* Spirometry : measurement of the air moving in & out of the lung During Various Respiratory maneuvers.
  - How much
  - How fast

Indication of Spirometer:
- Evaluate the signs & symptoms
- Classify asthma & COPD
- Assess Disease progression
- Monitor therapy effectiveness
- evaluate preoparitive patient in some situations

* Preparing:
- No smoking for 2h
- No exercise
- No heavy eating
- No tight clothings
- No long /short acting Bronchodilators

* long acting Bronchodilators are β_2-agonist
  - Salbutamol
* Short " " " Glucocorticosteroids

* Before test : it is logical Steps so I will not Right it.

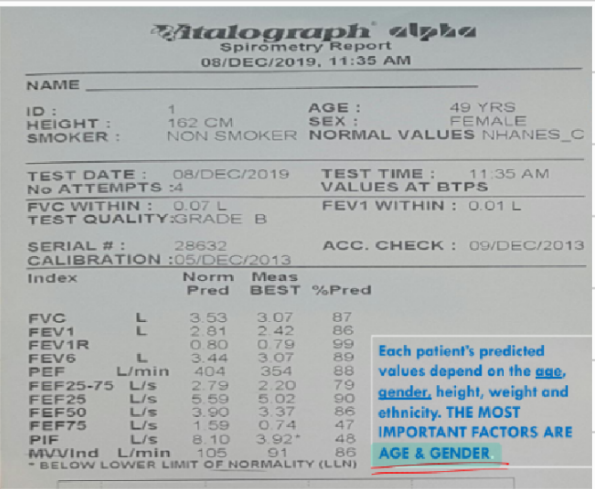
* (Performing test) → ① few normal breaths → ② Deepest inhalation you can do.

② Deepest inhalation you can do. → ③ Exhale as much as fast as you can for 6s → take Deep breath back → Repeate it 3 times

* the highest value of the 3 trials will be used.

* Dynamic volume is the volume that depend on the Rate of flow as
  * Dynamic test as FVC and MVV (maximum voluntary ventilation)

* Important lung volumes:
- FVC : forced vital capacity : Volume that can you exhale forcefully After Deep inspiration
- FEV_1 : FVC in first second
  - $\frac{FEV}{FVC} \sim 80\%$
- PEF : maximum speed while expiration
- FEF : speed of air during expiration
  - * FEF 25-75 : the avarege flow when 25% of air has been exhaled to one in 75% of air


Vitalograph alpha
Spirometry Report
08/DEC/2019, 11:35 AM

NAME

ID : 1 AGE : 49 YRS
HEIGHT : 162 CM SEX : FEMALE
SMOKER : NON-SMOKER NORMAL VALUES NHANES_C

TEST DATE : 08/DEC/2019 TEST TIME : 11:35 AM
No ATTEMPTS :4 VALUES AT BTPS
FVC WITHIN : 0.07 L FEV1 WITHIN : 0.01 L
TEST QUALITY:GRADE B

SERIAL # : 28632 ACC. CHECK : 09/DEC/2013
CALIBRATION :05/DEC/2013

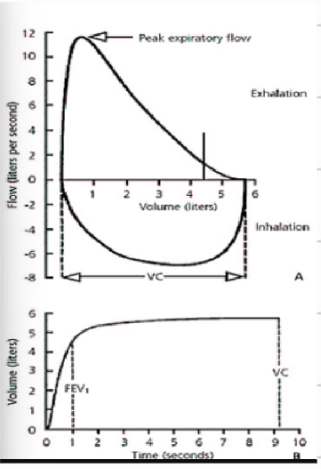
Index		Norm Pred	Meas BEST	%Pred
FVC	L	3.53	3.07	87
FEV1	L	2.81	2.42	86
FEV1R		0.80	0.79	99
FEV6	L	3.44	3.07	89
PEF	L/min	404	354	88
FEF25-75	L/s	2.79	2.20	79
FEF25	L/s	5.59	5.02	90
FEF50	L/s	3.90	3.37	86
FEF75	L/s	1.59	0.74	47
PIF	L/s	8.10	3.92*	48
MVVind	L/min	105	91	86

* BELOW LOWER LIMIT OF NORMALITY (LLN)

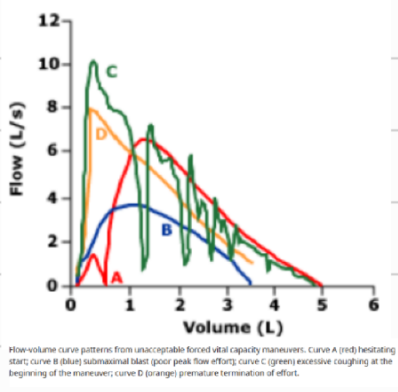
Each patient's predicted values depend on the age, gender, height, weight and ethnicity. THE MOST IMPORTANT FACTORS ARE AGE & GENDER.

* there are two Graphs → flow-volume curve & volume-time curve

PEF FVC Expiratory effort FVC FEV_1 Duration of expiration



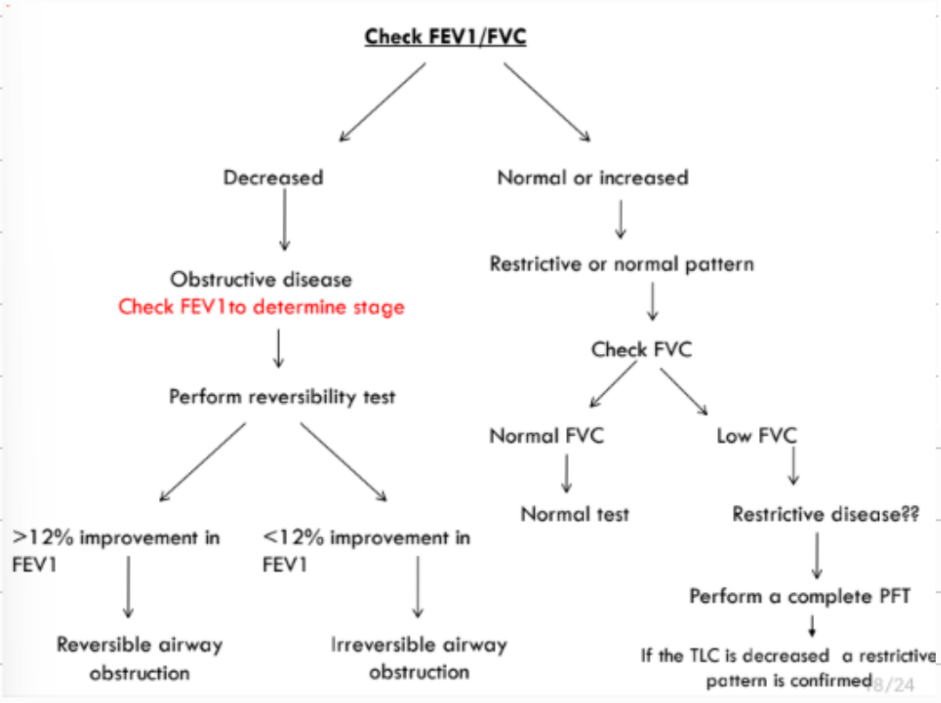
* the test must be → Acceptable → Rapid ↑ in Airflow in the biginning of exhalation
→ exhalation for 6s
→ Reproducible → the difference between two largest FVC & FEV_1 is < 0.2L

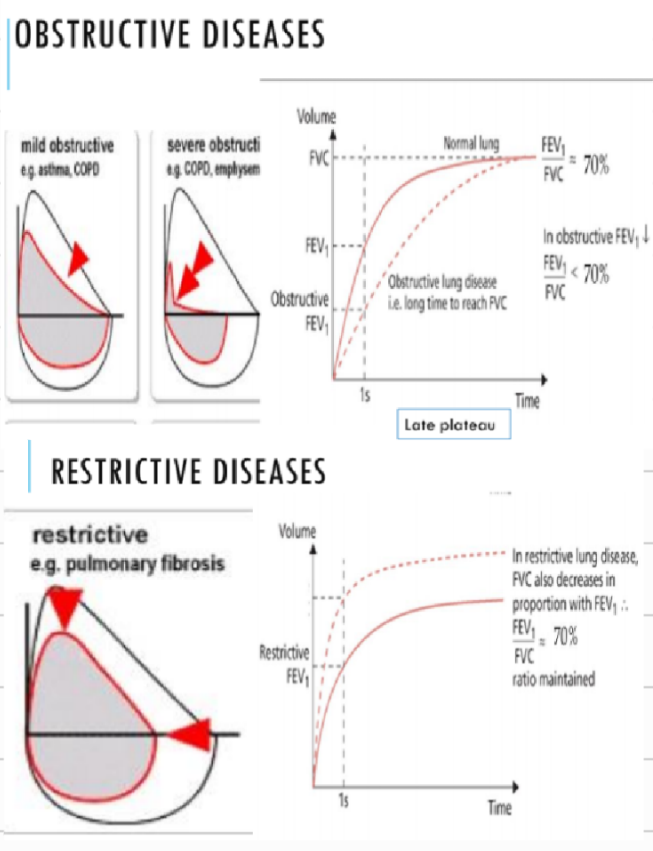


How-volume curve patterns from unacceptable forced vital capacity maneuvers. Curve A (red) hesitating start; curve B (blue) submaximal blast (poor peak flow effort); curve C (green) excessive coughing at the beginning of the maneuver; curve D (orange) premature termination of effort.

	FEV1	FVC	FEV1/FVC
Normal	80%-120% of the predicted value	80%-120% of the predicted value	>70%
Obstructive lung disease	Decreased	Normal or **decreased**	**Decreased**
Restrictive lung disease	Decreased	**Decreased**	Normal or increased

* Reduction in FEF 25-75 less than 60% of predicted confirm Airway obstruction
* PEF is Reduced with obstructive disease & Shows Diurnal variation.



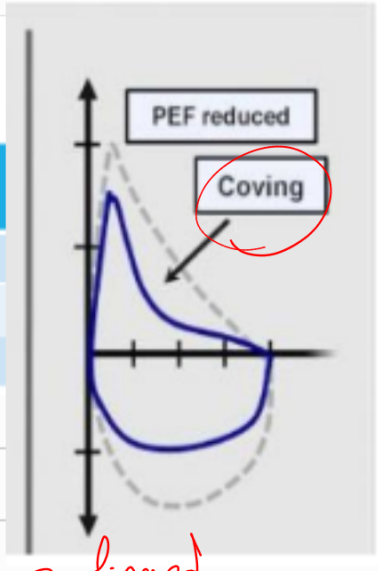


* Reversible airway obstruction: if the FEV_1 increased by more than 12% after short acting bronchodilator (salbutamol)
* we use complete PFT to confirm restrictive lung disease diagnosis

* if the tests are normal but the History strongly suggest presence of Asthma Methcholine challange test is performed
↳ we measure FEV_1 & then we adminster methcholine sequentially
↳ By nebulizer
from 4 mg to 16 mg & if FEV_1 drops more than 20% it will diagnosed by Asthma

A 51 year old woman presents with shortness of breath, coughing and wheezing for the past 3 months. Her spirometry results are shown in the table below. What is your diagnosis?

	Predicted	Actual	% of predicted	Post bronchodilator	% change
FVC (L)	2.91	2.42	83%	2.72	12%
FEV1(L)	2.41	1.52	63%	2.05	34%
FEV1/FVC	82.8%	58.2%		75.4%	



* FEV_1/FVC is < 70 ⇒ obstructive
& there is Coving so the diagnosis is confirmed

اللهم ثبت اخواننا بالقول الثابت
في الحياة الدنيا وفي الآخرة

Abd Arrahman Dabbas