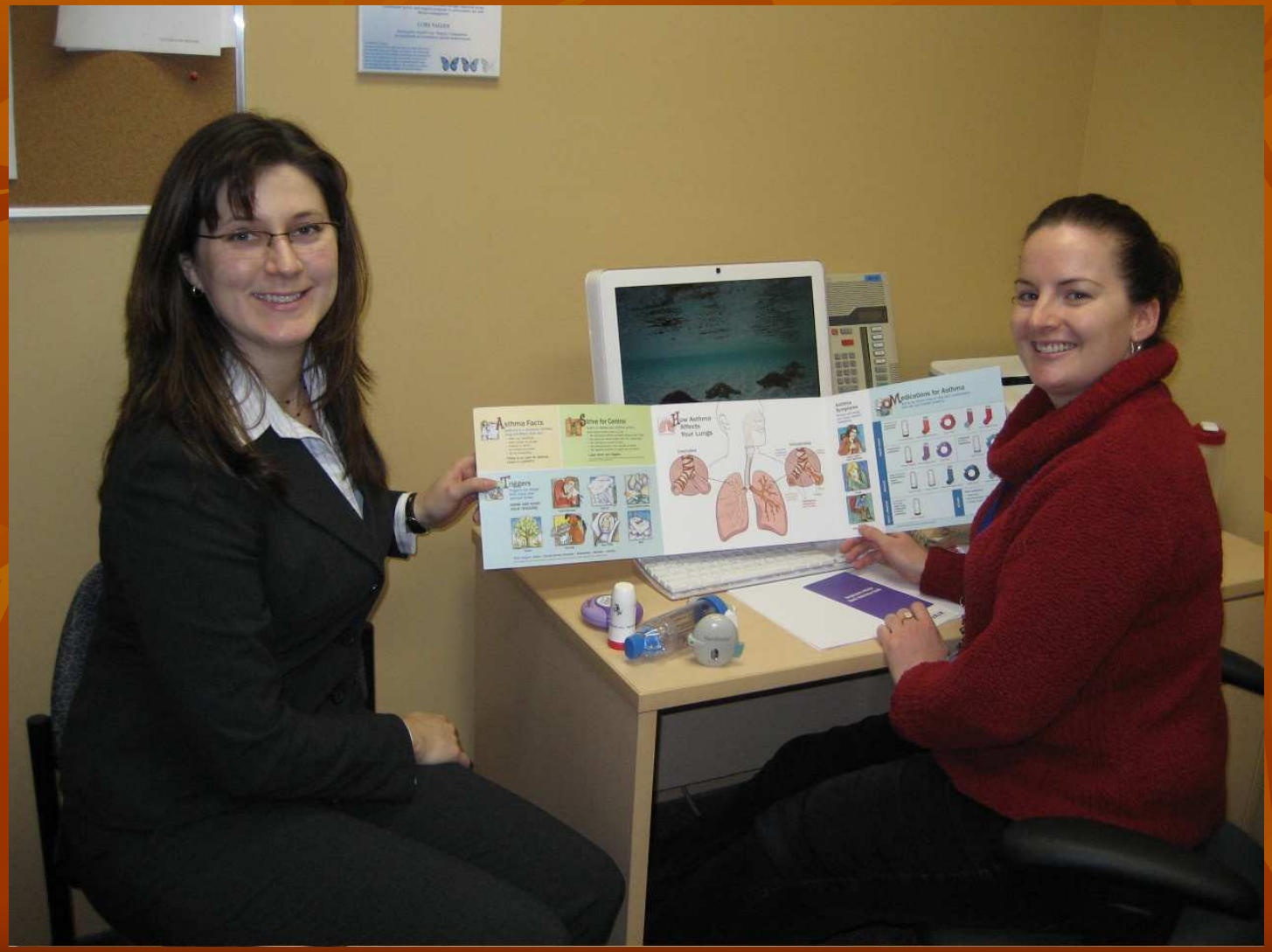
Using Spirometry In Clinical Practice

Amy Massie RRT,CRE
Angie Shaw RRT,CRE

Introductions



Where We Come From:

St. Mary's
GENERAL HOSPITAL

New Vision FHT

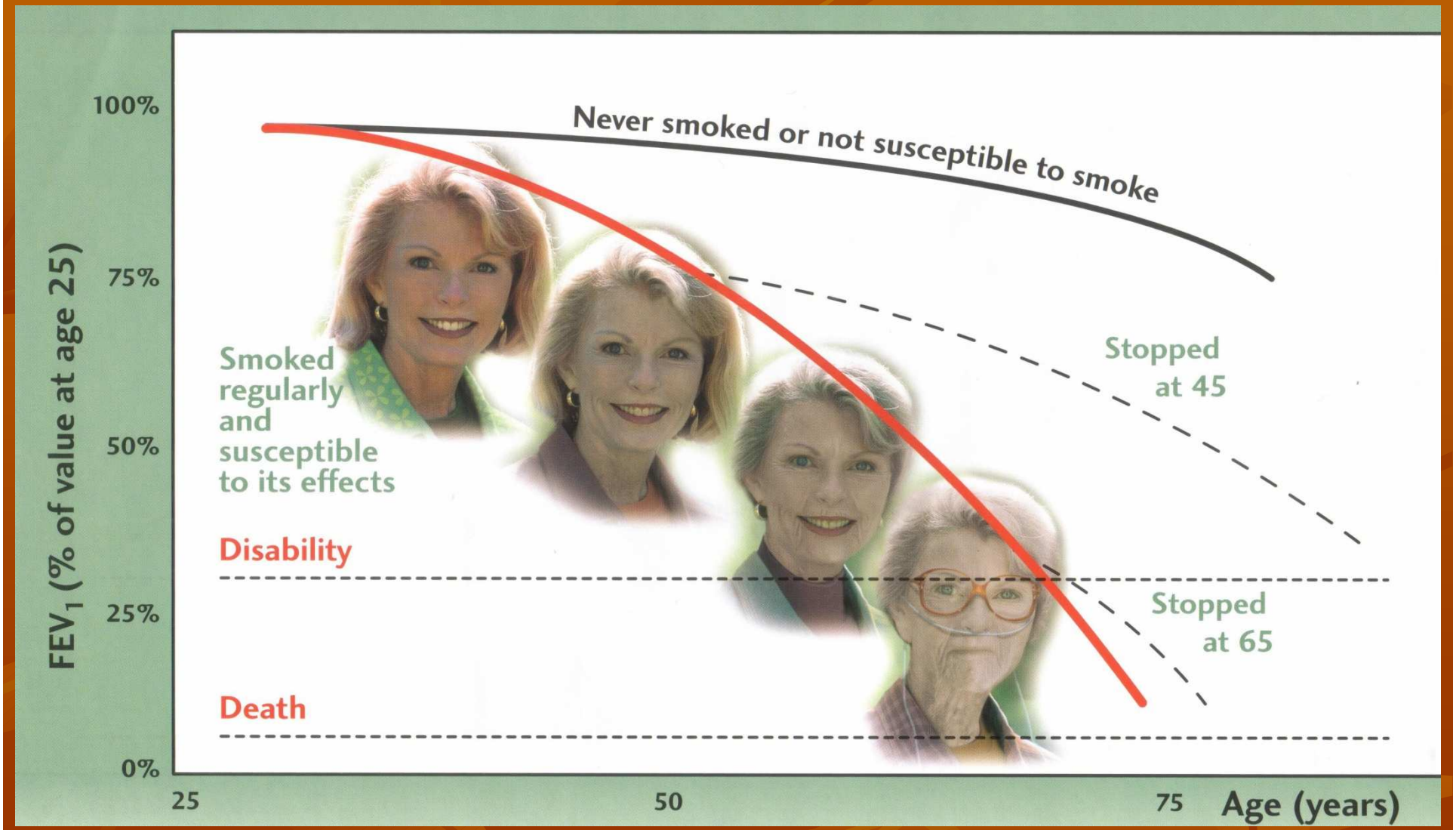
Terminology

- **FVC**: forced vital capacity (in litres)
- Maximal volume of air exhaled rapidly and forcefully following a maximal inspiration
- Useful measurement for diagnosing and following restrictive lung disease
- Normal range is 80% or better of predicted value

Terminology

- **FEV1**: forced expiratory volume in one second (in litres)
- Volume of air exhaled during the first second
- Most important measurement for following obstructive lung disease
- Normal range is 80% or better of predicted
- *Normal rate of decline is 30ml/year, smokers with COPD have decline of 60-120ml/year

Progressive, chronic airflow limitation



Normals FEV1 declines < 30 ml/yr

COPD FEV1 declines > 60 ml/yr

Peto & Fletcher 1976

Terminology

- **FEV1/FVC Ratio**
- FEV1 divided by the FVC
- Used to detect airways obstruction
- Ratio <0.70 indicates obstruction

Predicted Values

- Sets of normal values
- Factors that influence spirometry:
- Age
- Height
- Sex
- Weight
- Race or ethnic origin

Common Obstructive Disorders

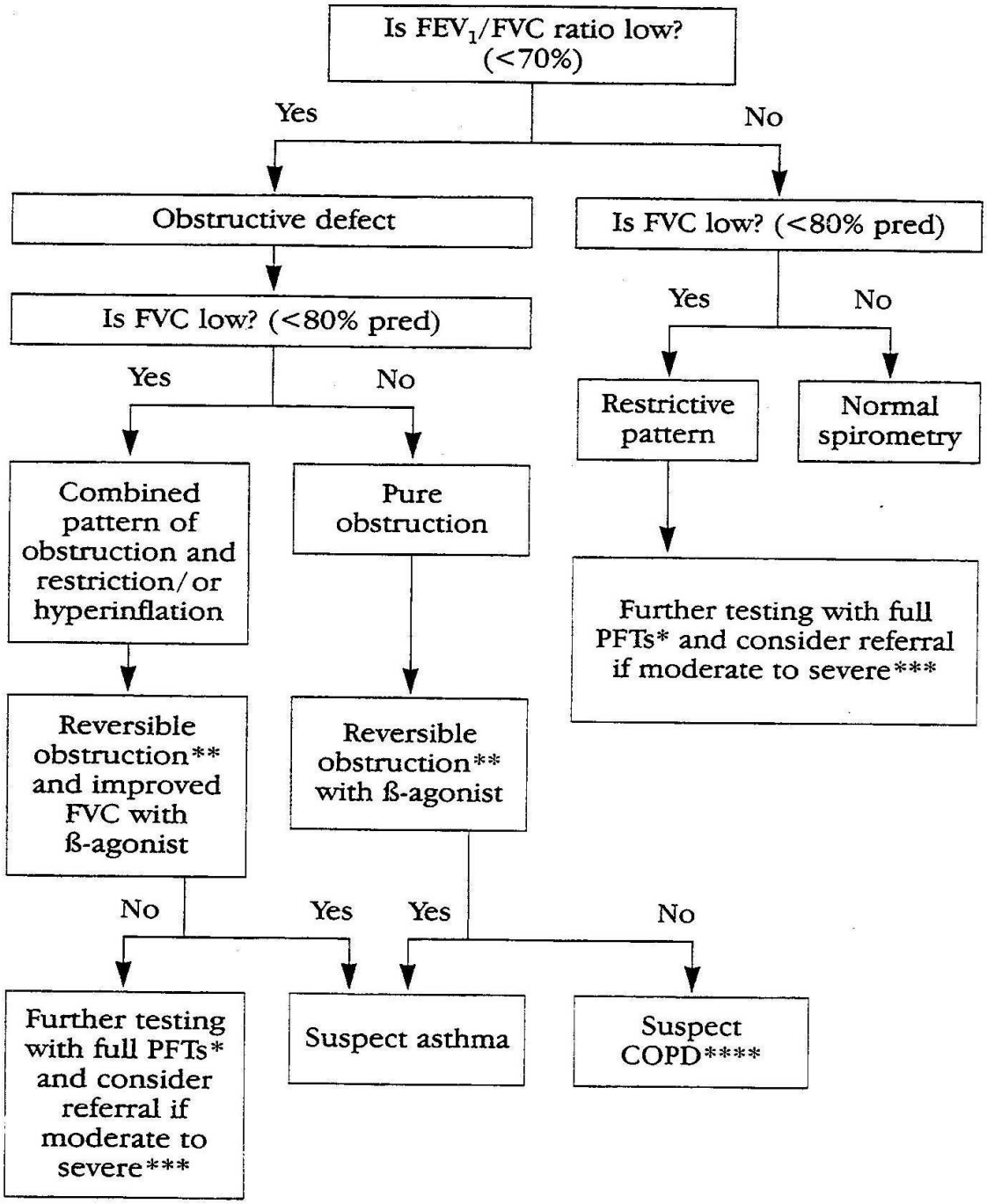
- Asthma
- COPD
- Bronchiectasis
- Cystic Fibrosis
- Foreign Body
- Vocal Cord Paralysis (VCD)

Common Restrictive Disorders

- Interstitial lung diseases
- Atelectasis
- Lung resection
- Neuromuscular disease
- Kyphoscoliosis
- Effusion
- Obesity
- Abdominal distension

Interpretation

- There is a simple algorithm we can use to quickly interpret spirometry results…


Is FEV_1/FVC ratio low? (<70%)
Yes
No
Obstructive defect
Is FVC low? (<80% pred)
Yes
No
Combined pattern of obstruction and restriction/or hyperinflation
Pure obstruction
Reversible obstruction** and improved FVC with ß-agonist
Reversible obstruction** with ß-agonist
No
Yes
Further testing with full PFTs* and consider referral if moderate to severe***
Suspect asthma
Is FVC low? (<80% pred)
Yes
No
Restrictive pattern
Normal spirometry
Further testing with full PFTs* and consider referral if moderate to severe***
Yes
No
Suspect COPD****

Practice Time!!

We know you've all been waiting for this moment!

Height at test (in): 70.0	Sex: Female	Smoking history (pk-yrs):
Weight at test (lb): 170.0	Age at test: 28	Predicted set: Toronto 1991

Comments:
Diagnosis: [redacted]
Physician: Dr. Steven Chan
Technician: Amy Kropf RRT/CRE

Test date/time: 28/05/08 10:23:41 AM
Effort protocol: ATS/ERS 2005

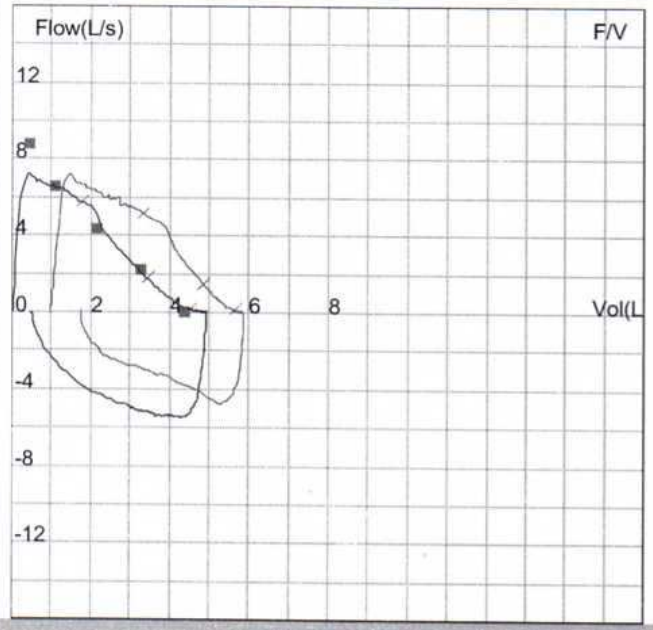
Bronchodilator200 mcg Salbutamol with Chamber

Results, Best Pre- and Post-

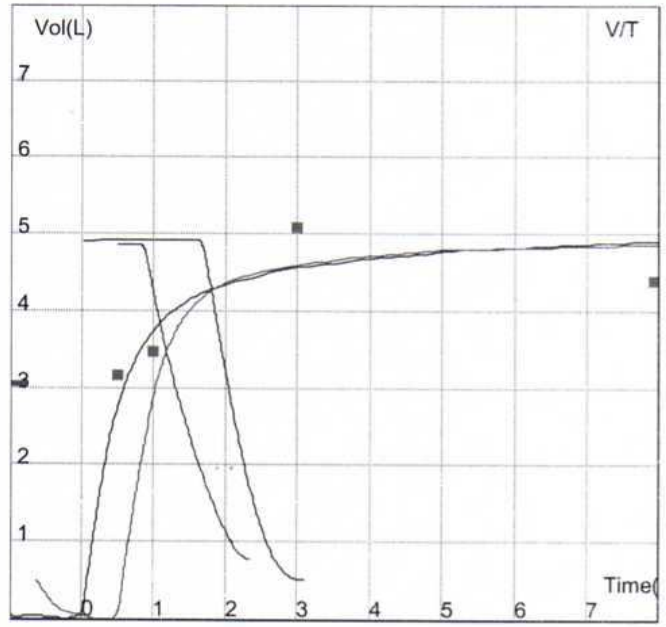
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	4.38	4.92	112%	4.87	111%	-1%
FEV1 (L)	3.47	3.76	108%	4.02	116%	7%
FEV1/FVC	0.79	0.76	96%	0.83	104%	8%
FEF25-75% (L/s)	4.76	3.24	68%	4.22	89%	30%
PEFR (L/s)	8.76	6.96	79%	7.06	81%	1%
Exp time (s)	8.30	7.60		-8%		

Test comments (Pre):
Test comments (Post):Good patient effort and cooperation

Flow vs Volume



Volume vs. Time



Height at test (in): 62.0
Weight at test (lb): 145.0

Sex: Female
Age at test: 56

Smoking history (pk-yrs): 80
Predicted set: Toronto 1991

Comments: Considering quitting smoking
Diagnosis: [redacted]
Physician: Dr. Ruth Adler
Technician: Angela Shaw RRT/CRE

Test date/time: 01/08/08 10:44:04 AM
Effort protocol: ATS/ERS 2005

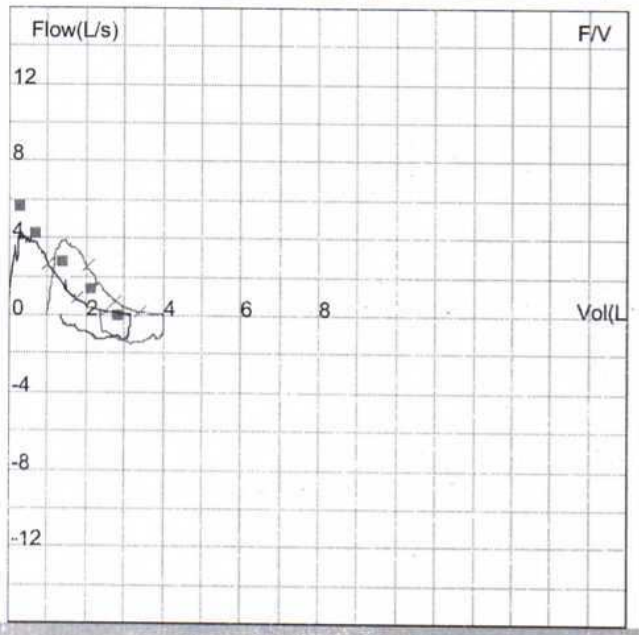
Bronchodilator: 400 mcg Salbutamol with chamber

Results, Best Pre- and Post-

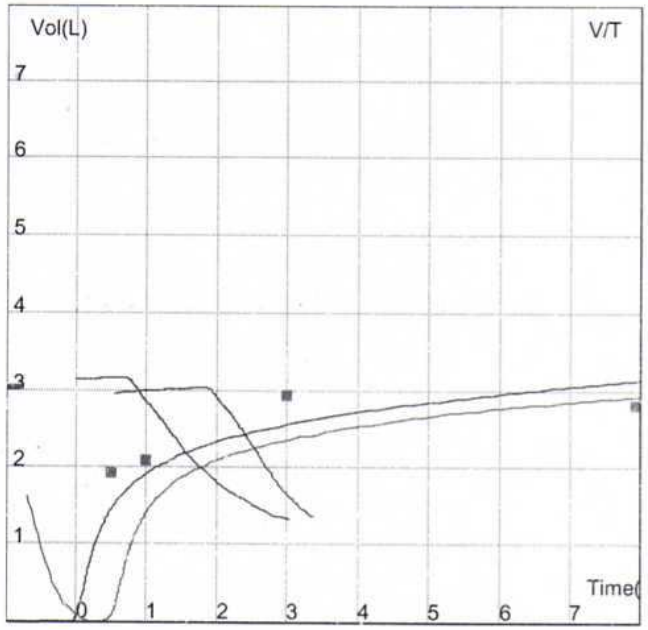
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	2.82	3.15	112%	3.04	108%	-3%
FEV1 (L)	2.09	1.93	92%	1.87	89%	-3%
FEV1/FVC	0.74	0.61	82%	0.62	83%	1%
FEF25-75% (L/s)	2.57	0.82	32%	0.79	31%	-4%
PEFR (L/s)	5.64	4.20	74%	3.89	69%	-7%
Exp time (s)	8.70		9.29		7%	

Test comments (Pre): Good patient effort and cooperation
Test comments (Post): Good patient effort and cooperation

Flow vs Volume



Volume vs. Time



Height at test (in): 61.8
Weight at test (lb): 140.0

Sex: Female
Age at test: 80

Smoking history (pk-yrs): 0
Predicted set: Toronto 1991

Comments:
Diagnosis:
Physician: Dr. Karen Cameron
Technician: Amy Kropf RRT/CRE

Test date/time: 09/09/08 08:45:51 AM
Effort protocol: ATS/ERS 2005

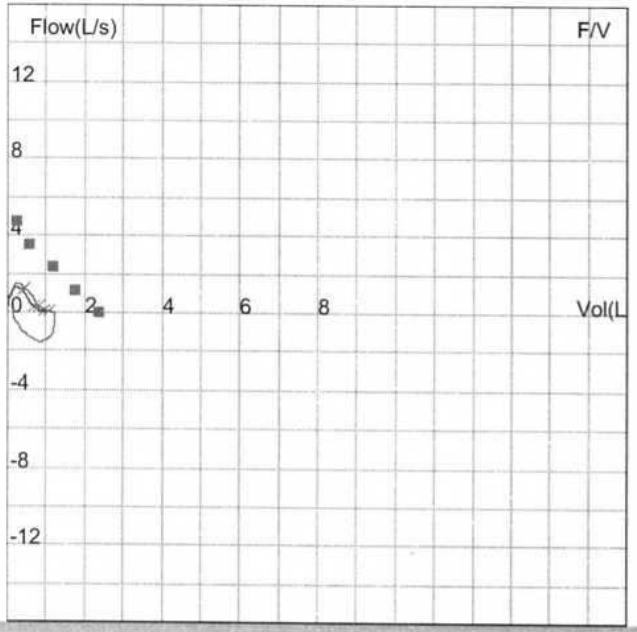
Bronchodilator:400 mcg Salbutamol with chamber

Results, Best Pre- and Post-

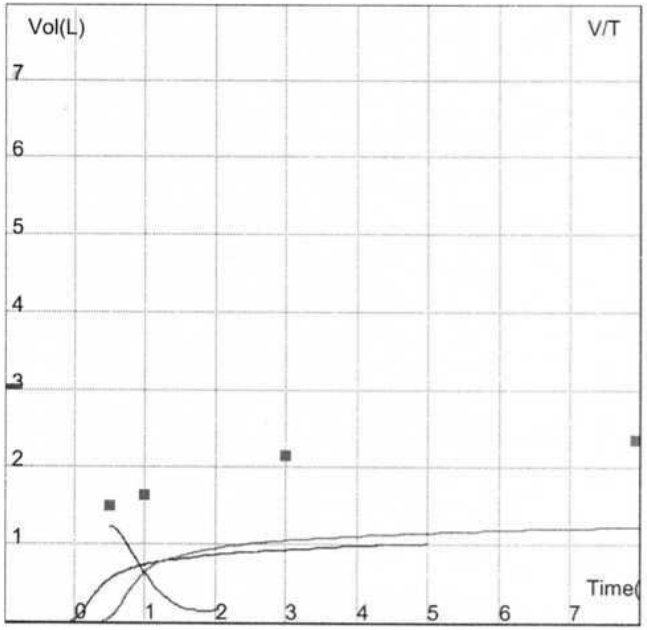
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	2.36	1.02	43%	1.19	50%	17%
FEV1 (L)	1.65	0.74	45%	0.86	52%	16%
FEV1/FVC	0.70	0.73	104%	0.72	103%	0%
FEF25-75% (L/s)	1.67	0.55	33%	0.61	37%	13%
PEFR (L/s)	4.73	1.32	28%	1.51	32%	14%
Exp time (s)	5.00		5.51		10%	

Test comments (Pre): Good patient effort and cooperation
Test comments (Post): Good patient effort and cooperation

Flow vs Volume



Volume vs. Time



Height at test (in): 66.0
Weight at test (lb): 208.0

Sex: Male
Age at test: 58

Smoking history (pk-yrs): 47
Predicted set: Toronto 1991

Comments:
Diagnosis: [redacted]
Physician: Dr. Mel Cescon
Technician: Amy Kropf RRT/CRE

Test date/time: 23/07/08 08:49:30 AM
Effort protocol: ATS/ERS 2005

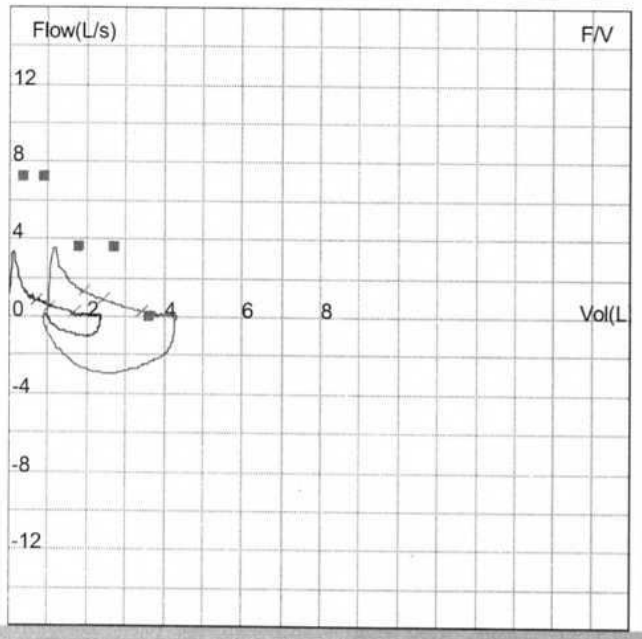
Bronchodilator:400 mcg Salbutamol with chamber

Results, Best Pre- and Post-

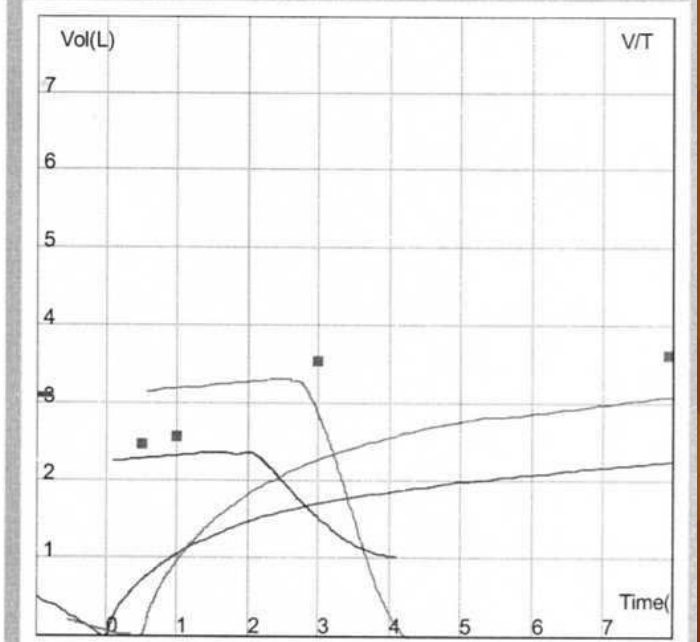
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	3.60	2.36	66%	3.31	92%	40%
FEV1 (L)	2.57	1.06	41%	1.47	57%	39%
FEV1/FVC	0.72	0.45	63%	0.44	62%	-1%
FEF25-75% (L/s)	3.08	0.40	13%	0.58	19%	47%
PEFR (L/s)	7.19	2.91	40%	3.62	50%	24%
Exp time (s)	9.98		9.90	-1%		

Test comments (Pre): Good patient effort and cooperation
Test comments (Post): Good patient effort and cooperation

Flow vs Volume



Volume vs. Time



Height at test (in): 63.0	Sex: Female	Smoking history (pk-yrs): 0
Weight at test (lb): 118.0	Age at test: 13	Predicted set: Toronto 1991

Comments:
Diagnosis: [redacted]
Physician: Dr. Ruth Adler
Technician: Amy Kropf RRT/CRE

Test date/time: 26/08/08 08:47:02 AM
Effort protocol: ATS/ERS 2005

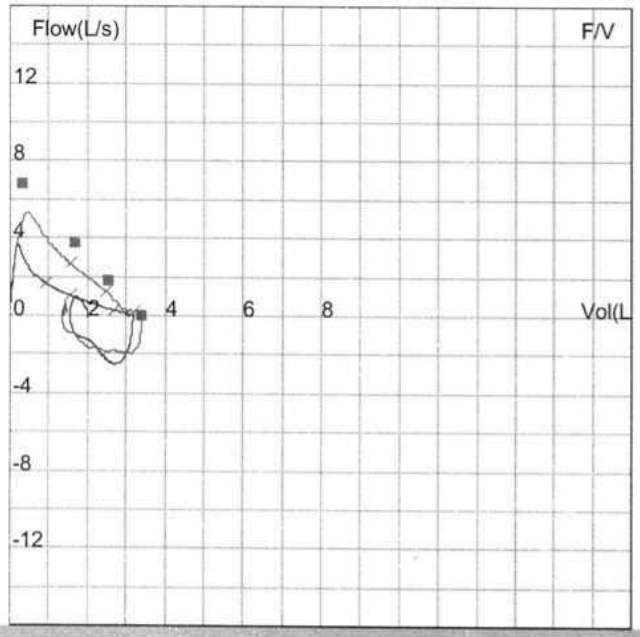
Bronchodilator:400 mcg Salbutamol with chamber

Results, Best Pre- and Post-

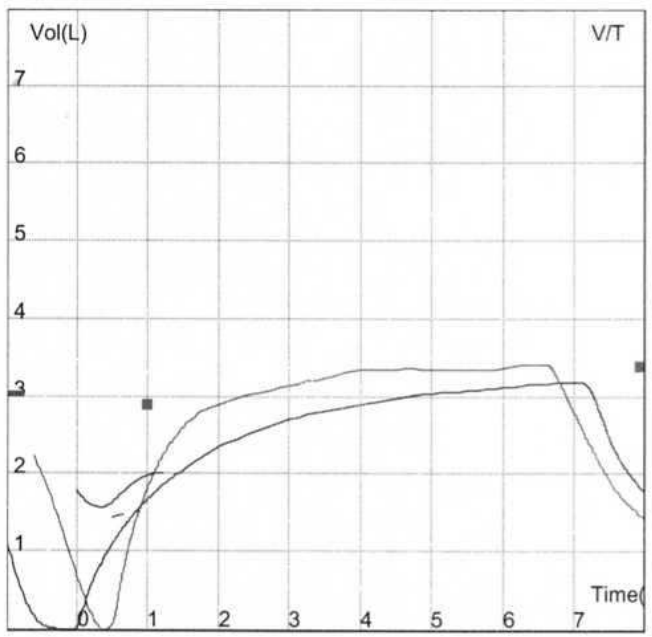
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	3.39	3.18	94%	3.36	99%	6%
FEV1 (L)	2.89	1.68	58%	2.61	90%	55%
FEV1/FVC	0.85	0.53	62%	0.78	91%	47%
FEF25-75% (L/s)	3.57	0.90	25%	2.27	64%	153%
PEFR (L/s)	6.78	3.65	54%	5.34	79%	46%
Exp time (s)	7.07	4.08		-42%		

Test comments (Pre): Good patient effort and cooperation
Test comments (Post): Good patient effort and cooperation

Flow vs Volume



Volume vs. Time



Height at test (in): 63.0
Weight at test (lb): 203.0

Sex: Female
Age at test: 61

Smoking history (pk-yrs): 40
Predicted set: Toronto 1991

Comments: quit smoking 2001, [redacted]

Diagnosis:
Occupation:

Previous FEV1 (L)

Test series date/time:
Best pre-Rx FEV1, effort sequence:

Site: AWC Remote
Physician: [redacted]
Technician: Angie Shaw

Test date/time: 09/22/08 09:15:10 AM
Effort protocol: ATS/ERS 2005

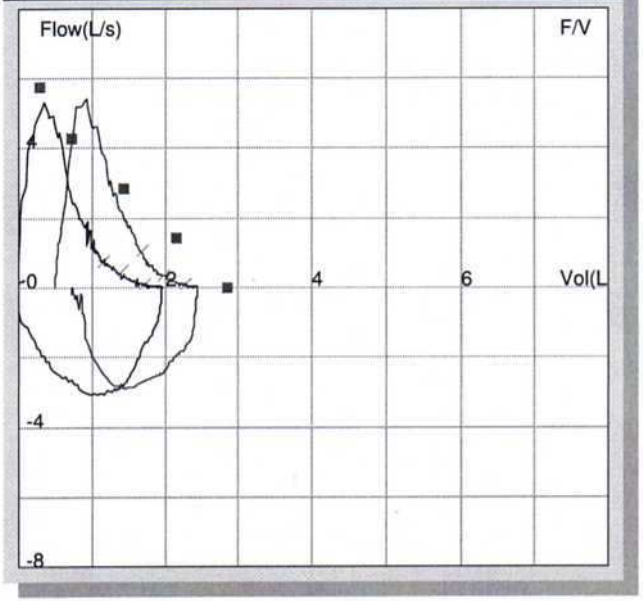
Bronchodilator: 400 mcg salbutamol MDI + spacer

Results

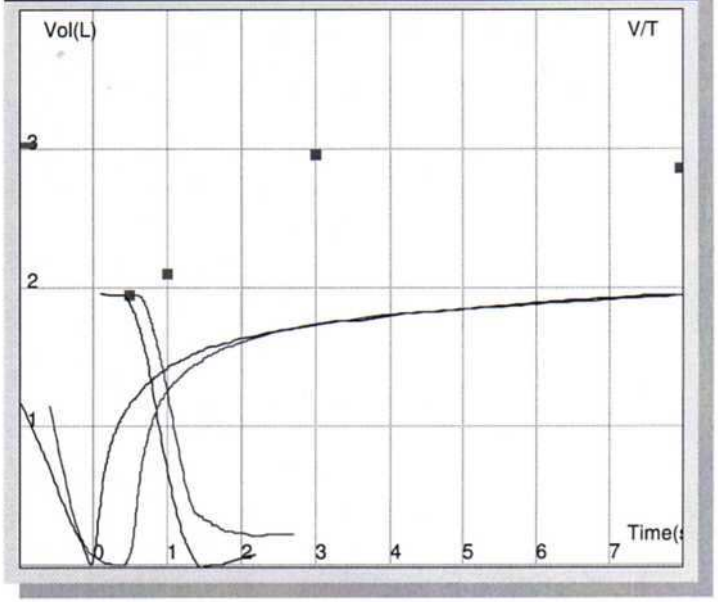
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	2.86	1.93	67%	1.89	66%	-2%
FEV1 (L)	2.10	1.42	68%	1.49	71%	5%
FEV1/FVC	0.73	0.74	100%	0.79	107%	7%
FEF25-75% (L/s)	2.53	0.99	39%	1.33	53%	35%
PEFR (L/s)	5.73	5.24	92%	5.42	95%	3%
Vext %	---	2.46	---	4.18	---	70%

Test comments (Pre): Good patient effort and cooperation
Test comments (Post): Good patient effort and cooperation, but unable to exhale for 6 seconds

FVC Flow vs. Volume



FVC Volume vs. Time



Case 1

Case DB

- 10 year old female
- Sent to me for spirometry in follow up to PFT's done in 2009.
- Mom present for visit.
- Hx asthma symptoms x many years
- Pt has eczema
- Fam hx of cousins with asthma, mom has eczema

DB

- Has asthma symptoms with exertion and with exposure to pets ->other peoples pets, of course.
- At home there is a cat and a dog
- They previously had 3 cats and 2 dogs.

Timeline

- First reported symptoms in Aug 2009.
- Sent for Full PFT's and a referral to allergist initiatied.
- Oct 2009 Full PFT's

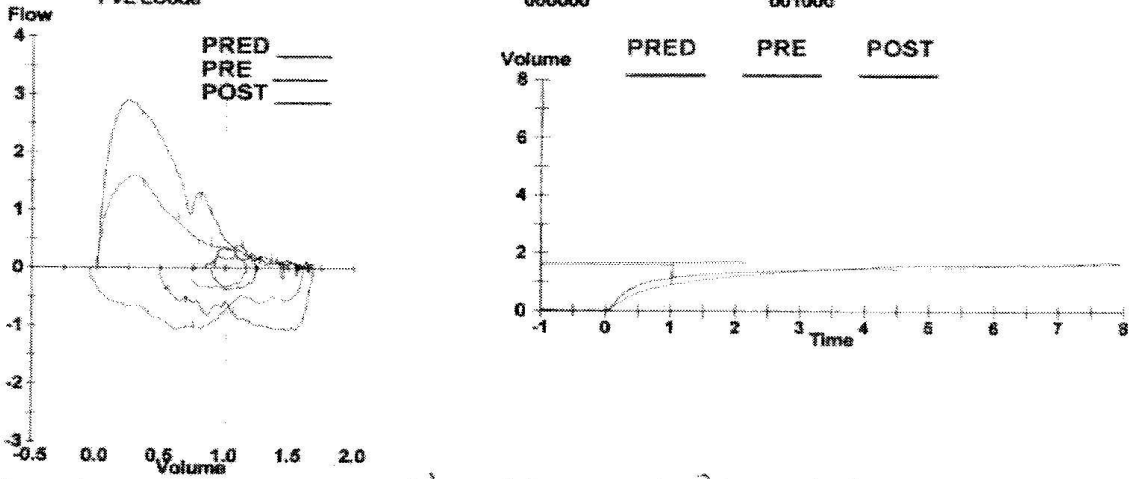
Gender: Female
Birth Date: [redacted]
Height(cm): 125
Room: OP

Race:
Age: [redacted]
Weight(kg): 29.0 BMI: 18.56
Therapist: [redacted]

Date: 16/10/09
Temp: 25 PBar: 754
Physician: [redacted]
Consulting:

Spirometry (BTPS)

		PRED	PRE-RX BEST	PRE-RX %PRED	POST-RX BEST	POST-RX %PRED	% CHG
FVC	Liters	1.74	1.64	95	1.69	98	3
FEV1	Liters	1.58	0.91	57	1.16	73	28
FEV1/FVC	%		86		68		
FEF25-75%	L/sec	2.14	0.46	22	0.62	29	33
PEF	L/sec	4.01	1.61	40	2.90	72	80
FEF25%	L/sec	3.28	1.52	46	2.74	84	80
FEF50%	L/sec	2.21	0.50	23	1.32	59	164
FEF75%	L/sec	1.20	0.20	16	0.19	16	-1
FET100%	Sec		8.04		9.14		14
FIVC	Liters	1.74	1.66	96	1.20	69	-28
PIF	L/sec		1.05		1.09		3
FIF50%	L/sec		1.01		0.78		-23
FVL ECode			000000		001000		



Diagnosis:
Comments: Questionable patient effort.

Interpretation: Pattern of Moderate airflow obstruction with significant bronchodilator response. consistent with asthma. -Suggest repeat study at a later date.

[redacted]

Version: IVS-0101-07-2B

PF Reference: CMH

Interpretation

- Questionable patient effort
- Pattern of moderate airflow obstruction with significant bronchodilator response consistent with Asthma.
- Suggest repeat study at a later date.

What happened next

- Note came back to fam doc office, and it was scanned, and titled, “Spirom C/W asthma – repeat, poor pt effort.
- Family followed up with a visit to MD.
- No inhalers given….

- December – saw an allergist

Allergist note

- “Pt has hx of irritating cough, mild difficulty breathing, especially at night.”
- “This has occurred for many, many years, and at one time she was suspected to have asthma, but never had investigation or treatment.”
- “She was given a puffer one month ago and it seemed to be helpful”

Allergist note cont'd

- "Impression:
  - Reactive Airways- maybe related to animals.
  - Eczema – under control.

Management: I suggested they get rid of the animals, but met with resistance. Suggested no pets in bedroom, and bathe every 10 days if possible.

... There's more

"Otherwise she will just have to use a non-sedating antihistamine or puffers to relieve her irritating cough."

There's more

- In January, 2011 DB presented to doc's office with c/o LRTI. She also was requiring Salbutamol TID at times. (!!)
- Prescribed antibiotics.

It goes on…

- April 2011- prescription renewal. 1 Salbutamol given
- July 2011 – phone request for Salbutamol renewal
  - NP writes, “Spirometry last done 2009. Suggested follow up. See Amy.
  - And 1 Salbutamol given.

August, 2011
Visit with Respiratory Therapist

- Hx
- Spirometry
- Mom comes out and says, “Isn’t there another medicine we should be using??”

Height at test (in): 55.1
Weight at test (lb): 88.0

Sex: Female
Age at test: 10

Smoking history (pk-yrs): 0
Predicted set: Toronto 1991

Comments:

Diagnosis: ? Asthma

Site: AWC Remote
Physician: [redacted]
Technician: Amy Massie RRT

Bronchodilator: Salbutamol 400 mcg with chamber

Previous FEV1 (L)

Test series date/time:
Best pre-Rx FEV1, effort sequence:

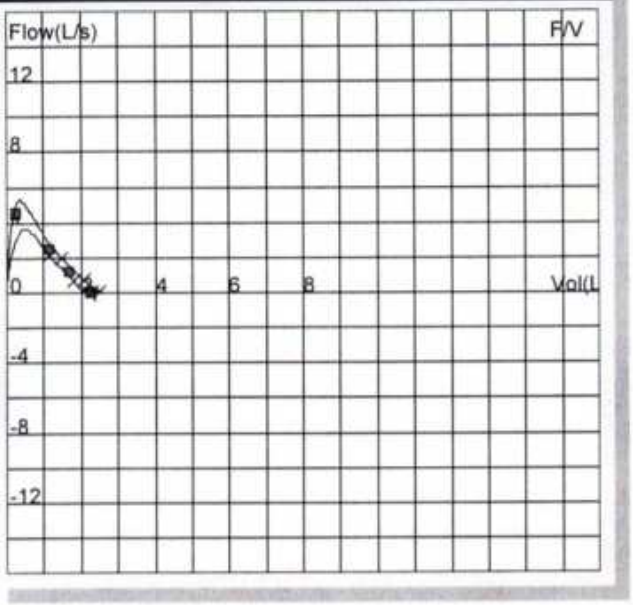
Effort protocol: ATS 1994
Test date/time: 15/08/11 09:07:42 AM

Results

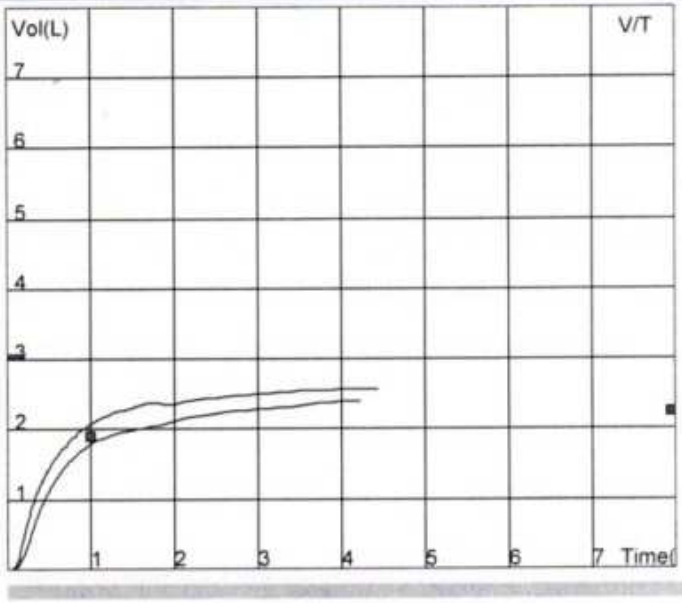
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	2.25	2.41	107%	2.57	114%	7%
FEV1 (L)	1.91	1.88	99%	2.15	113%	14%
FEV1/FVC	0.85	0.78	92%	0.84	99%	7%
FEF25-75% (L/s)	2.38	1.70	71%	2.18	91%	28%
PEFR (L/s)	4.61	3.67	80%	5.32	115%	45%
Exp time (s)	---	4.08	---	4.34	---	6%

Test comments (Pre): Good patient effort and cooperation
Test comments (Post):Good patient effort and cooperation

FVC Flow vs. Volume



FVC Volume vs. Time



Follow up with Doc 1 week later

- PULMICORT!!!!
- RT anxiously awaits follow up! ☺

Case 2

Patient MS

- 27 yr old female
- Sent to Resp Therapist for spirometry
- In to see fam doc for SOB/cough
- Mum of 3 – 2 yo twins and a 9 month old
- Nurse – on Mat leave
- Active
- Never smoked
- Not one to complain!!!

1st visit

- Pt c/o productive, irritated cough and SOB x 2 years
- Worse in am
- Worse with exercise
- Hx allergies, rhinitis, PND.

- Attempted spirometry 6 times.
- Unable to achieve acceptable, reproducible results.

Height at test (in): 67.0	Sex: Female	Smoking history (pk-yrs): 0
Weight at test (lb): 158.0	Age at test: 27	Predicted set: Toronto 1991

Comments:
Diagnosis: Cough NYD
Physician: [redacted]
Technician: Amy Kropf RRT/CRE

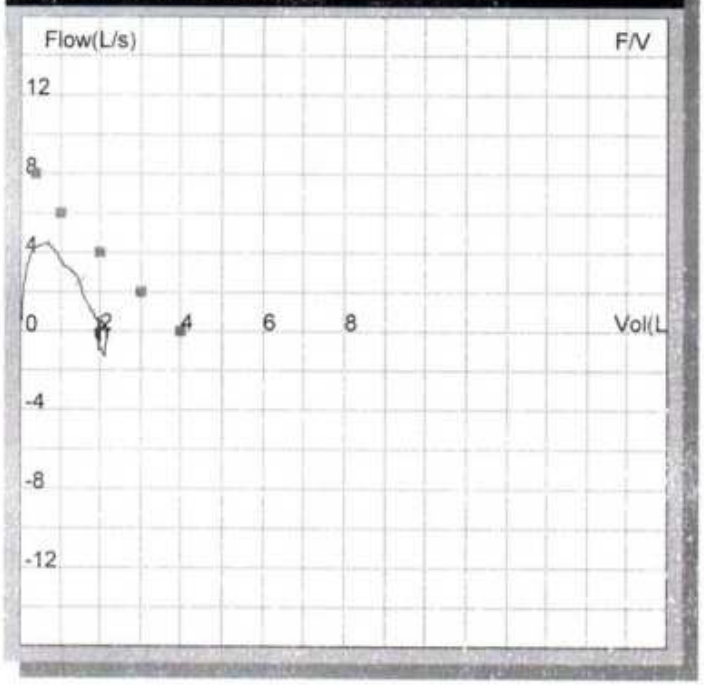
Number of efforts performed: 1
Test date/time: 08/26/08 01:32:37 PM
Test comments: results not reproducible, ++ coughing

Results

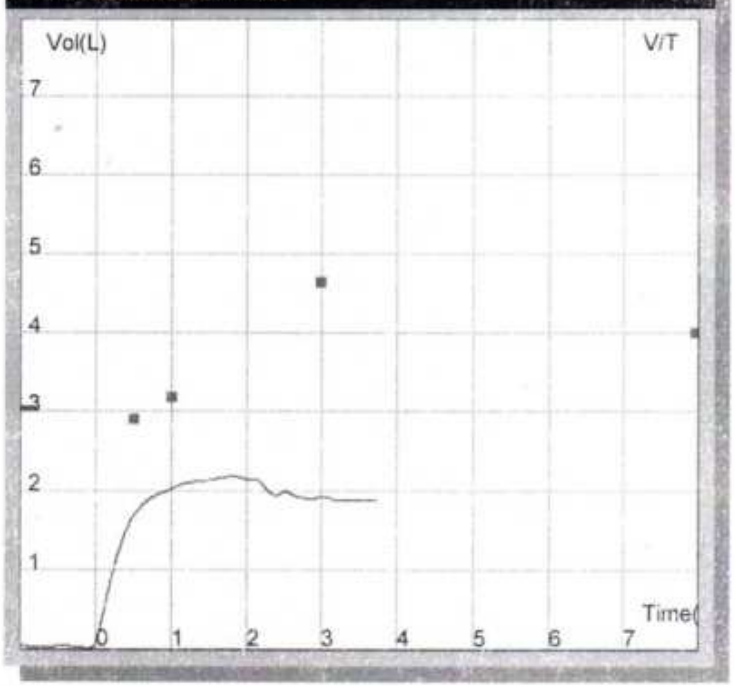
Result	Pred	Best	%Prd		%Prd		%Prd
FVC (L)	4.00	2.13	53%	---	---	---	---
FEV1 (L)	3.18	2.02	64%	---	---	---	---
FEV1/FVC	0.79	0.95	119%	---	---	---	---
FEF25-75% (L/s)	4.36	3.27	75%	---	---	---	---
PEFR (L/s)	8.01	4.43	55%	---	---	---	---
Exp time (s)	---	2.15	---	---	---	---	---

Test comments: results not reproducible, ++ coughing

FVC Flow vs. Volume



FVC Volume vs. Time



Advice?

- Saline rinses
- ? Nasal ICS
- OTC antihistamines
- ? GERD impact
- ? Trial of inhalers

Return visit in February, 2010

- Has been referred to respirology -appt in 2 months
- Fam MD would like Spirometry attempted again, and opinion
- Pt c/o increased SOB
- Started on Advair 500 mcg 1p BID, Nasonex 2 sprays each nostril once daily, and Keflex for a sinus infection.
- Exercise limited – MRC 4 (!)
- SpO2 on Room Air = 93% at rest. (!)
- Digital clubbing…(!!!)

Name: [redacted]

Height at test (in): 67.0
Weight at test (lb): 158.0

Sex: Female
Age at test: 28

Smoking history (pk-yrs): 0
Predicted set: Toronto 1991

Comments:
Diagnosis: Cough NYD

Site: New Vision FHT
Physician: [redacted]
Technician: Amy Kropf RRT,CRE

Effort protocol: ATS/ERS 2005
Bronchodilator: 400 mcg Salbutamol with Pre-BD

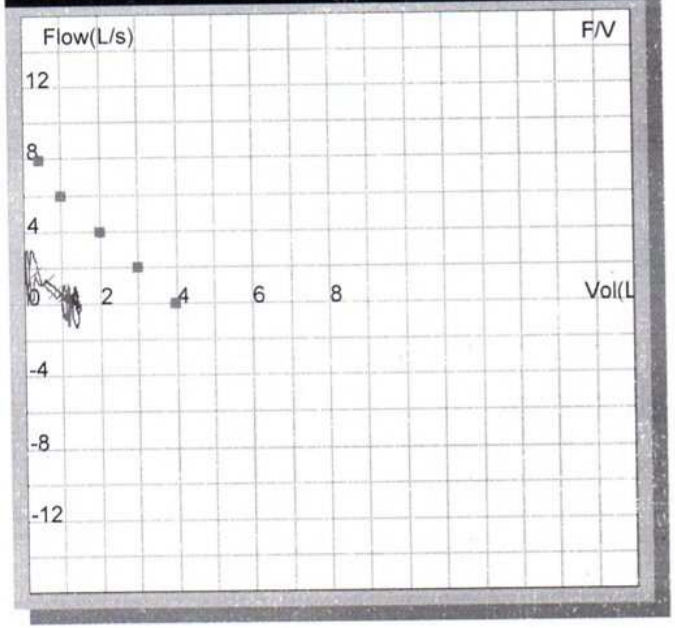
Interpreted by:
Test date/time: 02/02/10 02:35:12 PM
Pre-BD Number of efforts performed: 3
Post-BD Number of efforts performed: 1

Results

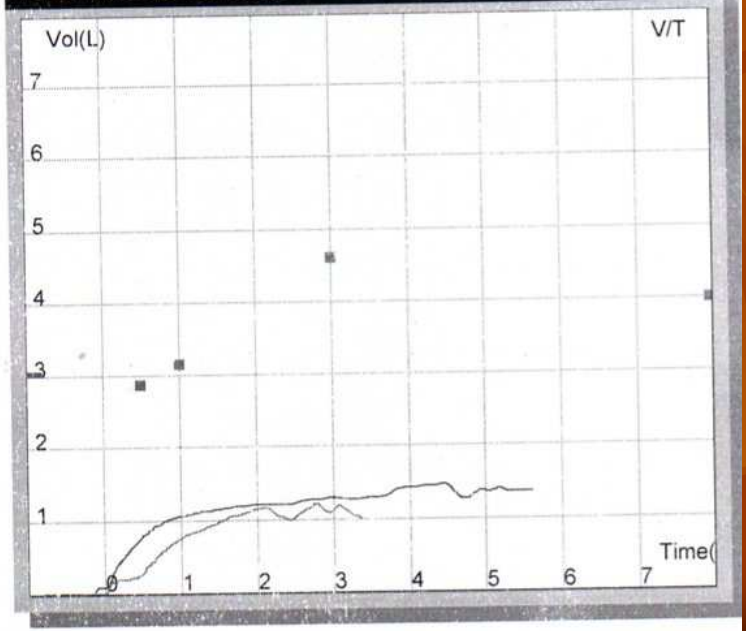
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	3.99	1.30	33%	1.17	29%	-10%
FEV1 (L)	3.16	1.06	34%	0.76	24%	-28%
FEV1/FVC	0.79	0.82	103%	0.65	82%	-20%
FEF25-75% (L/s)	4.32	1.04	24%	0.76	18%	-27%
PEFR (L/s)	7.97	2.83	36%	3.16	40%	12%
Exp time (s)	---	3.68	---	2.12	---	-42%

Test comments (Pre): results not reproducible, ++ coughing
Test comments (Post)results not reproducible, ++ coughing

FVC Flow vs. Volume



FVC Volume vs. Time



YIKES!

- Coincidently, the Respirologist she was to see in 2 months happened to be on that week in the Chest Unit.
- Called Respirologist, jumped up and down
- Insisted he see her tomorrow in Airway Clinic at St. Mary's Hospital
- He agreed. ☺

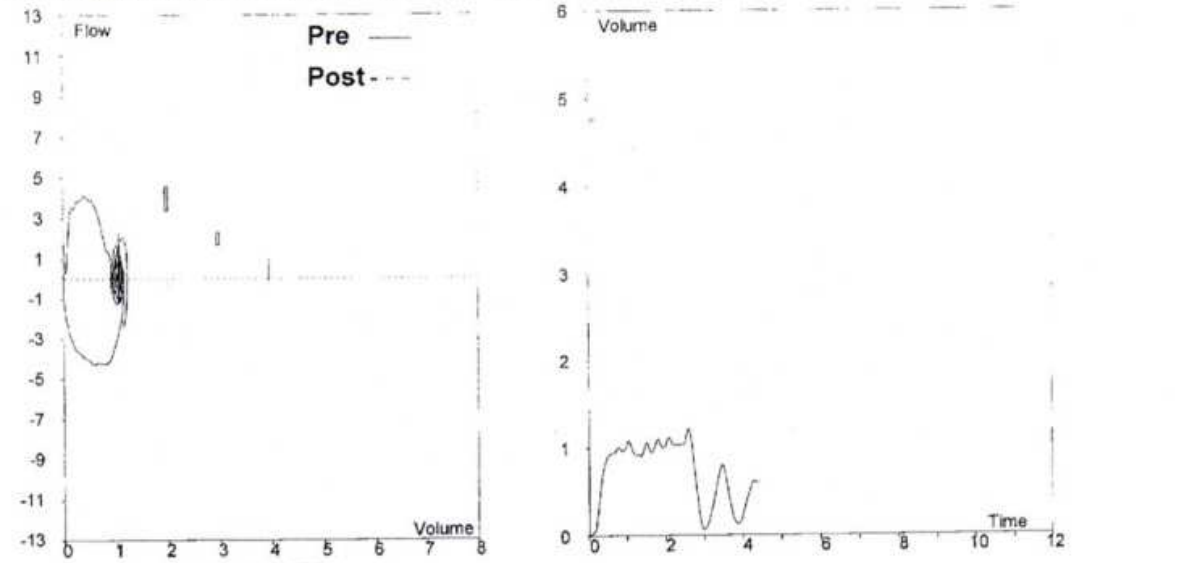
PFT and ABG's

- pH=7.42
- PaCO2=40
- PaO2=58 (!!!!!!)
- HCO3=24.9
- SaO2=90%

SPIROMETRY (BTPS)	Actual Pre.	% Pred	Pred	Actual Post	% Pred	% Change
FVC(L)	**1.14**	**29**	3.96	----	----	----
FEV1(L)	**1.05**	**34**	3.13	----	----	----
FEV1/FVC(%)	92	117	79	----	----	----
PEF(L/S)	4.12	52	7.92	----	----	----
FEF25-75(L/S)	2.85	72	3.97	----	----	----
FEF50(L/S)	3.56	90	3.96	----	----	----
FEF75(L/S)	1.34	68	1.98	----	----	----
FI50(L/S)	4.29	----	----	----	----	----
FET(Sec)	3	----	----	----	----	----
LUNG VOLUMES (BTPS)						
VC (body)(L)	**1.39**	**35**	3.96	----	----	----
IC (body)(L)	**0.58**	**25**	2.37	----	----	----
ERV(body)(L)	**0.81**	**51**	1.59	----	----	----
RV(L)	**1.19**	**68**	1.75	----	----	----
TLC(L)	**2.58**	**45**	5.71	----	----	----
RV/TLC(%)	**46**	**150**	31	----	----	----
FRC (TLC)(L)	**2.00**	**60**	3.34	----	----	----
RV HE(L)	----	----	1.75	----	----	----
TLC HE(L)	----	----	5.71			
RV/TLC HE(%)	----	----	31			
FRC HE(L)	----	----	3.34			
DIFFUSION						
DLCO(mL/mmHg/Mi)	----	----	30.7			
KCO(DLCO/L)	----	----	5.4			

Notes and Comments:

Room air ABG results 7.42 pCO2 40 pO2 58 HCO3 24.9 BE 0.9 SaO2 90% AaDO2 40.2 BMI 22.8
Good effort; difficult test due to persistent cough. DLCO not attempted.



Therapist: Julie Hopkins RRT

Seen by NP and Respirologist

- CXR – interstitial changes predominantly in upper lobes
- CT scan arranged for next day
- Bronchoscopy arranged for next week
- Thorough history revealed the family detected mould when they renovated the basement. ** Symptoms started following moving in to the home.

- ?Hypersensitivity Pneumonitis

- Advised to: GET OUT of house
- Arranged to move in with her parents
- Continue on Advair
- Return to Airway Clinic in 2 weeks for follow up PFT's

Feb 18, 2010

- Bronchoscopy
- Spirometry prior to bronchoscopy not improved
- Did not tolerate procedure well. Only able to obtain washings, no biopsies as hoped.
- Airways irritated, but no significant mucous.
- Desaturation, tachypnea, laryngospasm following procedure.

Feb 18, continued

- Spirometry prior to bronchoscopy not improved
- Repeat ABG's when stable revealed PaO2=51 mmHg
- Home O2 arranged
- Oral Steriods started – 0.5-1.0 mg/kg x 1 month with taper

May 5, 2010

- Reassessment with Respirology
- Has weaned off Prednisone
- PaO2 up to 74
- FVC up to 2.02 L (must have had done in a separate lab)
- Felt better on Prednisone, but has been off x 2 weeks, and starting to feel poorly again
- Family had home air quality test which was not totally suggestive of mould, but they could see it visibly

May 25, 2010

- Attempt #2 Bronchoscopy
- Successful Biopsies – better tolerated
- No further deterioration without steroids
- Samples sent for the Weird Wild and Wacky conditions
- Using O2 sporadically

- Starting to see signs of improvement
- House for sale

Aug 31, 2010

- Reassessed by Respirology
- Cardiopulmonary Exercise Test (CPET)
- FVC=2.21L
- FEV1.0=1.76L
- Desaturated during test to SpO2=75% on room air
- Continued O2 for exertional purposes

Referring:

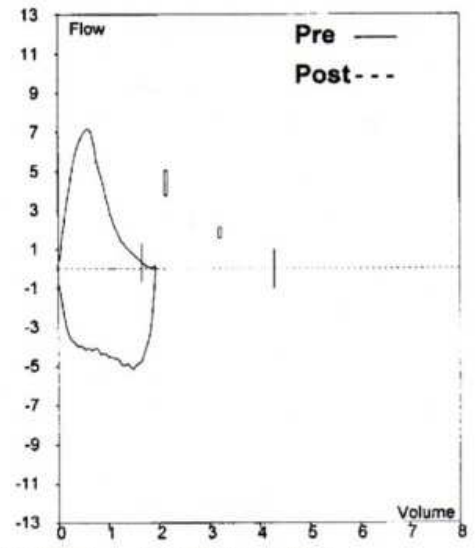
Smoking Hx: nonsmoker

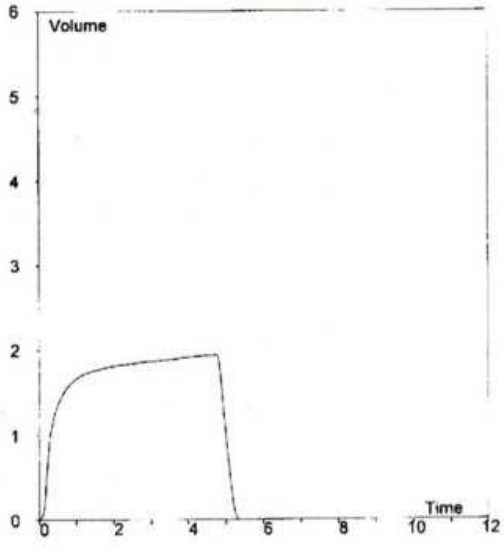
SPIROMETRY (BTPS)	Actual Pre.	% Pred	Pred	Actual Post	% Pred	% Change
FVC(L)	**1.93**	**45**	4.29	----	----	----
FEV1(L)	**1.66**	**46**	3.65	----	----	----
FEV1/FVC(%)	86	102	84	----	----	----
PEF(L/S)	7.18	133	5.38	----	----	----
FEF25-75(L/S)	2.36	65	3.65	----	----	----
FEF50(L/S)	3.38	77	4.41	----	----	----
FEF75(L/S)	0.82	45	1.84	----	----	----
FI50(L/S)	4.33	----	----	----	----	----
FET(Sec)	5	----	----	----	----	----
LUNG VOLUMES (BTPS)						
VC (body)(L)	**1.93**	**45**	4.28	----	----	----
IC (body)(L)	**1.07**	**37**	2.90			
ERV(body)(L)	0.87	----	----			
RV(L)	1.42	93	1.53			
TLC(L)	**3.35**	**57**	5.90			
RV/TLC(%)	**42**	**146**	29			
FRC (TLC)(L)	**2.29**	**75**	3.06			
RV HE(L)	----	----	1.53			
TLC HE(L)	----	----	5.90			
RV/TLC HE(%)	----	----	29			
FRC HE(L)	----	----	3.06			
DIFFUSION						
DLCO(mL/mmHg/Mi)	10.5	53	19.7			
KCO(DLCO/L)	3.5	----	----			

Mechanics

	Obs.	%Pred.val	Pred.v
RAW Ins(cmH2O/L/S)	0.91	55	1.67

Notes and Comments:





Therapist: Carolyn Currie SRT

Medisoft Expan

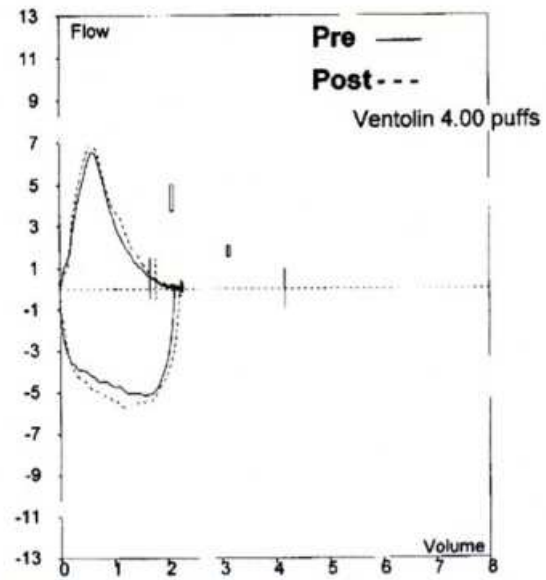
SPIROMETRY (BTPS)	Actual Pre.	% Pred	Pred	Actual Post	% Pred	% Change
FVC(L)	**2.23**	**53**	4.18	**2.30**	**55**	3
FEV1(L)	**1.73**	**48**	3.56	**1.80**	**51**	4
FEV1/FVC(%)	77	92	84	78	93	1
PEF(L/S)	6.54	124	5.26	6.90	131	6
FEF25-75(L/S)	1.88	52	3.58	2.09	58	11
FEF50(L/S)	2.52	58	4.38	3.04	69	20
FEF75(L/S)	**0.56**	**31**	1.82	**0.63**	**34**	12
FI50(L/S)	4.76	----	----	5	----	15
FET(Sec)	6	----	----	8	----	21
LUNG VOLUMES (BTPS)						
VC (body)(L)	**2.32**	**56**	4.17			
IC (body)(L)	**1.23**	**41**	3.04			
ERV(body)(L)	1.09	----	----			
RV(L)	1.26	84	1.50			
TLC(L)	**3.58**	**62**	5.75			
RV/TLC(%)	**35**	**120**	29			
FRC (TLC)(L)	**2.35**	**79**	2.98			
RV HE(L)	----	----	1.50			
TLC HE(L)	----	----	5.75			
RV/TLC HE(%)	----	----	29			
FRC HE(L)	----	----	2.98			
DIFFUSION						
DLCO(mL/mmHg/Mi)	14.8	73	20.44			
KCO(DLCO/L)	4.5					

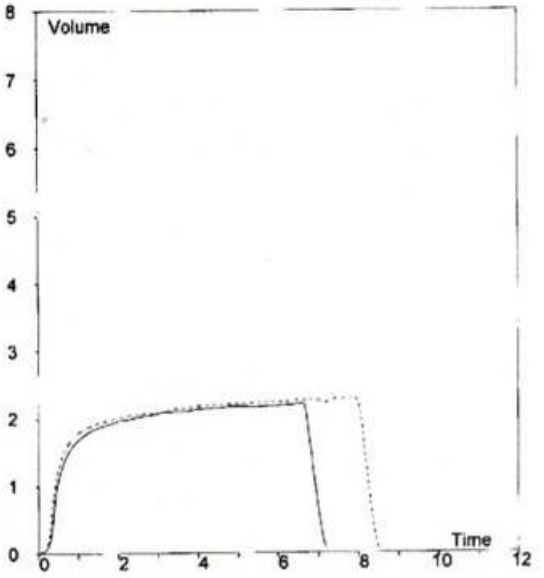
Mechanics

	Obs.	%Pred.val.	Pred.val.
RAW Ins(cmH2O/L/S)	0.58	36	1.63

Notes and Comments:

Room Air Sp02 96%, HR 79 bpm, BMI 27.6. Good pt. effort.





Therapist: Amanda Meyer RRT

Medi soft Exp'air I 28

Case 3

Patient ZS

- 58 yr old male
- Referred to Respiratory Therapist for spirometry following a chest x-ray report that stated:

  Moderate hyperinflation of lungs in keeping with COPD

- Referral has also been made to Respirology

Spirometry Assessment

- Non-Smoker (ETS exposure in childhood home)
- Wood burning heat in childhood home
- Works in pizzeria (flour exposure)
- No family history of lung disease

Continued…

- Denies SOB
- Notes need to clear his throat frequently
- Throat irritation often noted in early evening
- Feels that “something” is occluding his nasal passage

Height at test (in): 71.0	Sex: Male	Smoking history (pk-yrs): 0
Weight at test (lb): 136.0	Age at test: 58	Predicted set: Toronto 1991

Comments: grew up in smoking home, CXR shows "moderate hyperinflation"
Diagnosis: Spirometry screening

Site: New Vision FHT
Physician: [redacted]
Technician: Angela Shaw RRT,CRE

Effort protocol: ATS/ERS 2005
Bronchodilator: 400 mcg Salbutamol

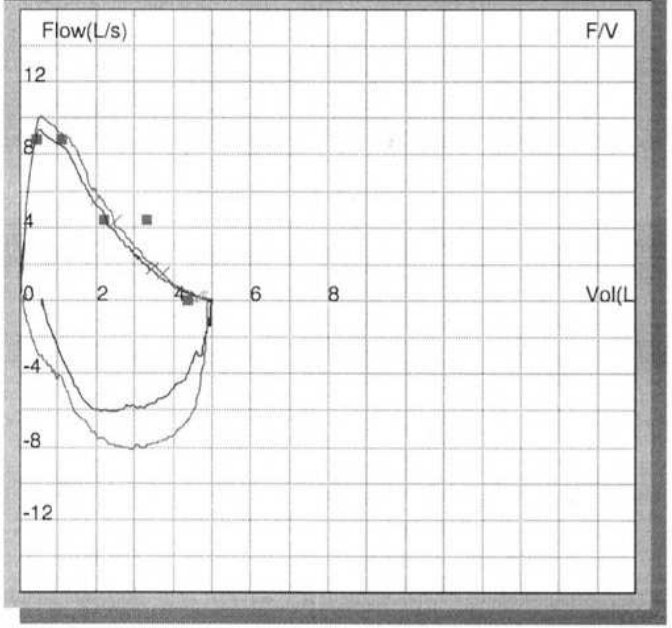
Interpreted by:
Test date/time: 08/11/11 08:41:00 AM
Pre-BD Number of efforts performed: 3
Post-BD Number of efforts performed: 3

Results

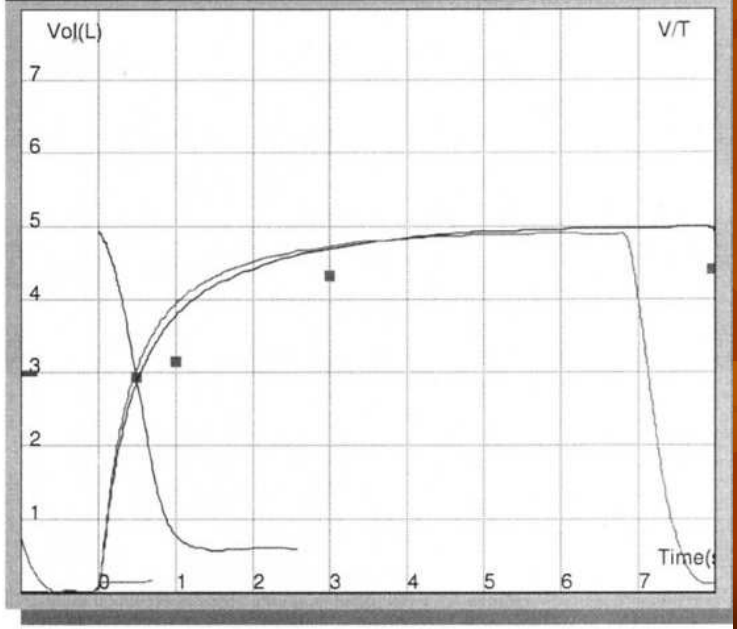
Result	Pred	Pre	%Prd	Post	%Prd	%Chg
FVC (L)	4.41	4.98	113%	4.89	111%	-2%
FEV1 (L)	3.16	3.79	120%	3.95	125%	4%
FEV1/FVC	0.72	0.76	106%	0.81	113%	6%
FEF25-75% (L/s)	3.82	3.09	81%	3.77	99%	22%
PEFR (L/s)	8.82	8.97	102%	9.78	111%	9%
Exp time (s)	---	6.27	---	5.14	---	-18%

Test comments (Pre): Good effort and co-operation.
Test comments (Post): Good effort, reproducible efforts, unable to exhale 6 seconds

FVC Flow vs. Volume



FVC Volume vs. Time



Recommendations?

- Follow up with Family Physician
  - ? upper airway involvement (nasal blockage, post nasal drip…)
  - ? GERD
- Should he see Respirology?