/sec)	0	-27	-15	-30	-17	-51	1


FEV1
Baseline
Diluent
0.025mg/ml
0.25mg/ml
2.5mg/ml
Post BD
5.0mg/ml
100
% Baseline
0
PD(-20)
0.1
1
10
CDU (log)
Pre
Chlg
Post
Sensitivity = 25.46 cdu's, PC = 3.76


FEF 25-75%
Baseline
Diluent
0.025mg/ml
0.25mg/ml
2.5mg/ml
Post BD
5.0mg/ml
100
% Baseline
0
PD(-25)
0.1
1
10
100
CDU (log)
Pre
Chlg
Post
Sensitivity = 0.53 cdu's, PC = 0.10

Quick Review

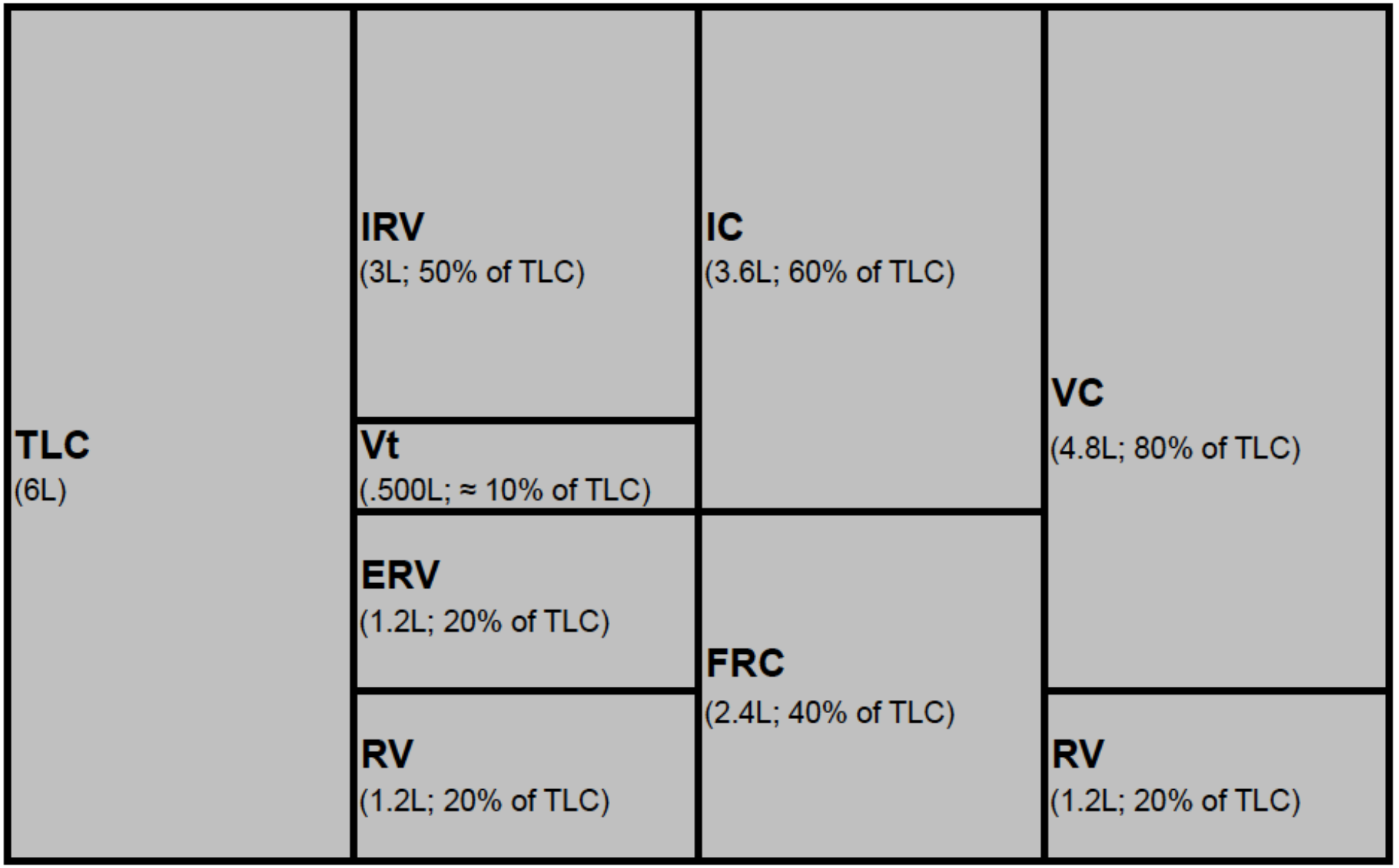
- Simple Spirometry
  - FEV_1
  - FVC
  - FEV1/FVC
- Bronchodilator Responsiveness Testing
  - $\geq$ 10% Δ FEV_1
- Bronchoprovocation Testing
  - PC 20

Complete PFT

The ‘Full PFT’

- Indicated to measure volumes/capacities
  - Includes diffusion studies

- SVC
- RV
- TLC
- DLCO

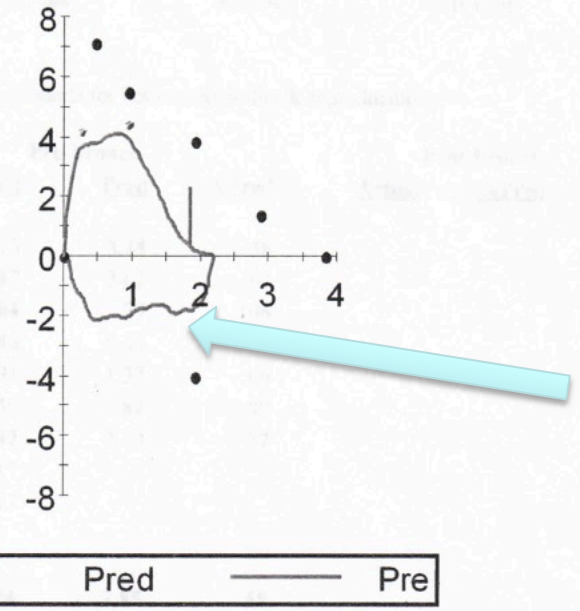

TLC
(6L)
IRV
(3L; 50% of TLC)
Vt
(.500L; ≈ 10% of TLC)
ERV
(1.2L; 20% of TLC)
RV
(1.2L; 20% of TLC)
IC
(3.6L; 60% of TLC)
FRC
(2.4L; 40% of TLC)
VC
(4.8L; 80% of TLC)
RV
(1.2L; 20% of TLC)

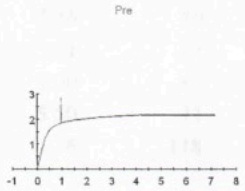
Tech:		Height:	67.00	Age:	53	Room:	Pulm. Clinic
Doctor:		Weight:	231.80	Sex:	Female	Race:	Caucasian

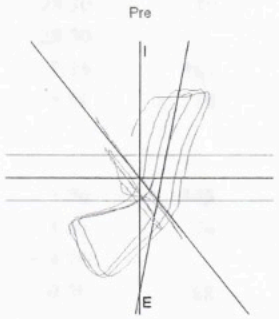
Diagnosis: Dyspnea
Dyspnea: Cough: Wheeze:
Tbco Prod: Yrs Smk: Pks/Day: Yrs Quit:
Medications:
Pre Test Comments:
Post Test Comments: All tests met ATS standards for both acceptability & reproducibility.

	Pre-Bronch			Post-Bronch		
	Actual	Pred	%Pred	Actual	%Pred	%Chng
---- SPIROMETRY ----						
FVC (L)	2.23	3.85	58			
FEV1 (L)	1.87	3.03	62			
FEV1/FVC (%)	84	79	106			
FEF 25% (L/sec)	3.86	5.46	71			
FEF 75% (L/sec)	0.91	1.37	66			
FEF 25-75% (L/sec)	2.50	2.82	89			
FEF Max (L/sec)	5.47	7.10	77			
FIVC (L)	2.11					
FIF Max (L/sec)	2.17					
---- LUNG VOLUMES ----						
SVC (L)	2.24	3.85	58			
IC (L)	1.80	2.39	75			
ERV (L)	0.44	1.46	30			
TGV (L)	2.09	3.11	67			
RV (Pleth) (L)	1.65	2.00	83			
TLC (Pleth) (L)	3.89	5.50	71			
RV/TLC (Pleth) (%)	42	36	118			
Trapped Gas (L)						
---- DIFFUSION ----						
DLCOunc (ml/min/mmHg)	16.67	28.30	59			
DLCOcor (ml/min/mmHg)		28.30				
DL/VA (ml/min/mmHg/L)	5.18	5.15	101			
VA (L)	3.22	5.50	58			
---- AIRWAYS RESISTANCE						
Raw (cmH2O/L/s)	2.69	1.86	145			
Gaw (L/s/cmH2O)	0.37	1.03	36			
sRaw (cmH2O*s)	5.70	< 4.76				
sGaw (1/cmH2O*s)	0.18	0.20	88			

Tech:		Height:	67.00	Age:	53	Room:	Pulm. Clinic
Doctor:		Weight:	231.80	Sex:	Female	Race:	Caucasian

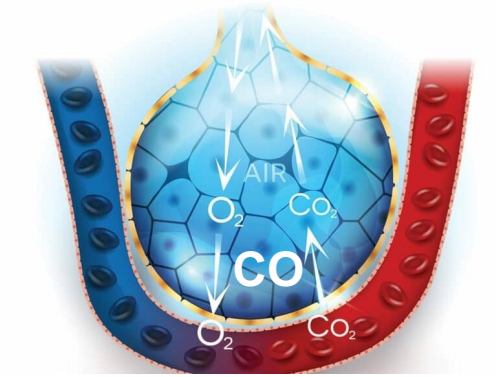






DLCO

Lung diffusion (capacity) for Carbon Monoxide (CO)



Main indications

Rule out or confirm *diffusion impairment*

Monitor disease progression

Obstruction vs. Restriction

Obstruction

- Decreased flows
- Increased RV & TLC(?)

Restriction

- Decreased volumes

Obstructive and restrictive patterns

MEASUREMENT	OBSTRUCTIVE PATTERN	RESTRICTIVE PATTERN
Forced vital capacity (FVC)	Decreased or normal	Decreased
Forced expiratory volume in 1 second (FEV_1)	Decreased	Decreased or normal
FEV_1/FVC ratio	Decreased	Normal
Total lung capacity (TLC)	Normal or increased	Decreased

Published in Cleveland Clinic journal of medicine 2003

Interpreting pulmonary function tests: recognize the pattern, and the diagnosis will follow.

F. Al-Ashkar, R. Mehra, P. Mazzone

Obstructive Flow Volume Loop

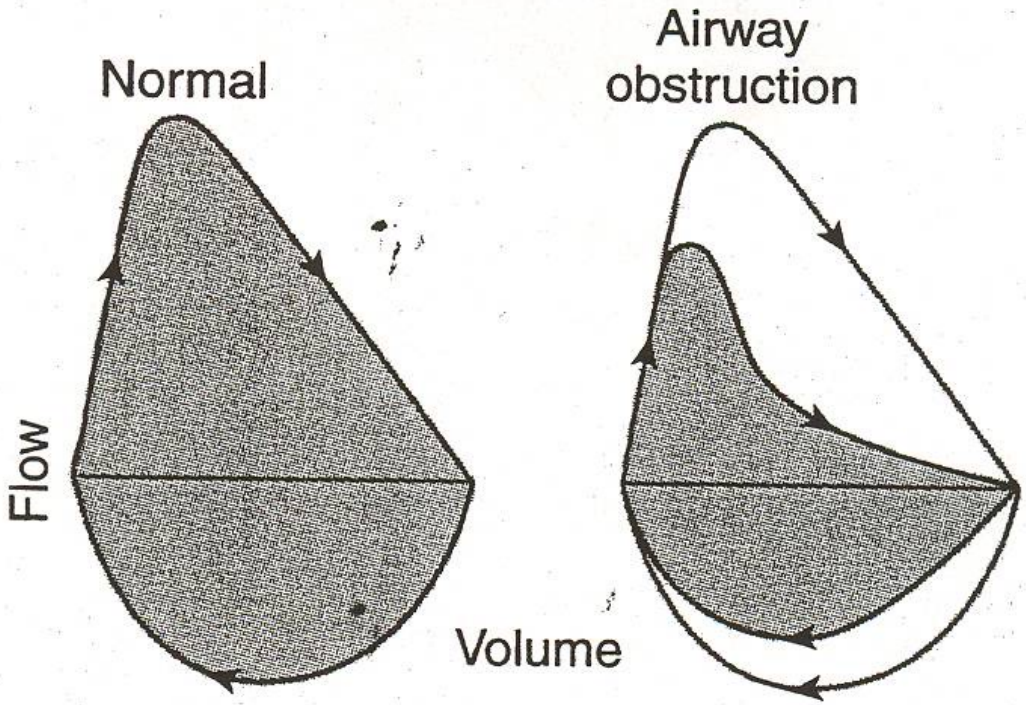


Fig. 3-9 Flow-volume loop demonstrating the shape change that results from an obstructive lung disorder. The curve on the right represents intrathoracic airway obstruction.

Restrictive Flow Volume Loop

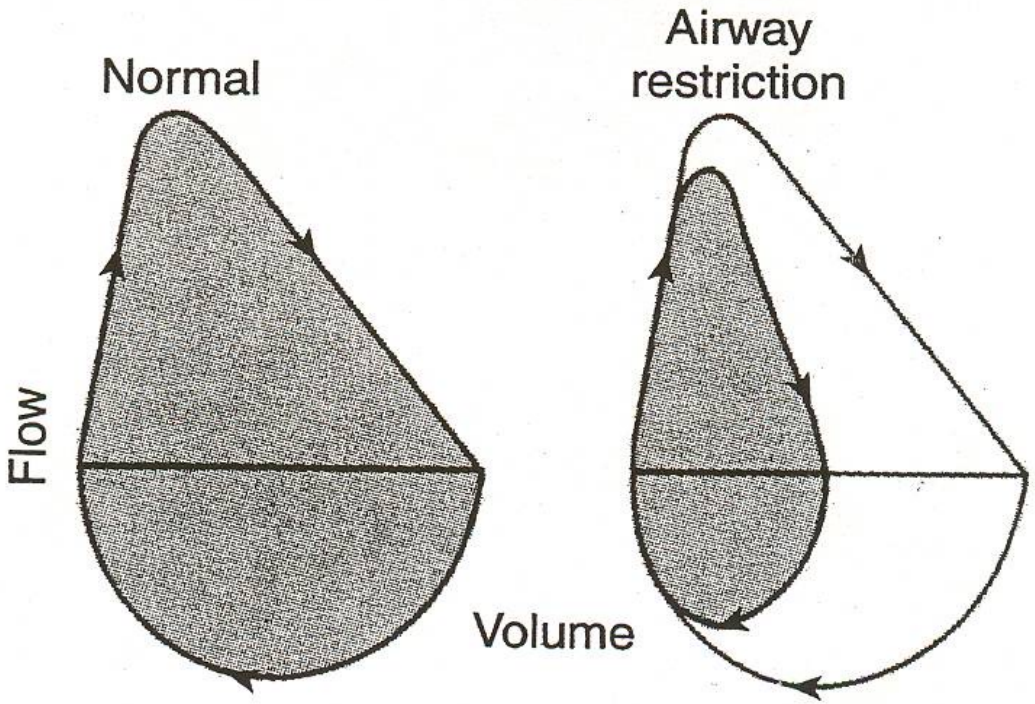


Fig. 3-10 Flow-volume loop demonstrating the shape change that results from a restrictive lung disorder. Note the symmetric loss of flow and volume.

Obstructive PFT #1

75 y/o female caucasion
Height 65 in
Weight 97 lbs

Spirometry

	pred	pre-tx best	% pred	post-tx best	% pred	% chg
FVC	2.76	1.52	55	2.01	73	32
FEV1	2.04	.66	32	.89	44	35
FEV1/FVC	81	43		44		
FEF 25 - 75	1.76	.22	13	.32	18	45
PEF	5.48	1.97	36	2.24	41	14

Interpretation

1. Spirometry indicates a severe obstructive ventilatory defect.

2. There is significant post-bronchodilator improvement

Obstructive PFT #2

73 y/o male caucasion
Height 70 in
Weight 270 lbs

Spirometry

	pred	pre-tx best	% pred	post-tx best	% pred	% chg
FVC	3.97	2.7	68	2.87	72	6
FEV1	3.07	1.32	42	1.52	50	15
FEV1/FVC	78	49		58		
FEF 25 - 75	3.12	.35	11	.46	14	29
PEF	8.16	2.92	36	3.22	41	14

Interpretation

1. Spirometry indicates a severe obstructive ventilatory defect.
2. There is significant post-bronchodilator improvement

Obstructive PFT #3

29 y/o female caucasion
Height 62 in
Weight 100 lbs

Spirometry

	pred	pre-tx best	% pred	post-tx best	% pred	% chg
FVC	3.31	1.31	40	1.39	42	6
FEV1	2.86	.64	22	.72	25	15
FEV1/FVC	87	49		52		
FEF 25 - 75	3.42	.17	5	.21	6	24
PEF	6.25	1.93	31	3.22	41	52

Interpretation

Severe obstruction with mild post bronchodilator improvement.
Reduced vital capacity may be secondary to obstruction but cannot rule out restriction as well
worse since 6/87
FVC 2.17----1.39
FEV1 1.32---.72
FEF 25-75 .61-----.21

Restrictive PFT

#4

73 y/o female caucasion
Height 60 in
Weight 146 lbs

Spirometry

	pred	pre-tx best	% pred	post-tx best	% pred	% chg
FVC	2.26	1.47	65	1.44	64	-2
FEV1	1.61	1.17	65	1.01	56	-14
FEV1/FVC	82	80		70		
FEF 25 - 75	1.88	1.09	58	.61	22	-44
PEF	4.9	3.21	66	2.51	51	-22

Lung Volumes

	pred	pre-tx avg	%pred
VC	2.25	1.47	65
TLC	3.99	1.65	41
RV	1.52	.18	11
RV/TLC	41	11	
FRC N2	2.23	.65	29

Diffusion

	pred	avg	%pred
DLCO	17.3	4.2	24

Interpretation

1. Spirometry indicates a moderate ventilatory restrictive defect. No significant improvement post bronchodilator
2. Lung volumes indicate a restrictive physiology
3. DLCO indicates a severe diffusion defect

Restrictive PFT

#5

78 y/o female caucasion
Height 68 in
Weight 166 lbs

Spirometry

	pred	pre-tx best	% pred	post-tx best	% pred	% chg
FVC	2.43	1.61	66	1.66	68	3
FEV1	1.92	1.29	67	1.48	77	15
FEV1/FVC	81	80		89		
FEF 25 - 75	1.67	2.19	139	2.99	190	27
PEF	5.15	4.16	81	4.32	84	4

Lung Volumes

	pred	pre-tx avg	%pred
VC	2.48	1.73	71
TLC	4.56	1.96	48
RV	1.92	.22	12
RV/TLC	42	12	
FRC N2	2.67	.97	34

Diffusion

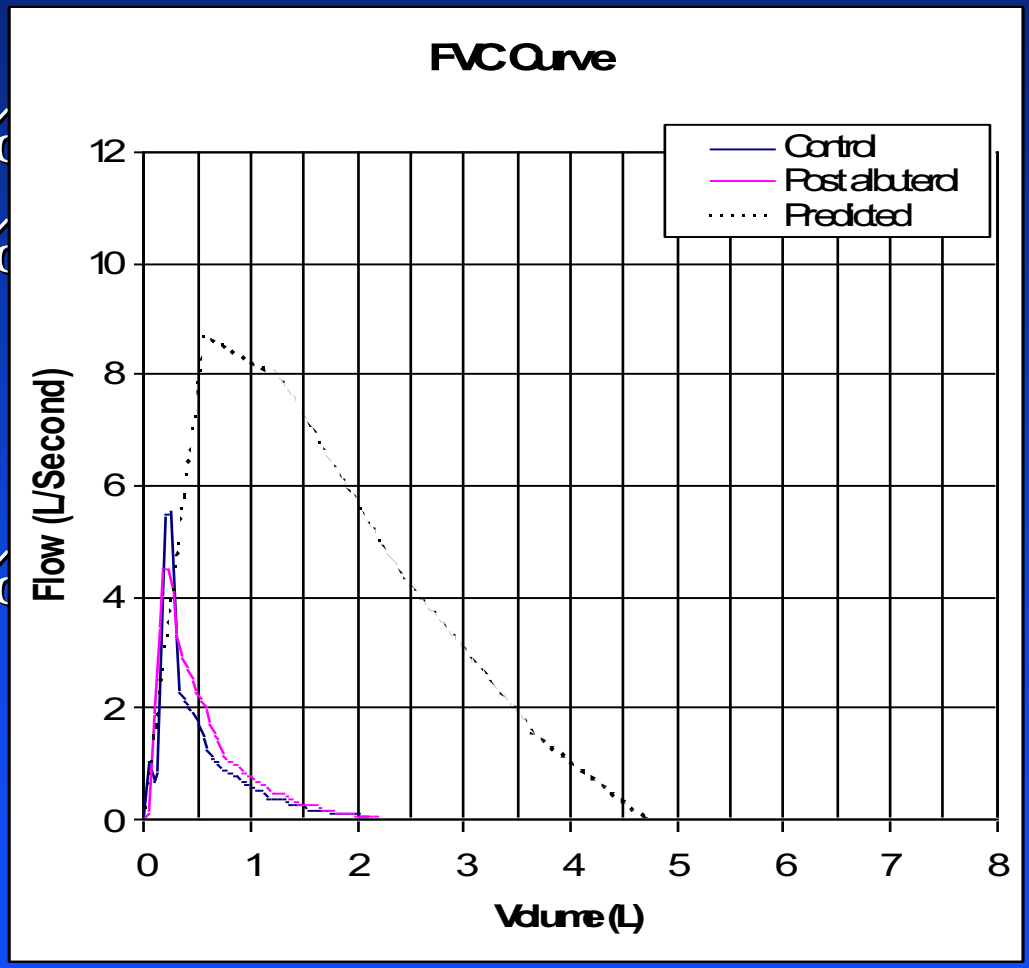
	pred	avg	%pred
DLCO	18.8	9.0	49

Interpretation

1. Spirometry indicates a restrictive process with significant improvement post bronchodilator
2. Lung volumes are reduced confirming a restrictive physiology
3. DLCO indicates a moderate reduction in diffusion capacity

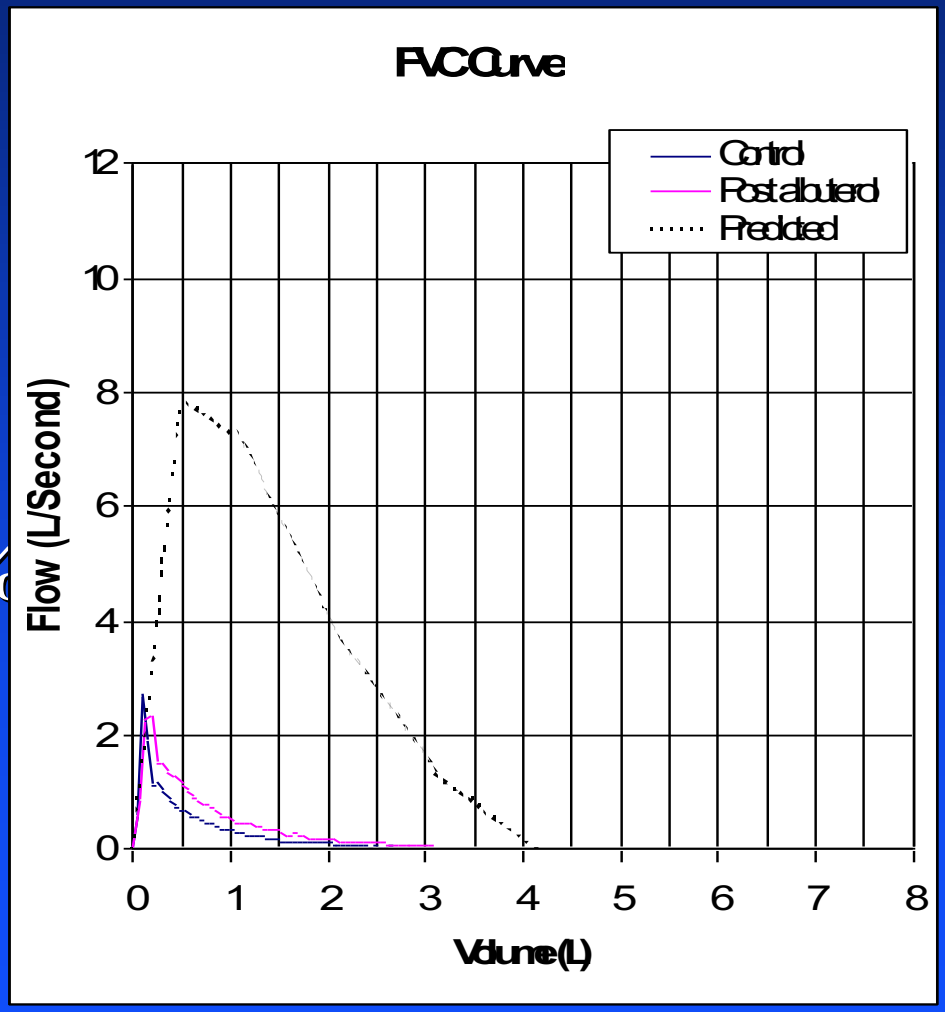
62 y.o. male

FVC	2.12	44%
FEV1	1.15	31%
Ratio	54%	
*TLC	4.67	67%



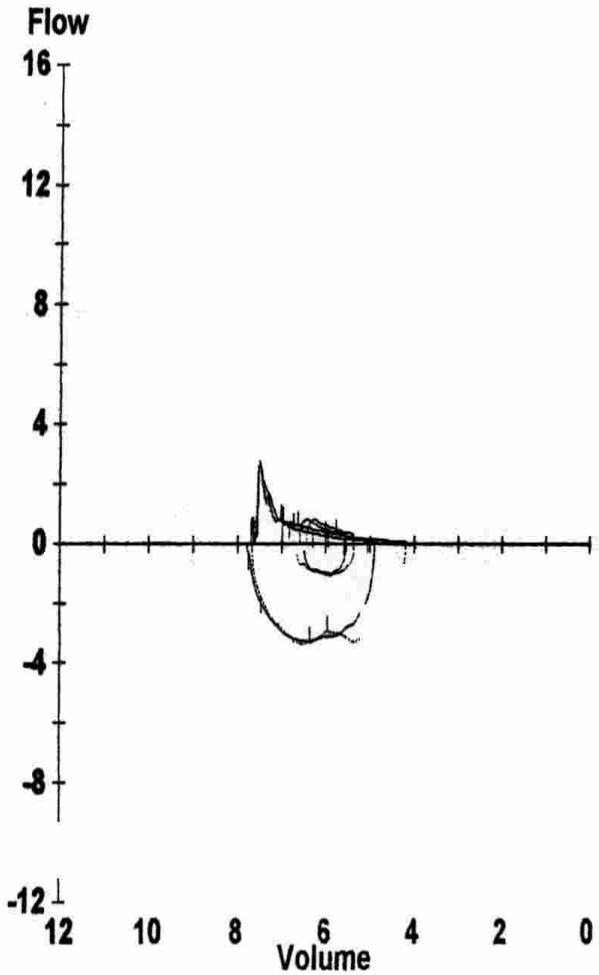
75 y.o. male

FVC	2.68	63%
FEV1	0.78	24%
Ratio	29%	
*TLC	9.37	141%



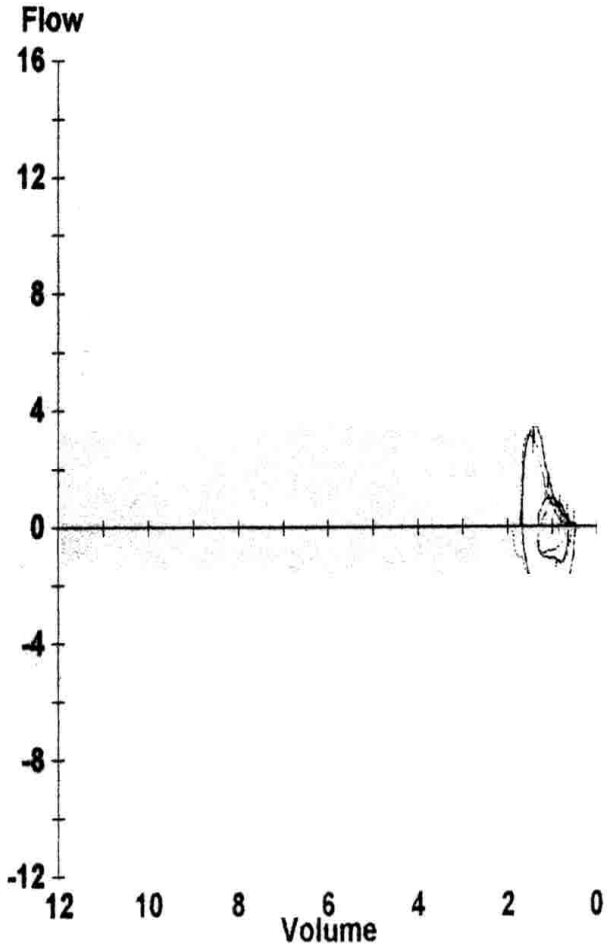
#8

		Ref	Pre	% Ref	Post	% Ref	%Chg
Spirometry							
FVC	Liters	4.09	2.81	69	3.50	86	24
FEV1	Liters	3.30	1.00	30	1.08	33	8
FEV1/FVC	%	80	35		31		
FEF25-75%	L/sec	3.39	0.40	12	0.41	12	3
PEF	L/sec	8.21	2.62	32	2.74	33	5
Lung Volumes							
TLC	Liters	6.21	7.70	124			
VC	Liters	4.09	3.27	80			
FRC PL	Liters	3.17	5.42	171			
Vtg	Liters		7.01				
ERV	Liters		0.99				
RV	Liters	2.20	4.43	201			
RV/TLC	%	37	58				
Diffusing Capacity							
DLCO	mL/min/mmHg	25.2	12.9	51			
DL Adj	mL/min/mmHg	25.2	12.9	51			
DLCO/VA	1/min/mmHg	3.82	2.72	71			
DL/VA Adj	1/min/mmHg		2.72				
Resistance							
Raw	cmH2O/L/sec	1.46	4.87	333			
Gaw	L/sec/cmH2O	0.761	0.205	27			
sGaw	1/cmH2O sec	0.216	0.029	13			



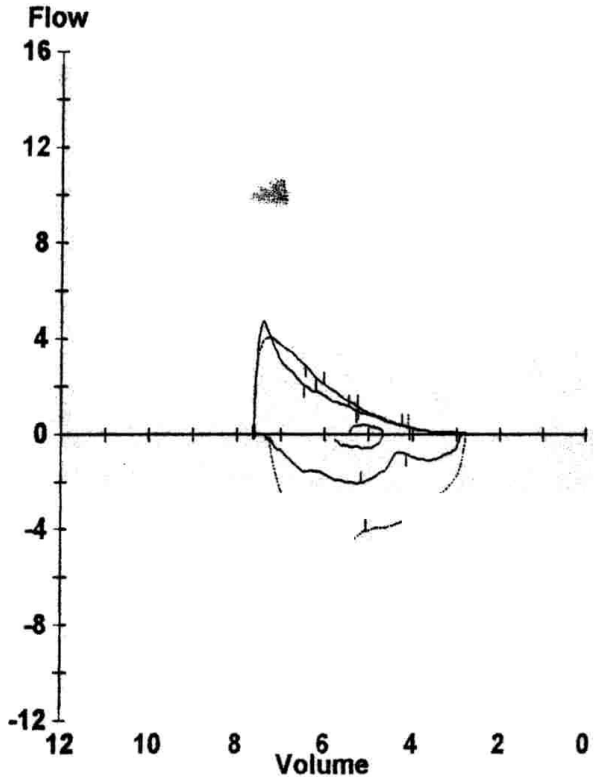
#9

		Ref	Pre	% Ref	Post	% Ref	%Chg
Spirometry							
FVC	Liters	2.98	1.25	42	1.15	39	-7
FEV1	Liters	2.39	1.09	46	0.95	40	-13
FEV1/FVC	%	82	88		82		
FEF25-75%	L/sec	2.54	1.44	57	1.05	41	-27
PEF	L/sec	5.65	3.41	60	3.17	56	-7
Lung Volumes							
TLC	Liters	4.87	1.71	35			
VC	Liters	2.98	1.29	43			
FRC PL	Liters	2.27	0.60	26			
Vtg	Liters		1.98				
ERV	Liters		0.16				
RV	Liters	1.87	0.42	22			
RV/TLC	%	38	25				
Diffusing Capacity							
DLCO	mL/min/mmHg	24.3	11.3	47			
DL Adj	mL/min/mmHg	24.3	11.3	47			
DLCO/VA	1/min/mmHg	3.67	5.78	157			
DL/VA Adj	1/min/mmHg		5.78				
Resistance							
Raw	cmH2O/L/sec	1.73	4.52	262			
Gaw	L/sec/cmH2O	0.544	0.221	41			

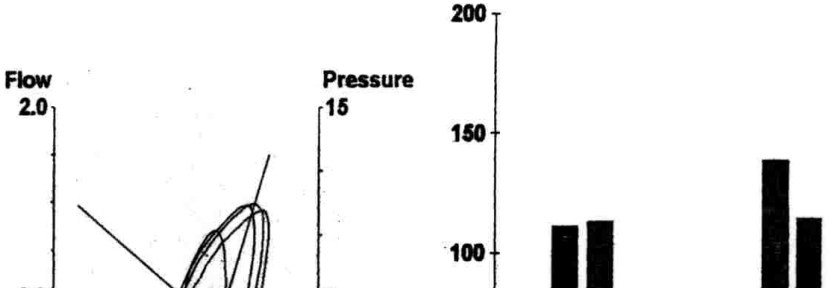


#10

		Ref	Pre	% Ref	Post	% Ref	%Chg
Spirometry							
FVC	Liters	4.29	4.76	111	4.85	113	2
FEV1	Liters	3.46	2.19	63	2.42	70	10
FEV1/FVC	%	80	46		50		
FEF25-75%	L/sec	3.55	0.83	24	0.90	25	7
PEF	L/sec	8.48	5.12	60	4.48	53	-13
Lung Volumes							
TLC	Liters	6.47	7.65	118			
VC	Liters	4.29	4.76	111			
FRC PL	Liters	3.84	4.61	120			
Vtg	Liters		6.00				
ERV	Liters		1.66				
RV	Liters	2.25	2.89	128			
RV/TLC	%	36	38				
Diffusing Capacity							
DLCO	mL/min/mmHg	21.4	24.5	114			
DL Adj	mL/min/mmHg	21.4	24.5	114			
DLCO/VA	1/min/mmHg	3.80	3.51	93			
DL/VA Adj	1/min/mmHg		3.51				
Resistance							
Raw	cmH2O/L/sec	1.15	2.46	215			
Gaw	L/sec/cmH2O	0.922	0.406	44			
sGaw	1/cmH2O sec	0.227	0.068	30			

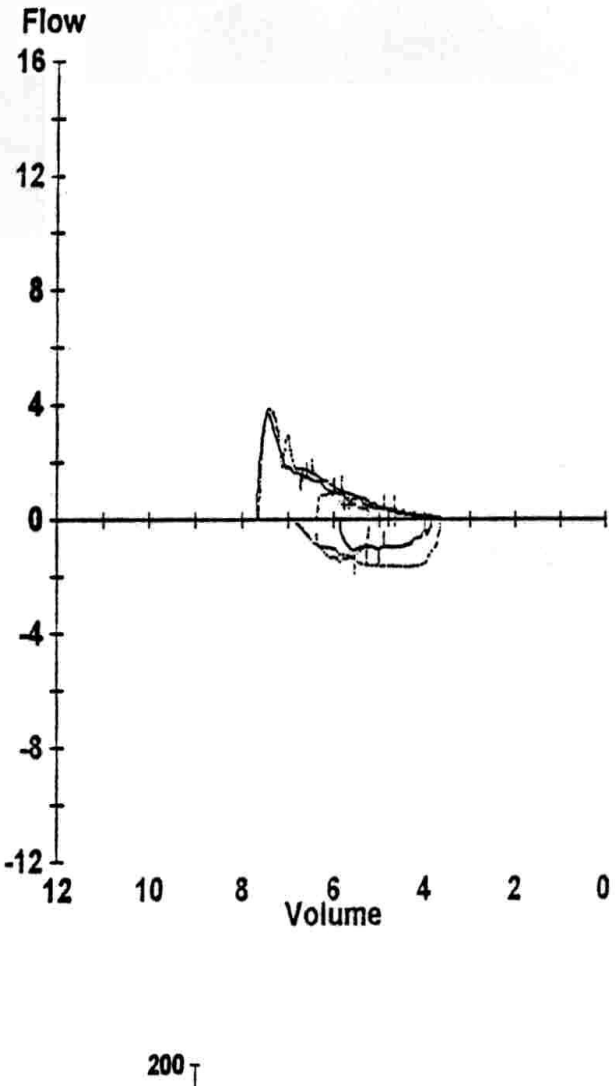


		Ref	1
Blood Gas			
FIO2	%		21.00
pH		7.35 - 7.45	7.44
PCO2	mmHg	35 - 45	40.0
PO2	mmHg		78.0
HCO3	meq/L	22 - 28	27.0



#11

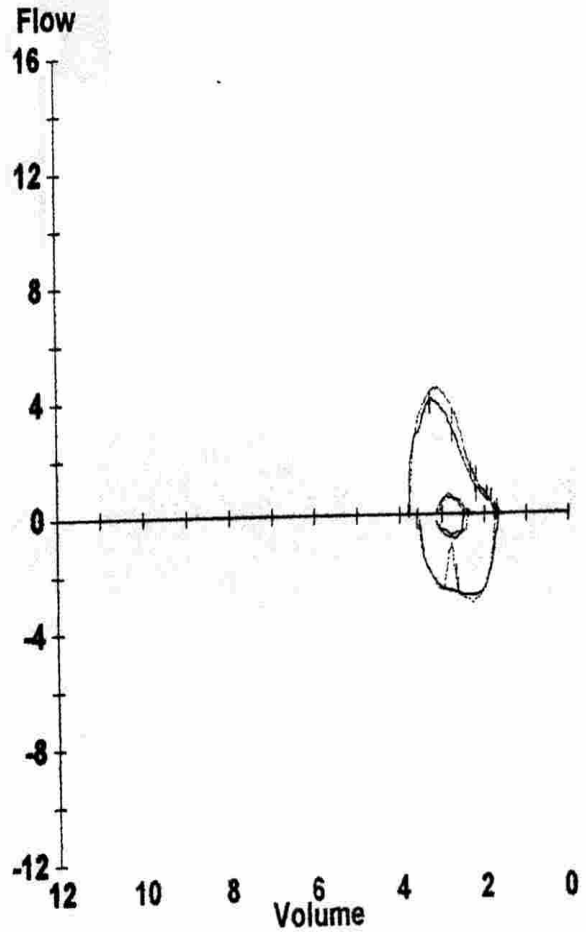
		Ref	Pre	% Ref	Post	% Ref	%Chg
Spirometry							
* FVC	Liters	4.41	3.84	87	4.04	91	5
* FEV1	Liters	3.50	1.70	49	1.87	53	10
* FEV1/FVC	%	79	44		46		
* FEF25-75%	L/sec	3.47	0.77	22	0.84	24	10
PEF	L/sec	8.61	3.69	43	3.93	46	7
Lung Volumes							
* TLC	Liters	6.79	7.68	113			
VC	Liters	4.41	3.84	87			
FRC PL	Liters	4.02	4.90	122			
Vtg	Liters		6.71				
ERV	Liters		0.71				
* RV	Liters	2.56	3.84	150			
* RV/TLC	%	40	50				
Diffusing Capacity							
DLCO	mL/min/mmHg	21.1	13.8	65			
DL Adj	mL/min/mmHg	21.1	13.8	65			
DLCO/VA	1/min/mmHg	3.69	2.50	68			
DL/VA Adj	1/min/mmHg		2.50				
Resistance							
Raw	cmH2O/L/sec	1.08	6.27	578			
Gaw	L/sec/cmH2O	0.965	0.159	17			
sGaw	1/cmH2O sec	0.229	0.024	10			



200

#12

		Ref	Pre	% Ref	Post	% Ref	%Chg
Spirometry							
FVC	Liters	3.23	2.15	66	2.12	66	-1
FEV1	Liters	2.68	1.90	71	1.99	74	5
FEV1/FVC	%	84	88		94		
FEF25-75%	L/sec	3.00	2.38	79	3.01	100	27
PEF	L/sec	6.03	4.12	68	4.43	74	8
Lung Volumes							
TLC	Liters	4.99	3.80	76			
VC	Liters	3.23	2.22	69			
FRC PL	Liters	2.78	2.48	89			
Vtg	Liters		3.19				
ERV	Liters		0.73				
RV	Liters	1.74	1.58	91			
RV/TLC	%	34	42				
Diffusing Capacity							
DLCO	mL/min/mmHg	21.4	15.8	74			
DL Adj	mL/min/mmHg	21.4	15.8	74			
DLCO/VA	1/min/mmHg	4.03	4.87	121			
DL/VA Adj	1/min/mmHg		4.87				
Resistance							
Raw	cmH2O/L/sec	1.37	1.13	82			
Gaw	L/sec/cmH2O	0.668	0.886	133			
sGaw	1/cmH2O sec	0.262	0.278	106			



Cardio-Pulmonary Investigation

Name:

Admit:

ID: *********

Room: OP

Date Tested: **18-May-15**

Age: 67 Race: W Height: 59 in Weight: 203 lb Sex: F

Smoker: S

Consulting Physician:

Referring Physician:

Clinical Technician:

Temp: 20ºC

Pack Years: 98.00

Pressure: 766mmHg

BTPS: 1.045

Diagnosis: 1. 496 COPD

2.

3.

Spirometry

Parameter	Units	Predicted Value	Observed Pre	Observed % Pred	Observed Post	Observed % Pred	Percent Change
FVC	L	2.34	1.58	68	1.57	67	-1
FEV.5	L	1.51	0.94	62	0.94	62	0
FEV_1	L	1.88	1.17	62	1.23	65	5
FEV_1 / FVC	%	79	74	94	78	99	5
FEF_{25-75}	L/s	1.96	0.85	43	1.15	59	35
PEFR	L/s	4.94	2.81	57	2.35	48	-16
FET	sec	----	6.90	----	6.73	----	-2
FIVC	L	2.34	1.38	59	1.44	62	4
PIFR	L/s	3.29	1.83	56	1.96	60	7
MVV	L/m	77.4	35.5	46	----	----	--

Lung Volumes

Parameter	Units	Predicted Value	Observed Pre	Observed % Pred	Observed Post	Observed % Pred	Percent Change
VC	L	2.34	1.59	68	----	----	--
IC	L	1.79	1.22	68	----	----	--
ERV	L	0.55	0.37	67	----	----	--
FRC	L	2.43	2.80	115	----	----	--
RV	L	1.88	2.43	129	----	----	--
TLC	L	4.22	4.02	95	----	----	--
RV/TLC	%	42	60	143	----	----	--

Diffusion

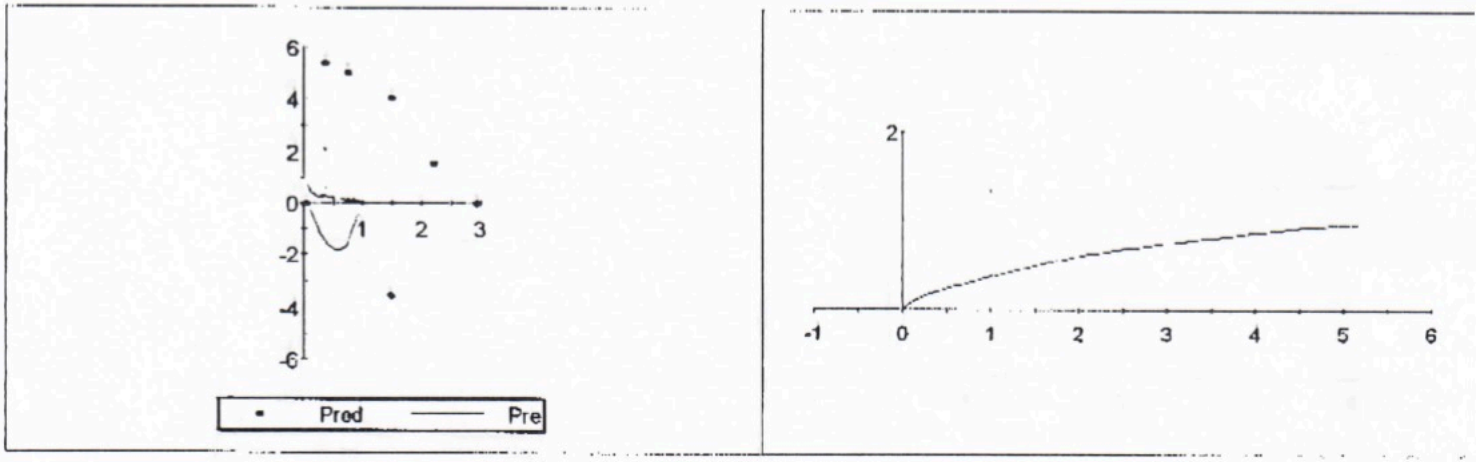
Parameter	Units	Predicted Value	Observed Pre	Observed % Pred	Observed Post	Observed % Pred	Percent Change
DLCO	mL/min/mmHg	18.54	10.33	56	----	----	--
DLCO [Hb]	mL/min/mmHg	18.54	10.33	56	----	----	--
Hb	g/dl	13.4	----	----	----	----	--
VA [BTPS]	L	4.22	3.16	75	----	----	--
DLCO/VA	mL/min/mmHg/L	4.40	3.27	74	----	----	--

What's the interpretation?

Name: [redacted]	ID: [redacted]	Visit date/time: 11/20/20[illegible]	
Tech:	Height: 61.00	Age: 45	Room: Pulm. Cl.
Doctor:	Weight: 124.00	Sex: Female	Race: Caucasian

Diagnosis: COPD
Dyspnea: Cough: Wheeze:
Tbco Prod: Yrs Smk: Pks/Day: Yrs Quit:
Medications:
Pre Test Comments: Patient stated that she just used her own albuterol inhaler.
Post Test Comments: Good effort.

	Pre-Ex			Post-Ex		
	Actual	Pred	%Pred	Actual	%Pred	%Chng
---- SPIROMETRY ----						
FVC (L)	0.96	2.92	33			
FEV1 (L)	0.38	2.47	15			
FEV1/FVC (%)	40	85	47			
FEF 25% (L/sec)	0.28	5.02	6			
FEF 75% (L/sec)	0.12	1.56	8			
FEF 25-75% (L/sec)	0.20	2.85	7			
FEF Max (L/sec)	1.08	5.40	20			
FIVC (L)	0.88					
FIF Max (L/sec)	1.84					



Name: [redacted]
Tech:
Doctor:

ID: [redacted]
Height: 57.50
Weight: 143.00

Visit date/time: 03/14/20[illegible]
Age: 54
Sex: Female

Room: Pulm. Clinic
Race: Caucasian

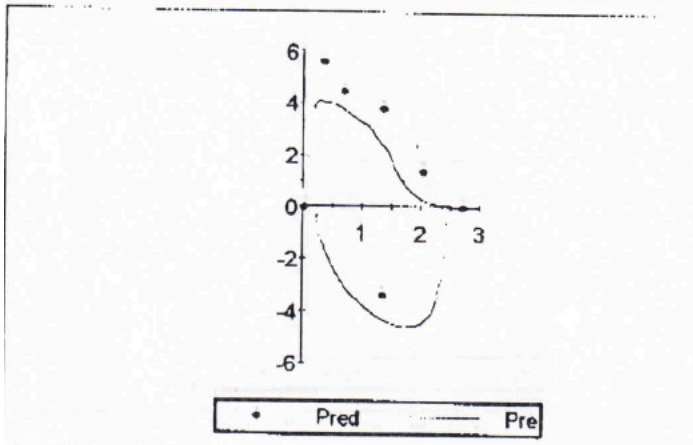
Diagnosis: Chronic Airway Obstruction

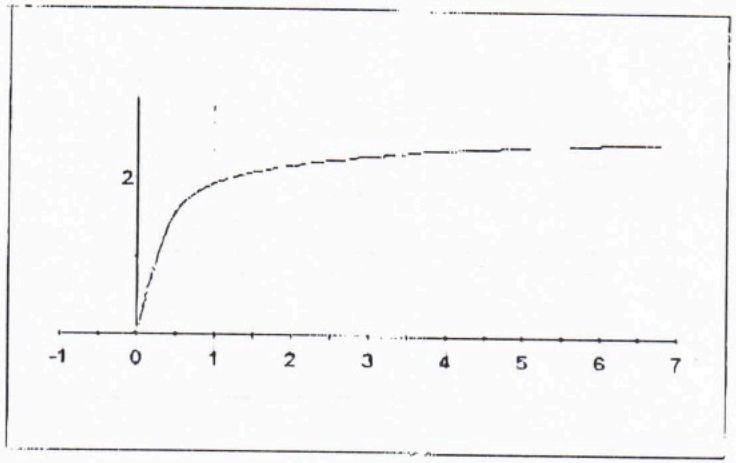
Dyspnea:
Cough:
Wheeze:
Tbco Prod:
Yrs Smk:
Pks/Day:
Yrs Quit:
Medications:

Pre Test Comments:

Post Test Comments: Spirometry meets ATS standards for both acceptability & reproducibility.

	Pre-Ex			Post-Ex		
	Actual	**Pred**	**%Pred**	**Actual**	**%Pred**	**%Chng**
---- SPIROMETRY ----						
FVC (L)	2.50	2.70	93			
FEV1 (L)	1.94	2.12	92			
FEV1/FVC (%)	78	79	98			
FEF 25% (L/sec)	3.86	4.44	87			
FEF 75% (L/sec)	0.54	1.35	40			
FEF 25-75% (L/sec)	1.79	2.24	80			
FEF Max (L/sec)	4.04	5.63	72			
FIVC (L)	2.25					
FIF Max (L/sec)	4.61					



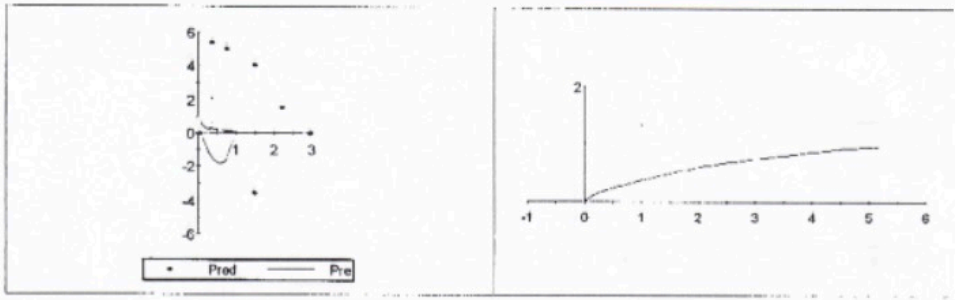


Post LUNG TRANSPLANT

Name: [redacted] ID: [redacted] Visit date/time: 11/20/2003
Tech: Height: 61.00 Age: 45 Room: Pulm. CL
Doctor: Weight: 124.00 Sex: Female Race: Caucasian

Diagnosis: COPD
Dyspnea: Cough: Wheeze:
Tbco Prod: Yrs Smk: Pks/Day: Yrs Quit:
Medications:
Pre Test Comments: Patient stated that she just used her own albuterol inhaler.
Post Test Comments: Good effort.

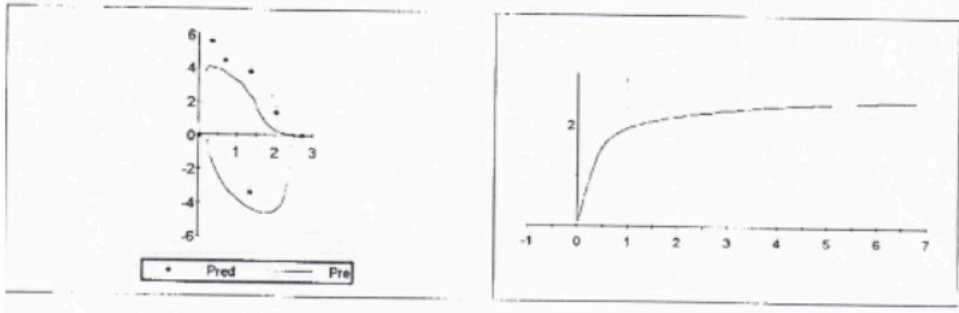
	Pre-Ex			Post-Ex		
	Actual	Pred	%Pred	Actual	%Pred	%Chng
---- SPIROMETRY ----						
FVC (L)	0.96	2.92	33			
FEV1 (L)	0.38	2.47	15			
FEV1/FVC (%)	40	85	47			
FEF 25% (L/sec)	0.28	5.02	6			
FEF 75% (L/sec)	0.12	1.56	8			
FEF 25-75% (L/sec)	0.20	2.85	7			
FEF Max (L/sec)	1.08	5.40	20			
FIVC (L)	0.88					
FIF Max (L/sec)	1.84					



Name: [redacted] ID: [redacted] Visit date/time: 03/14/2013
Tech: Height: 57.50 Age: 54 Room: Pulm. Clinic
Doctor: Weight: 143.00 Sex: Female Race: Caucasian

Diagnosis: Chronic Airway Obstruction
Dyspnea: Cough: Wheeze:
Tbco Prod: Yrs Smk: Pks/Day: Yrs Quit:
Medications:
Pre Test Comments:
Post Test Comments: Spirometry meets ATS standards for both acceptability & reproducibility.

	Pre-Ex			Post-Ex		
	Actual	Pred	%Pred	Actual	%Pred	%Chng
---- SPIROMETRY ----						
FVC (L)	2.50	2.70	93			
FEV1 (L)	1.94	2.12	92			
FEV1/FVC (%)	78	79	98			
FEF 25% (L/sec)	3.86	4.44	87			
FEF 75% (L/sec)	0.54	1.35	40			
FEF 25-75% (L/sec)	1.79	2.24	80			
FEF Max (L/sec)	4.04	5.63	72			
FIVC (L)	2.25					
FIF Max (L/sec)	4.61					



goldcopd.org/gold-spirometry-guide/

GLOBAL INITIATIVE FOR CHRONIC OBSTRUCTIVE LUNG DISEASE

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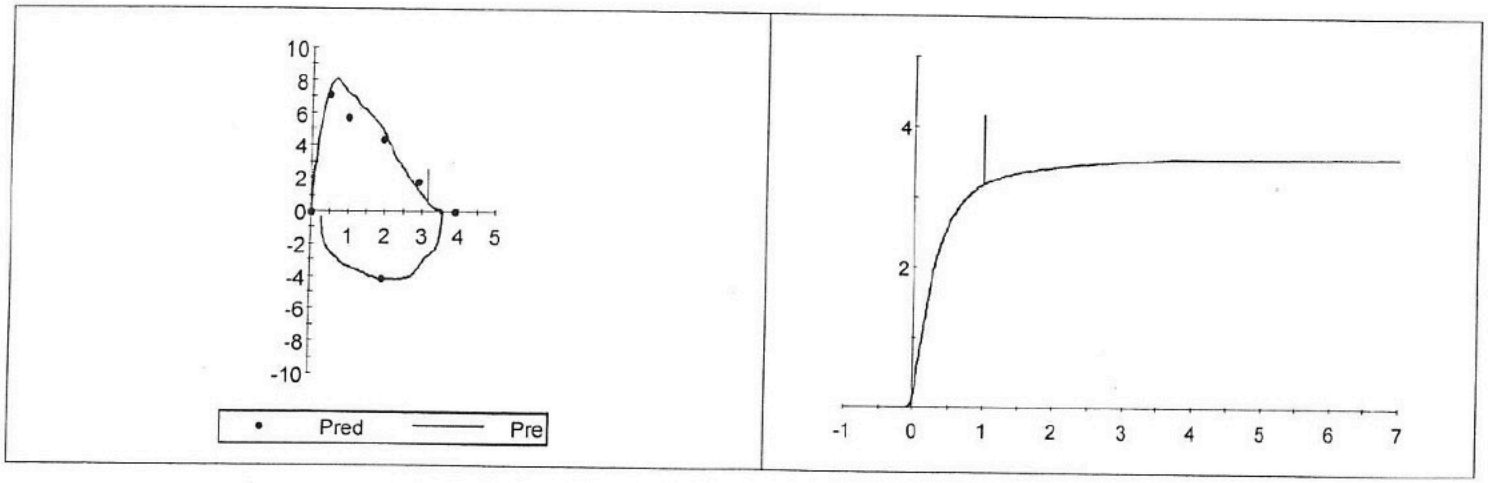
Figure 1. GOLD SPIROMETRIC CRITERIA FOR COPD SEVERITY[1]

I: Mild COPD	• $FEV_1/FVC < 0.7$ • $FEV_1 \geq 80\%$ predicted	At this stage, the patient may not be aware that their lung function is abnormal.
II: Moderate COPD	• $FEV_1/FVC < 0.7$ • $50\% \leq FEV_1 < 80\%$ predicted	Symptoms usually progress at this stage, with shortness of breath typically developing on exertion.
III: Severe COPD	• $FEV_1/FVC < 0.7$ • $30\% \leq FEV_1 < 50\%$ predicted	Shortness of breath typically worsens at this stage and often limits patients' daily activities. Exacerbations are especially seen beginning at this stage.
IV: Very Severe COPD	• $FEV_1/FVC < 0.7$ • $FEV_1 < 30\%$ predicted *or* $FEV_1 < 50\%$ predicted plus chronic respiratory failure	At this stage, quality of life is very appreciably impaired and exacerbations may be life-threatening.

Tech:	ID: [redacted]	Visit date/time	09/03/20
Doctor:	Height: 65.00	Age: 34	Room: Pulm. Clinic
	Weight: 177.60	Sex: Female	Race: Caucasian

Diagnosis: Asthma
Dyspnea: Cough: Wheeze:
Tbco Prod: Never Smoked Yrs Smk: Pks/Day: Yrs Quit:
Medications:
Pre Test Comments:
Post Test Comments: Spirometry meets ATS standards for both acceptability & reproducibility.

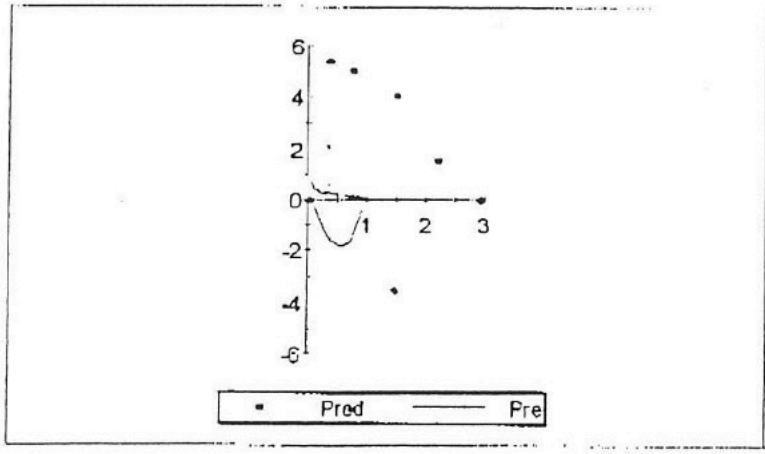
	Pre-Ex			Post-Ex		
	Actual	**Pred**	**%Pred**	**Actual**	**%Pred**	**%Chng**
---- SPIROMETRY ----						
FVC (L)	3.55	3.88	92			
FEV1 (L)	3.18	3.22	99			
FEV1/FVC (%)	90	83	108			
FEF 25% (L/sec)	7.51	5.71	131			
FEF 75% (L/sec)	1.98	1.81	109			
FEF 25-75% (L/sec)	4.37	3.39	129			
FEF Max (L/sec)	8.02	7.17	112			
FIVC (L)	3.29					
FIF Max (L/sec)	4.22					

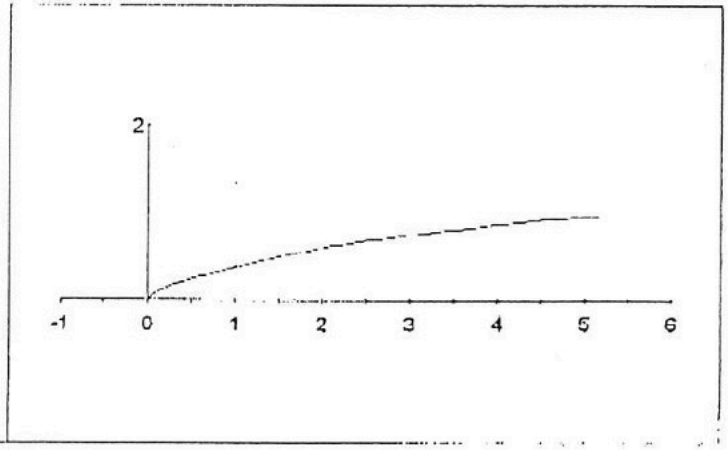


Name: [redacted]	ID: [redacted]	Visit date/time: 11/20/20[redacted]	
Tech:	Height: 61.00	Age: 45	Room: Pulm. Cl.
Doctor:	Weight: 124.00	Sex: Female	Race: Caucasian

Diagnosis: COPD
Dyspnea: Cough: Wheeze:
Tbco Prod: Yrs Smk: Pks/Day: Yrs Quit:
Medications:
Pre Test Comments: Patient stated that she just used her own albuterol inhaler.
Post Test Comments: Good effort.

	Pre-Ex			Post-Ex		
	Actual	Pred	%Pred	Actual	%Pred	%Chng
---- SPIROMETRY ----						
FVC (L)	0.96	2.92	33			
FEV1 (L)	0.38	2.47	15			
FEV1/FVC (%)	40	85	47			
FEF 25% (L/sec)	0.28	5.02	6			
FEF 75% (L/sec)	0.12	1.56	8			
FEF 25-75% (L/sec)	0.20	2.85	7			
FEF Max (L/sec)	1.08	5.40	20			
FIVC (L)	0.88					
FIF Max (L/sec)	1.84					





	ID:	Visit date/time	09/07/20[illegible] 08:25:35 AM
Tech:	Height: 61.00	Age: 56	Room:
Doctor:	Weight: 193.00	Sex: Female	Race: Black

Diagnosis:

Dyspnea: After any exertion | Cough: Productive | Wheeze: No Wheeze

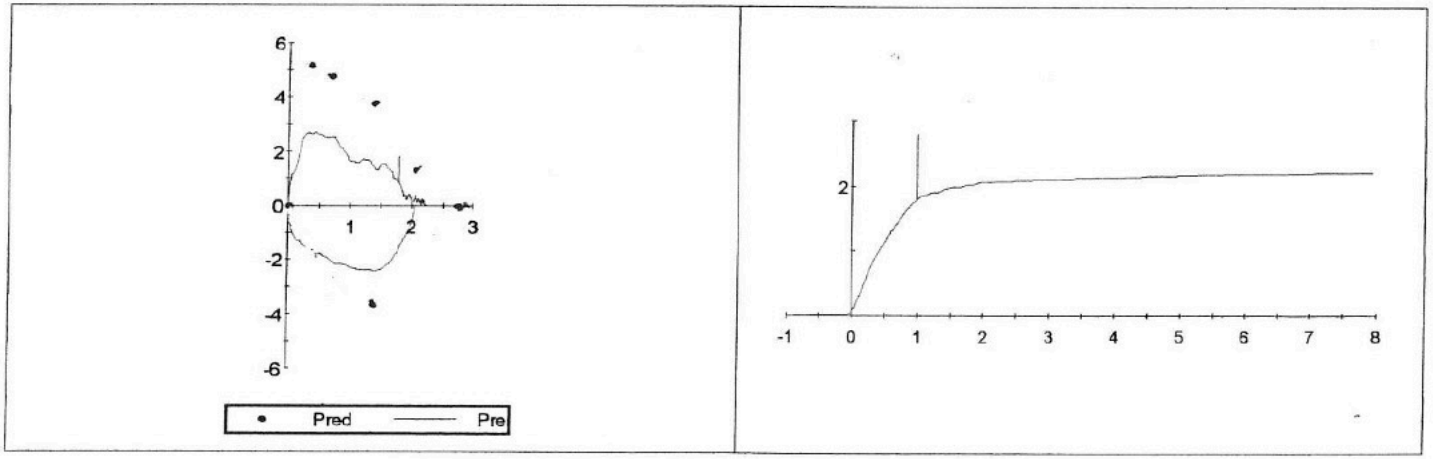
Tbco Prod: | Yrs Smk: | Pks/Day: | Yrs Quit:

Medications:

Pre Test Comments: PT. C/O MID-STERNAL PAIN WITH OCCASIONAL MID-SCAPULAR PAIN POSTERIOR. PT OCCASIONALLY TAKES IBUPROFEN PRN AND PAIN RESOLVES.

Post Test Comments: GOOD PT EFFORT. T. GILMORE, RRT, AE-C.

	Pre-Ex			Post-Ex		
	Actual	**Pred**	**%Pred**	**Actual**	**%Pred**	**%Chng**
---- SPIROMETRY ----						
FVC (L)	2.29	2.74	84			
FEV1 (L)	1.81	2.26	80			
FEV1/FVC (%)	79	82	96			
FEF 25% (L/sec)	2.57	4.76	54			
FEF 75% (L/sec)	1.25	1.30	96			
FEF 25-75% (L/sec)	1.73	2.51	69			
FEF Max (L/sec)	2.69	5.18	52			
FIVC (L)	2.05					
FIF Max (L/sec)	2.39					



Name: **Anonymous Doe** ID: ********* Date Tested: **17-Mar-17**

Age: 59 Race: W Height: 68.9 in Weight: 230 lb Sex: M Smoker: ?

Consulting Physician:
Referring Physician:
Clinical Technician: Mike Stockton, RRT, RPFT
Diagnosis: 1.
2.
3.

Temp: 20ºC Pack Years: N/A
Pressure: 751mmHg
BTPS: 1.045

Spirometry at

Parameter	Units	Predicted Value	Observed Pre	Observed % Pred	Observed Post	Observed % Pred	Percent Change
FVC	L	4.23	4.11	97	----	----	--
FEV.5	L	2.73	2.81	103	----	----	--
FEV.5 / FVC	%	----	68	----	----	----	--
FEV_1	L	3.40	3.64	107	----	----	--
FEV_1 / FVC	%	80	89	111	----	----	--
FEF_{25-75} [ISO]	L/s	3.47	4.09	118	----	----	--
PEFR	L/s	8.39	9.00	107	----	----	--
FET	sec	----	11.85	----	----	----	--
FIVC	L	4.23	4.06	96	----	----	--
PIFR	L/s	5.59	4.87	87	----	----	--
MVV	L/m	138.8	136.4	98	----	----	--

Lung Volumes

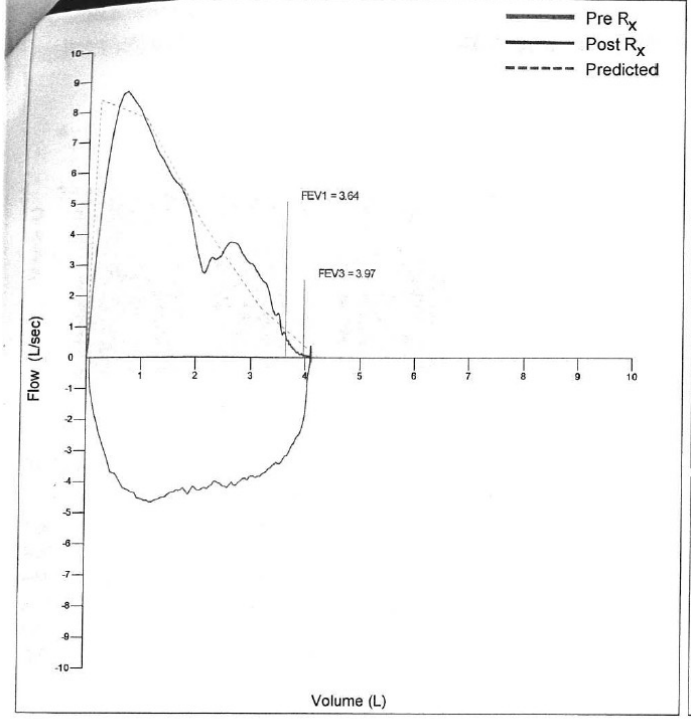
Parameter	Units	Predicted Value	Observed Pre	Observed % Pred	Observed Post	Observed % Pred	Percent Change
VC	L	4.23	4.11	97	----	----	--
IC	L	2.89	3.33	115	----	----	--
ERV	L	1.34	0.78	58	----	----	--
FRC	L	3.50	2.40	69	----	----	--
RV	L	2.16	1.62	75	----	----	--
TLC	L	6.39	5.73	90	----	----	--
RV/TLC	%	32	28	88	----	----	--

Diffusion

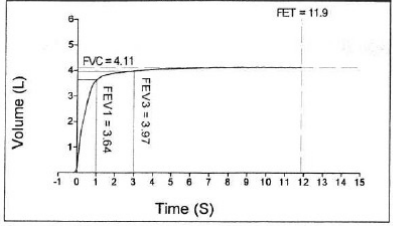
Parameter	Units	Predicted Value	Observed Pre	Observed % Pred	Observed Post	Observed % Pred	Percent Change
DLCO	mL/min/mmHg	28.46	26.17	92	----	----	--
DLCO [Hb]	mL/min/mmHg	28.46	26.17	92	----	----	--
Hb	g/dl	14.6	----	----	----	----	--
VA [BTPS]	L	6.39	5.45	85	----	----	--
DLCO/VA	mL/min/mmHg/L	4.46	4.80	108	----	----	--

Name	Anonymous Doe	Date	17-Mar-17
ID	**********		**Pulmonary Function**

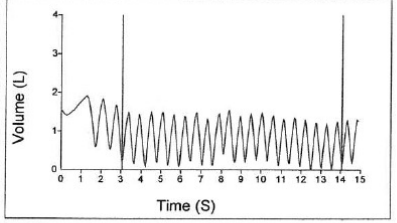
Flow Volume



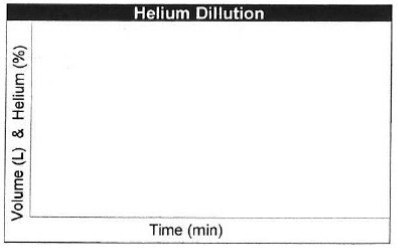
Volume Time



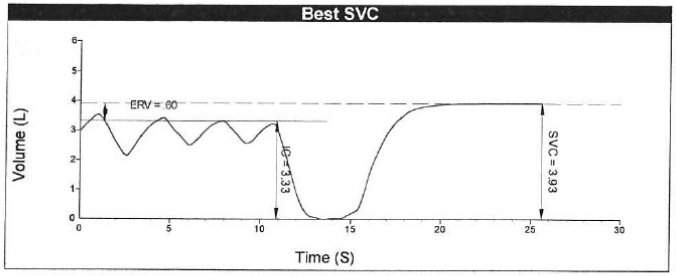
MVV



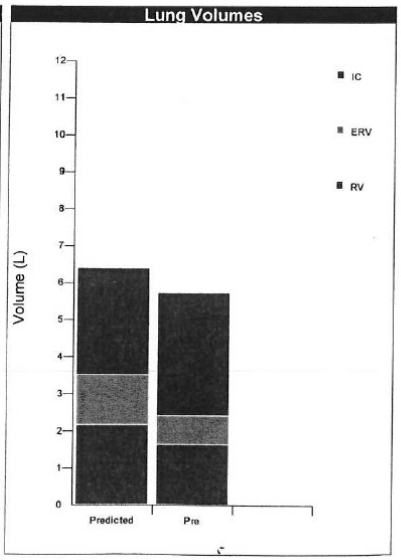
Helium Dillution



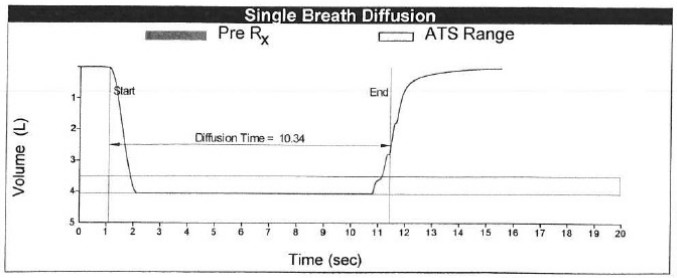
Best SVC



Lung Volumes



Single Breath Diffusion



Name	Anonymous Doe	Date	17-Mar-17
ID	*********		Pulmonary Function

Past Pulmonary Function Results for this Patient

Parameter	Units	Today	Previous Test Results - Most Recent to Past					
		17-Mar-17	30-Sep-16	% Diff	30-Dec-99	% Diff	% Diff	% Diff
FVC	L	4.11	4.23	2	----	----		
FEV_1	L	3.64	3.48	-5	----	----		
FEV_1 / FVC	%	89	82	-8	----	----		
PEFR	L/s	9.00	8.97	-1	----	----		
FEF_{25-75}	L/s	4.09	4.03	-2	----	----		
SVC	L	3.93	4.31	9	----	----		
TLC	L	5.73	5.88	2	----	----		
RV	L	1.62	1.57	-4	----	----		
RV/TLC	%	28	27	-4	----	----		
DLCO	mL/min/mmHg	26.17	26.40	<1	----	----		
DLCO [Hb]	mL/min/mmHg	26.17	24.86	-6	----	----		
VA [BTPS]	L	5.45	5.38	-2	----	----		
DLCO/VA	mL/min/mmHg/L	4.80	4.62	-4	----	----		
MIP	cmH2O	----	----	----	----	----		
MEP	cmH2O	----	----	----	----	----		

NBRC

The National Board for Respiratory Care®

Become a
Certified or Registered
Pulmonary Functions Technologist

Pulmonary Function Technology Examination

The Pulmonary Function Technology (PFT) Examination is designed to objectively measure essential tasks required of a pulmonary function technologist. If a candidate achieves the low cut score, he or she will earn the CPFT credential. If a candidate achieves the high cut score, he or she will earn the CPFT and RPFT credentials.

Admission Policy

1. Be 18 years of age or older.

and

2. Have a minimum of an associate degree from a respiratory care education program supported or accredited by the Commission on Accreditation for Respiratory Care (CoARC).

or

3. Be a CRT or RRT.

or

4. Complete 62 semester hours of college credit from a college or university accredited by its regional association or its equivalent, including college credit level courses in biology and mathematics. A minimum of six months of clinical experience* in the field of pulmonary function technology is also required prior to applying for the examination.

or

5. Be a CPFT if seeking the RPFT credential.

*Clinical experience is defined as a minimum of eight hours per week for a calendar year in pulmonary function technology under the supervision of a Medical Director of a pulmonary function laboratory or a special care area acceptable to the Board. Clinical experience must be completed before the candidate applies for this examination.

Thanks for Listening!

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