



October 22-25, 2015

Halic Congress Center
Istanbul / TURKEY



JPCRG workshops on respiratory diseases

Spirometry technique

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Spirometry must be used in primary care

- Is it useful in Primary Care?
- Have we got spirometers in our practices?
- Who is in charge to perform it?
- Who and how to interpretate it?

Spirometry must be used in primary care

- Is it usefull in Primary Care?

The concept

Forced exhalation from a **maximal** inspiration



When to perform a forced spirometry

- Spirometry measures airflow and lung volumes, and is the preferred lung function test to identify airway obstruction in COPD and asthma
- >60% of COPD patients are treated and controlled in P.C.
- More than 80% of asthmatic patients are managed in P.C.
- Diagnostic criteria for COPD is FEV₁/FVC <70%
- First test to be made when asthma is suspected

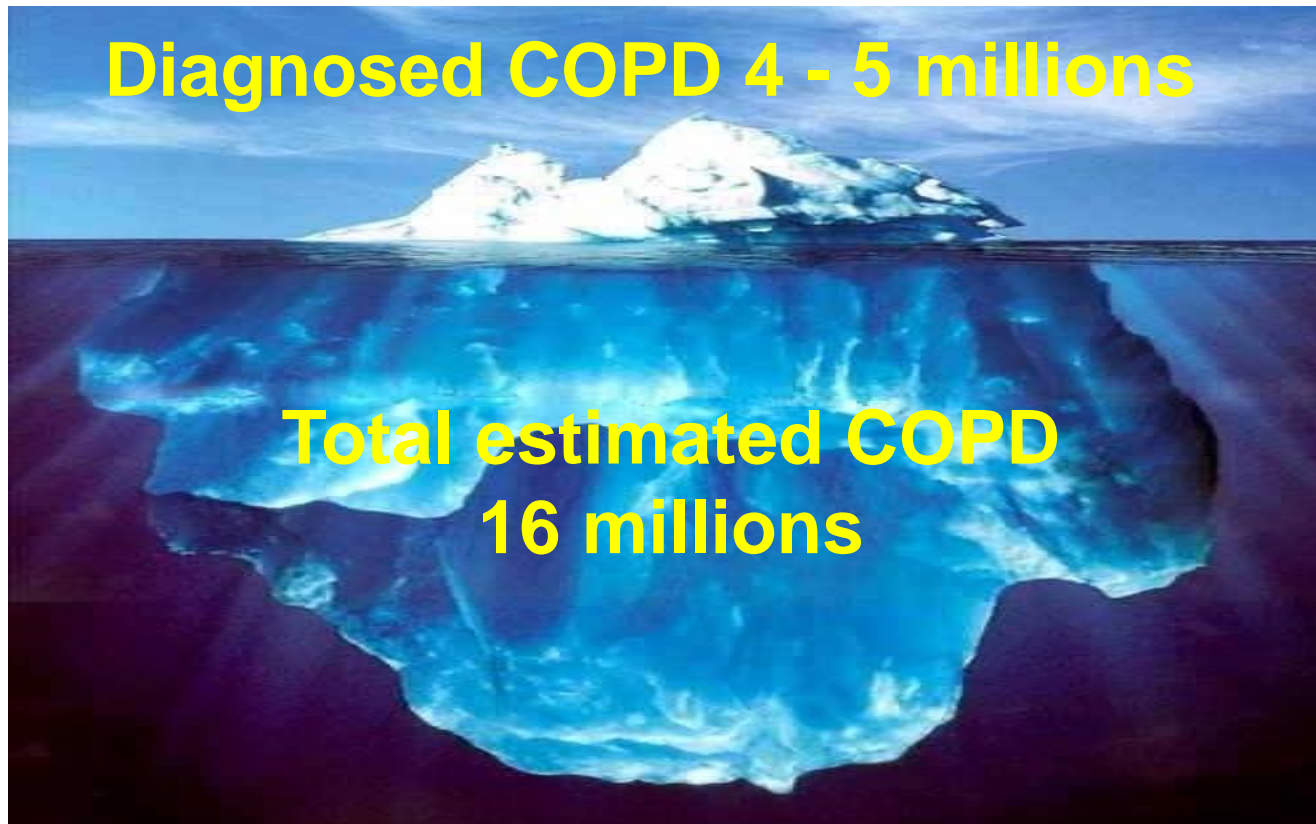
When to perform a forced spirometry

- Early diagnosis of COPD in smokers at risk?



When to perform a forced spirometry

- Early diagnosis of COPD in smokers at risk?



Effective Methods to Identify the Silent Population with COPD

Diagnostic standard spirometry

The only recognised method for confirming diagnosis



Handheld screening devices

- Inexpensive and easy-to-use monitors
- Useful for case identification



Validated screening questionnaires

- COPD Population Screener™ (COPD-PS)
- Simple and easy to use

The survey asks questions about you, your breathing and what you are able to do. To complete the survey, mark an X in the box that best describes your answer for each question below.

1. Having the following symptoms has had an effect on you?

SYMPTOM	NO	YES
Wheeze	<input type="checkbox"/>	<input type="checkbox"/>
Shortness of breath	<input type="checkbox"/>	<input type="checkbox"/>
Cough	<input type="checkbox"/>	<input type="checkbox"/>
Phlegm	<input type="checkbox"/>	<input type="checkbox"/>

2. Do you ever cough up any "sputum" (mucus or phlegm)?

NO, never	YES, most of the time	YES, every day
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Please select the answer that best describes you in the past 12 months.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Have you smoked at least 100 cigarettes in your ENTIRE LIFE?

NO	YES
<input type="checkbox"/>	<input type="checkbox"/>

5. How old are you?

Age 20 to 40	Age 41 to 50	Age 51 to 60	Age 70+
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. How many times have you visited a doctor in the past 12 months because of your breathing problem?

1 or fewer	2 to 4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. How often have you visited a doctor in the past 12 months because of your breathing problem?

1 or fewer	2 to 4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. How often have you visited a doctor in the past 12 months because of your breathing problem?

1 or fewer	2 to 4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. How often have you visited a doctor in the past 12 months because of your breathing problem?

1 or fewer	2 to 4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. How often have you visited a doctor in the past 12 months because of your breathing problem?

1 or fewer	2 to 4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. How often have you visited a doctor in the past 12 months because of your breathing problem?

1 or fewer	2 to 4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. How often have you visited a doctor in the past 12 months because of your breathing problem?

1 or fewer	2 to 4	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

When to perform a forced spirometry

European Journal of General Practice, 2010; 16: 215–221

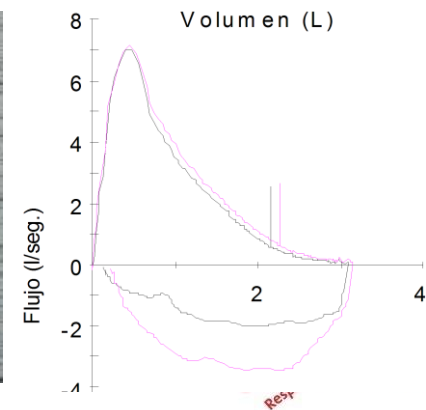


ORIGINAL ARTICLE

Spirometry for detection of undiagnosed chronic obstructive pulmonary disease in primary care

20% detection in smokers > 40 years old

Variables	(n = 39) n (%)	(n = 134) n (%)	P
Gender, male	28 (29.8)	66 (70.2)	0.013
Age (years)			
40–49	17 (20.0)	68 (80.0)	0.009
50–59	9 (15.5)	49 (84.5)	
60–69	13 (43.3)	17 (56.7)	
Pack-years			
Mean (SD)	33.8 (25.88)	26.0 (15.5)	0.019
Median (P25–P75)	34.0 (20.3–0.5)	23.4 (15.0–33.5)	
Symptoms			
Cough	20 (33.9)	39 (66.1)	0.01
Sputum	18 (25.7)	52 (74.3)	0.43
Wheeze	25 (22.5)	86 (77.5)	0.90



Spirometry can be used to Communicate Lung Health



- **The concept of 'lung age'**

- Lung age = the age of the average healthy person who would have a similar FEV₁
- Makes spirometry data easier to understand
- Can be a useful psychological tool to demonstrate to patients the premature decline in lung health

Morris JF, Temple W. *Prev Med* 1985;14:655–62;

- **UK Step2Quit study**

- 561 smokers (aged >35 years) in general practice
- Spirometric assessment of lung function to determine lung age
- Informing patients of lung age was associated with a **7.2% improvement in smoking cessation rates** ($p=0.005$)

Parkes G et al. *BMJ*; 2008; 336: 598–600.



Validated screening questionnaires

COPD POPULATION SCREENERTM

EMAIL TO A FRIEND 

**Internet accessible
self-administered**

Here's your score.



Your total score is between 0 and 4. If you are experiencing problems with your breathing, please share this survey with your doctor. He or she can help evaluate any type of breathing problem. [Print](#) your results now, or you can [email them to yourself](#) and print them later.

EMAIL RESULTS TO YOURSELF 

PRINT YOUR RESULTS 

Here is how you responded:

1. During the past 4 weeks, how much of the time did you feel short of breath?
You answered: None of the time
2. Do you ever cough up any "stuff," such as mucus or phlegm?
You answered: No, never
3. Please select the answer that best describes you in the past 12 months. I do less than I used to because of my breathing problems.
You answered: Strongly disagree
4. Have you smoked at least 100 cigarettes in your ENTIRE LIFE?
You answered: No
5. How old are you?
You answered: Age 50 to 59

When not to perform spirometry

Absolute contraindications

- ✓ Recent pneumotórax
- ✓ Pulmonary Embolism (before anticoagulation)
- ✓ Active respiratory infection
- ✓ Recent myocardical infarction or Unstable angor pectoris
- ✓ Retinal detachment
- ✓ Aortic Aneurisms
- ✓ Recent abdominal surgery
- ✓ Intracranial hypertension

Relative contraindications

- Traqueostomy
- Problems to hold the mouthpiece
- Facial hemiparesis
- Poor mental condition.

Spirometry must be used in primary care

- Have we got spirometers in our practices?



Spirometry must be used in primary care

- **Who is in charge to interpretate it?**





You !!!

C. SALUD SON PIZA
PRUEBAS DE FUNCION PULMONAR

DATOSPIR 120 - SIBELMED

Codigo: 870318 Fecha: 08.11.2001
Nombre: XXXXXXXXXX
Sexo: Hombre Edad(a): 14
Talla(cm): 175 Peso(Kg): 70
Temp(°C): 22 Humedad(%): 50
Pres(mmHg): 746 I. Fuma: 0
Referencias: MORRIS F. Etnico(%): 100
Motivo:
Procedencia:
Técnico:
Transductor: Fleisch F. Cal: 08.11.2001

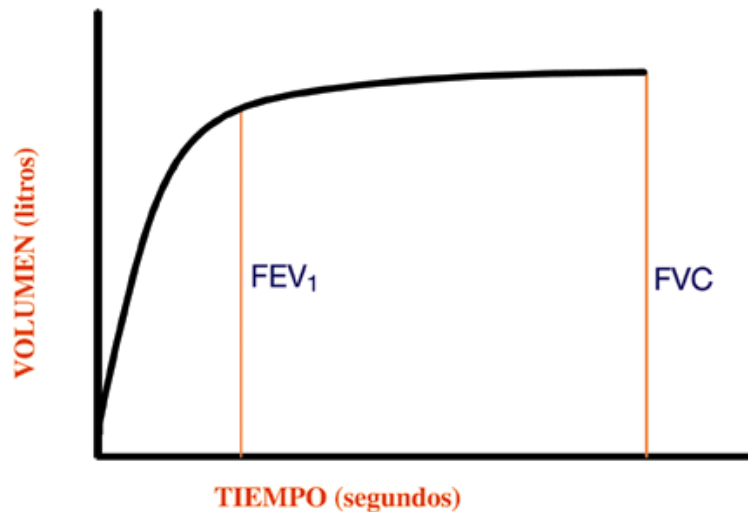
INFORME DE FVC MANIOBRA Nº: 1/4

PARAMETRO	OBS	REF	(%)
Mejor FVC (l)	5.21	4.33	120
Mejor FEV1 (l)	4.77	3.87	123
FVC (l)	4.90	4.33	113
FEV1 (l)	4.77	3.87	123
FEV1/FVC (%)	97.17	82.19	118
PEF (l/s)	9.92	7.91	125
FEF25%-75% (l/s)	5.72	4.99	115

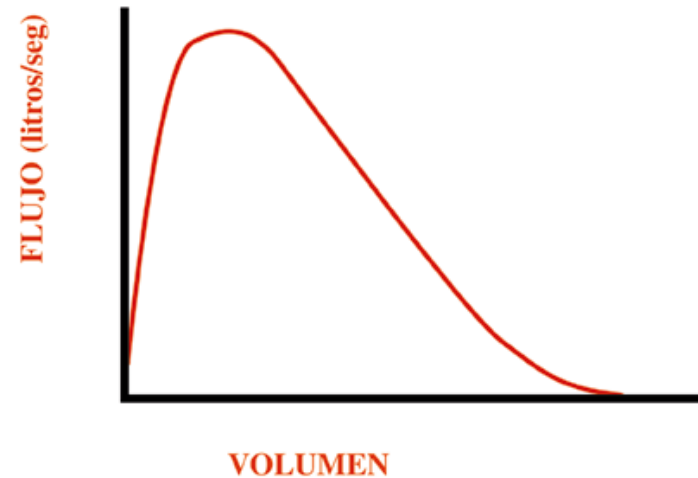
TRACES

Any test is only as good
as its accuracy

Time/volume

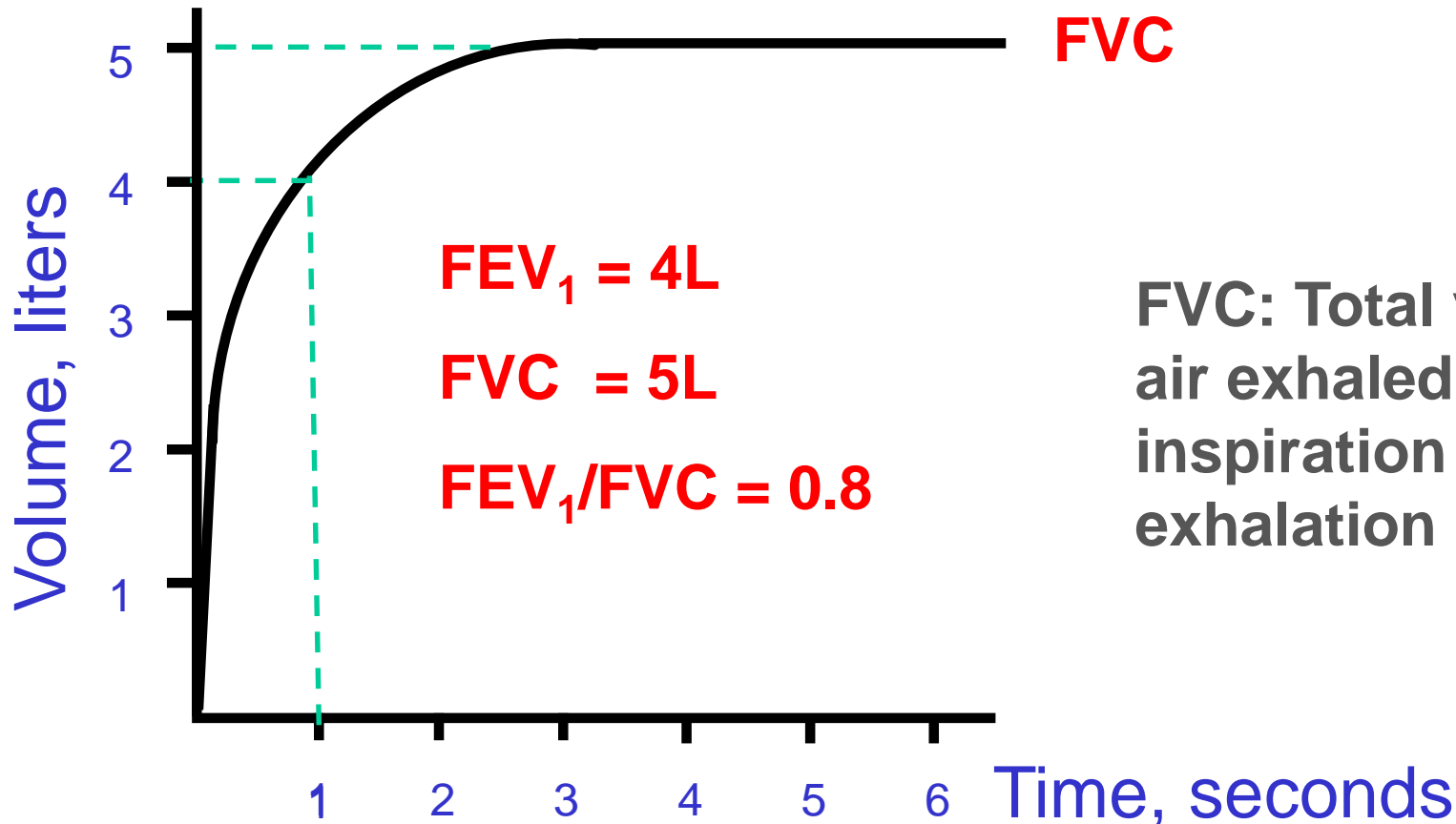


Flow/volume



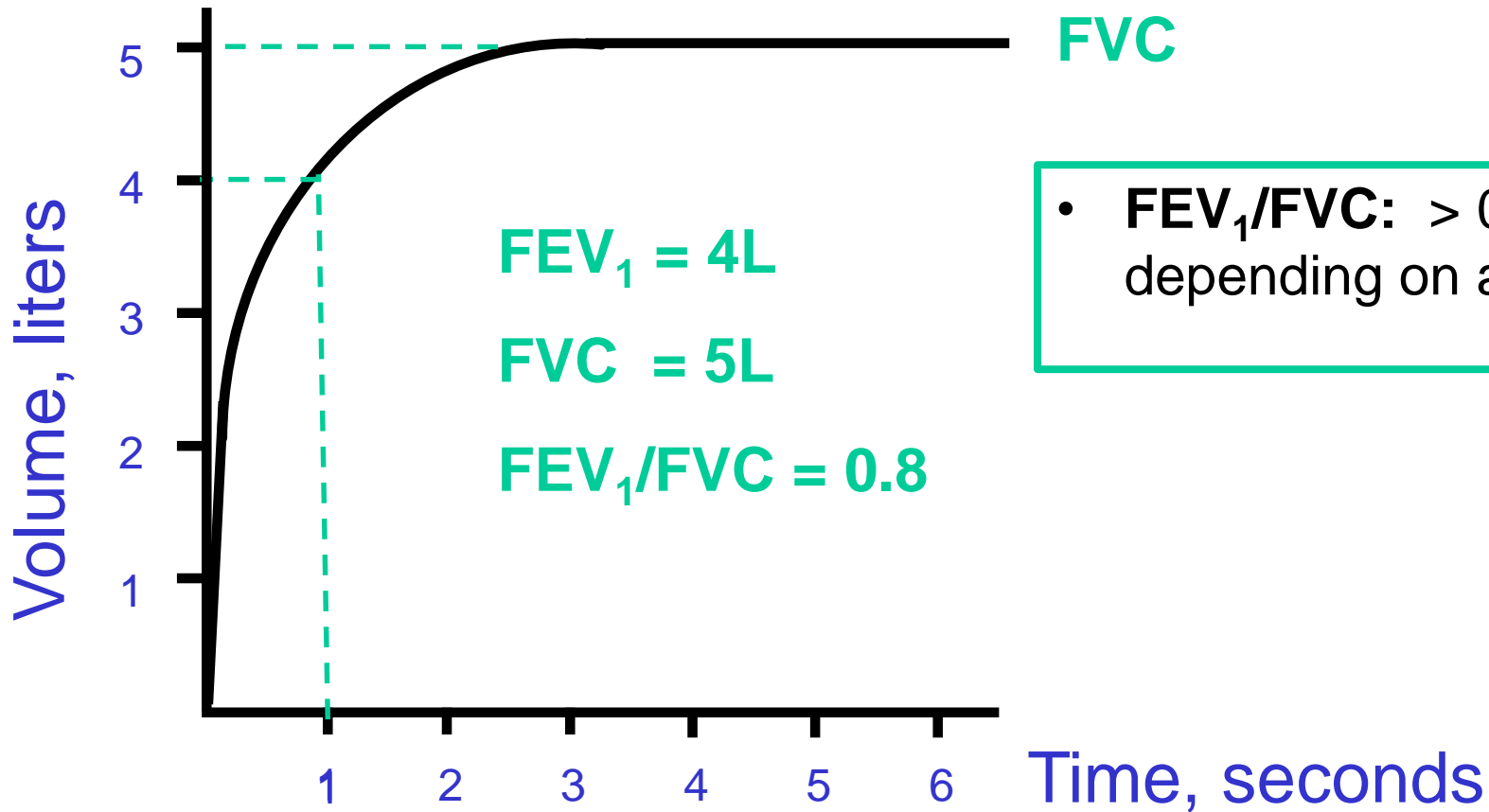
The most important issue

FEV₁: Volume of air exhaled in the first second of a forced exhalation after complete inspiration



FVC: Total volume of air exhaled after full inspiration and full exhalation

Is there an obstruction?



Same flow for anyone?



Spirometry

Interpretation

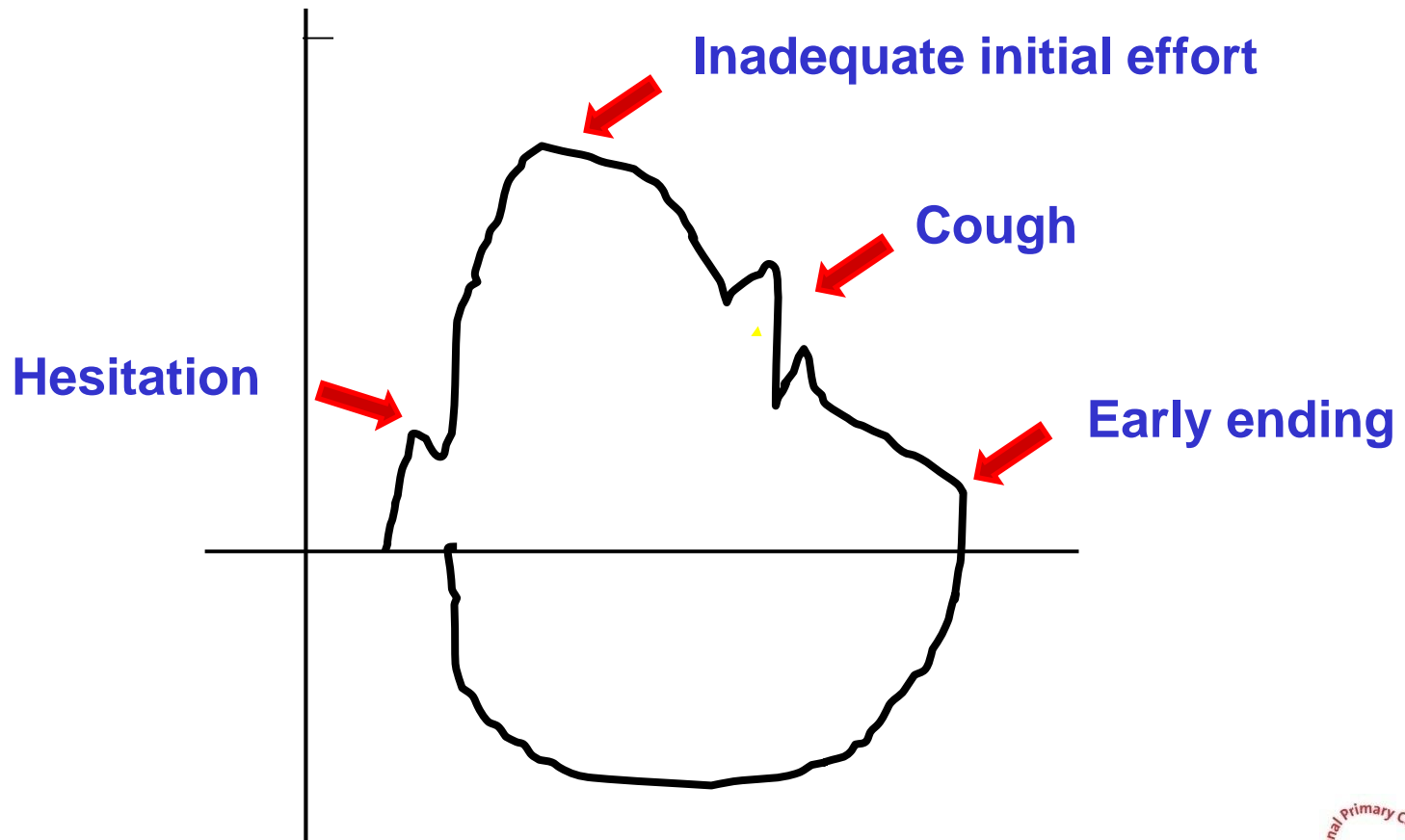


- **Is it acceptable and repeatable?**
- **The traces' shape**
- **Measurements assessment**

Reasons for unacceptable /unreliable readings:

- **Inadequate or incomplete inhalation**
- **Slow start to the forced exhalation**
- **Lack of blast effort during exhalation**
- **Coughing.**
- **Additional breath taken during manoeuvre**
- **Lips not tight around the mouthpiece**
- **Exhalation stops before complete expiration**
- **No 3 reproducible tests**

Reasons for unacceptable /unreliable readings:

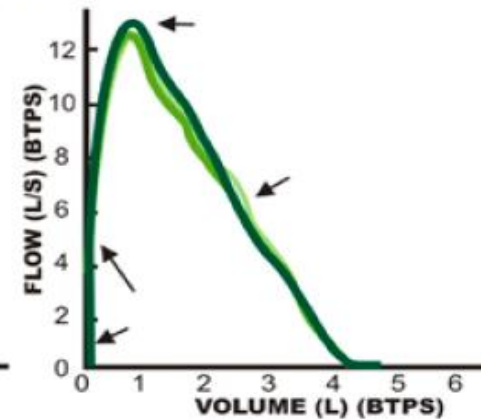
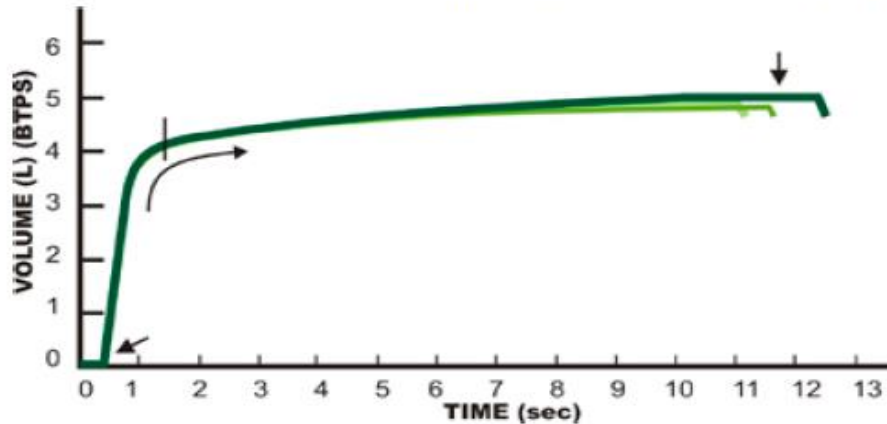


Reasons for unacceptable /unreliable readings:

Valid Normal Test

Trial	FVC (L)	FEV ₁ (L)	PEF (L/sec)
1	4.81	4.09	12.1
2	4.74	4.07	12.0
3	4.87	4.14	12.5
Repeatability	0.06	0.05	

$4.87 - 4.81 = 0.06$ $4.14 - 4.09 = 0.05$



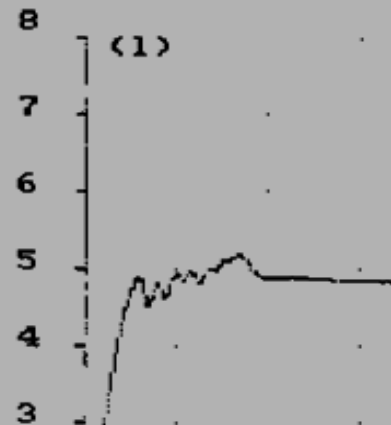
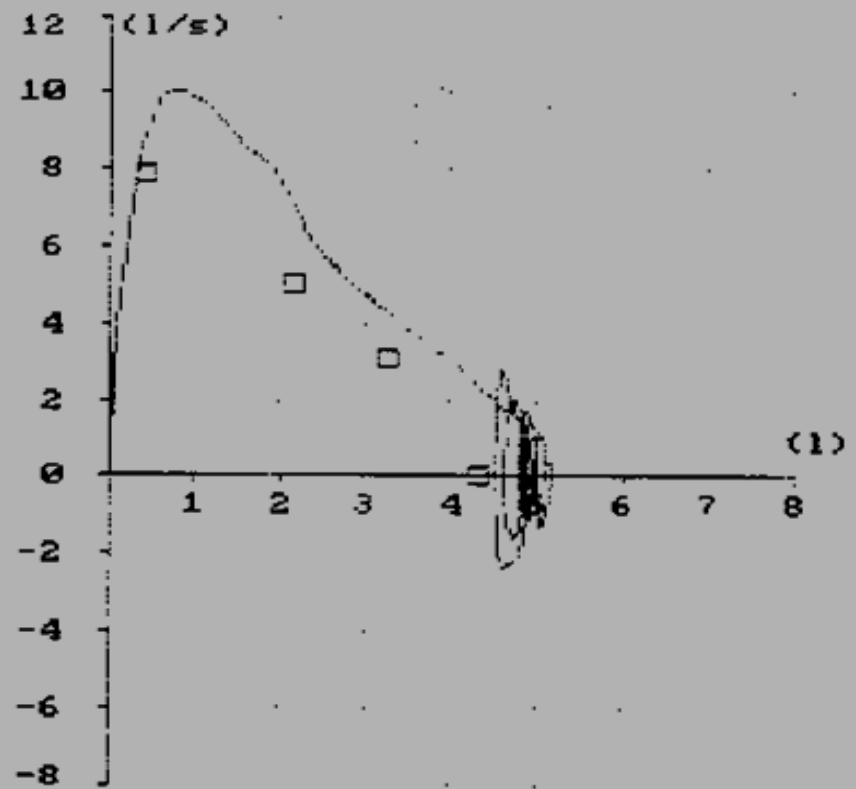
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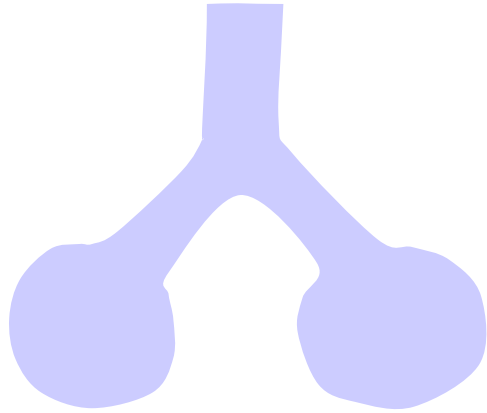
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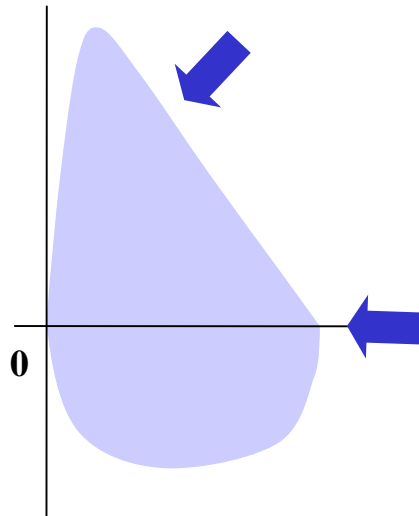


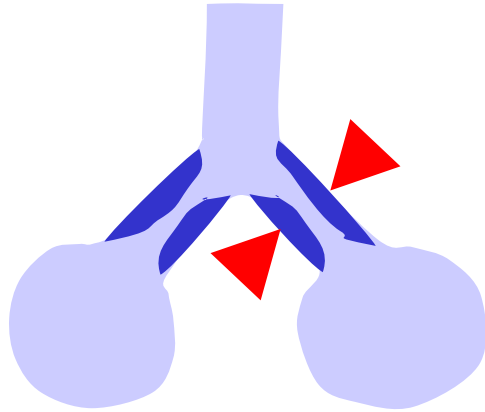
Spirometric patterns

- **Normal**
- **Obstructive**
- **Restrictive**
- **Mixed**

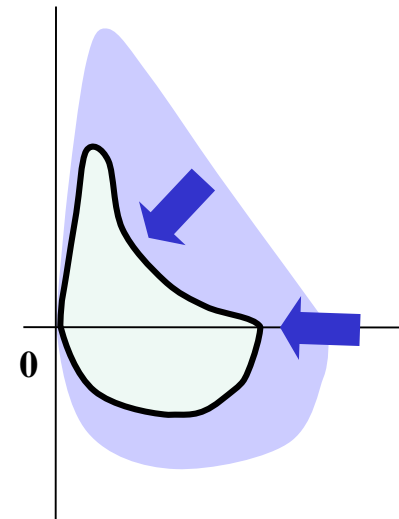
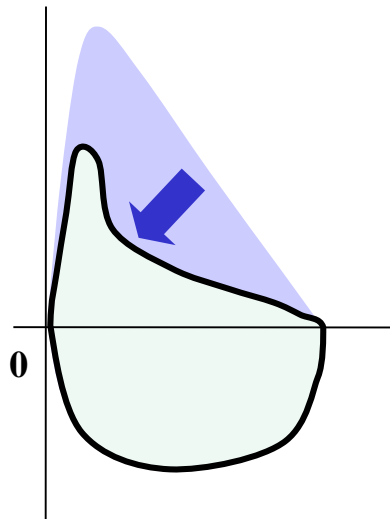
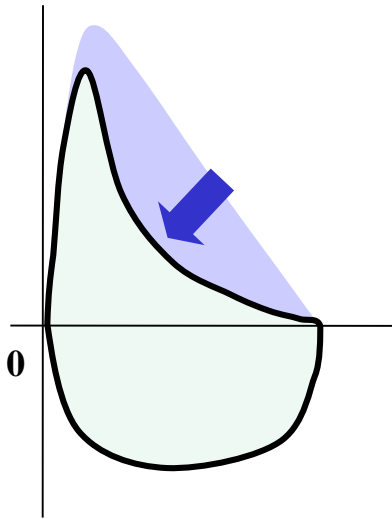


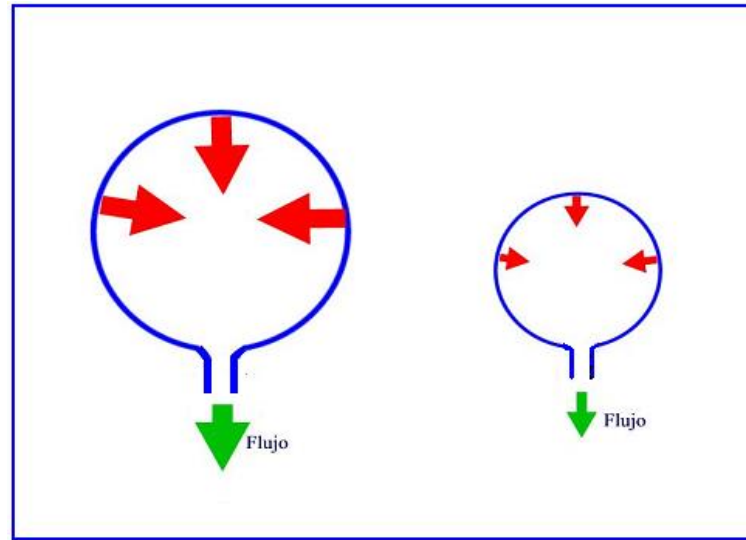
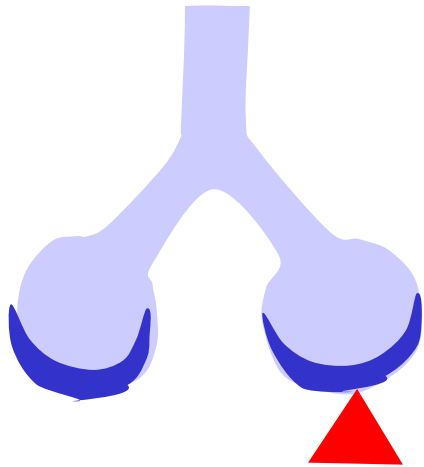
NORMAL



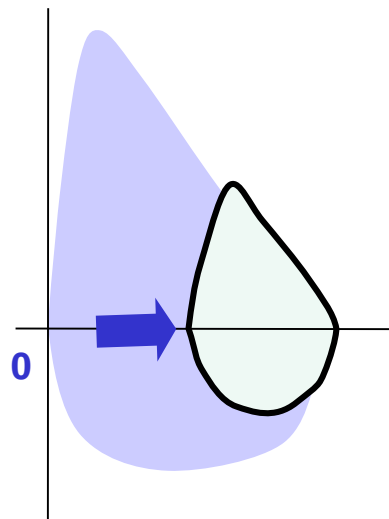
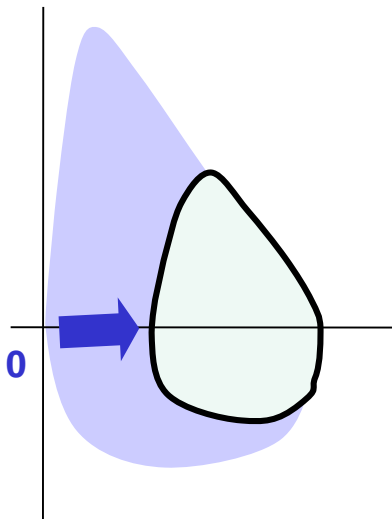


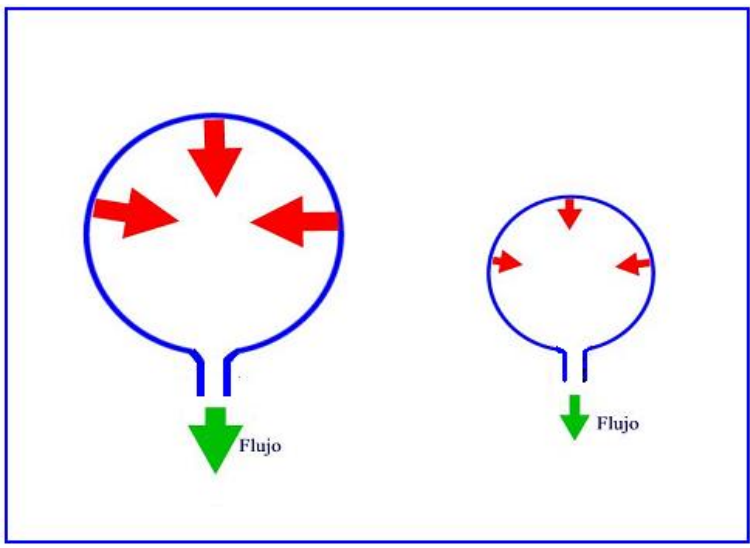
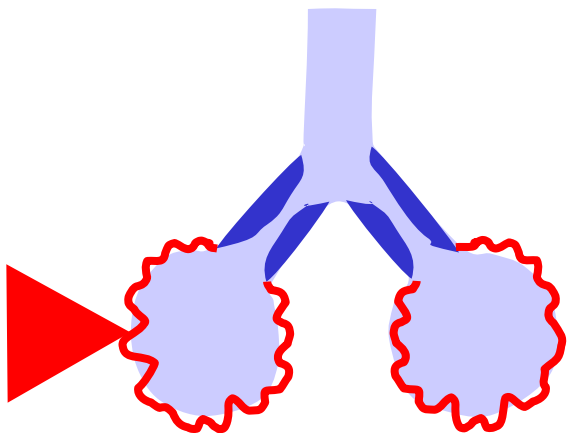
OBSTRUCTION



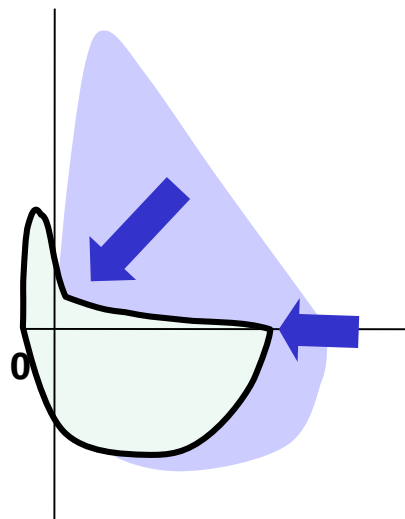
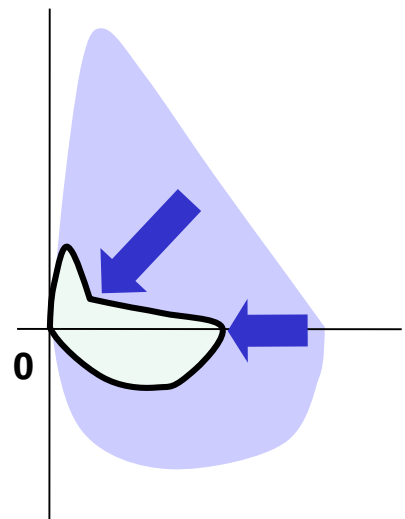
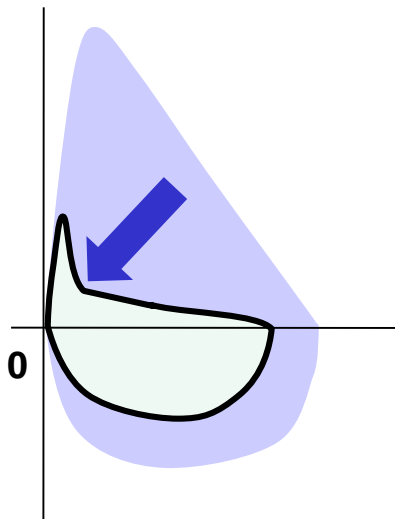


RESTRICTION





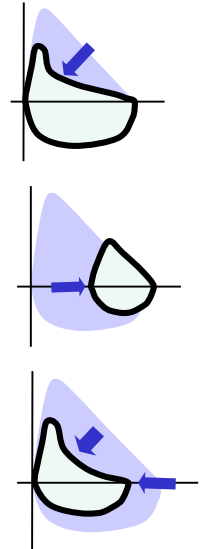
MIXED



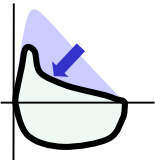
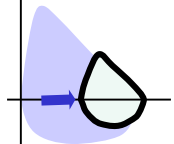
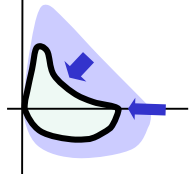
Spirometric patterns

	FEV ₁ /FVC	FVC	FEV ₁
Obstruction	↓	<i>N</i>	↓
Restriction	<i>N</i>	↓	<i>N</i> ↓
Mixed Obstruction and hyperinflation	↓	↓	↓

Pletismography and lung volumes studies are needed



Spirometric patterns

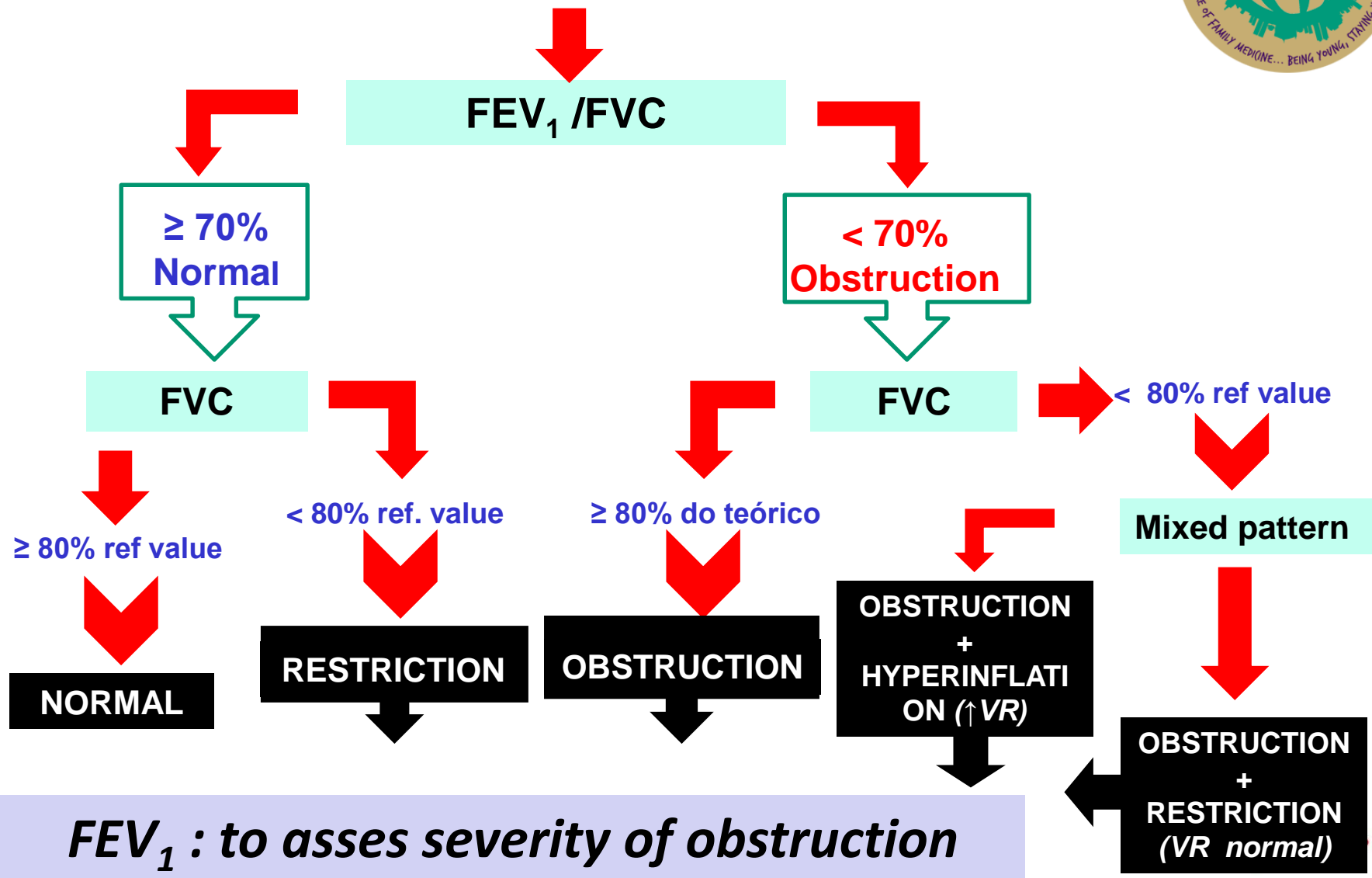
	FEV ₁ /FVC	FVC	
Obstruction	↓	<i>N</i>	
Restriction	<i>N</i>	↓	
Mixed Obstruction and hyperinflation	↓	↓	

Any other assessment?

Severity of obstruction

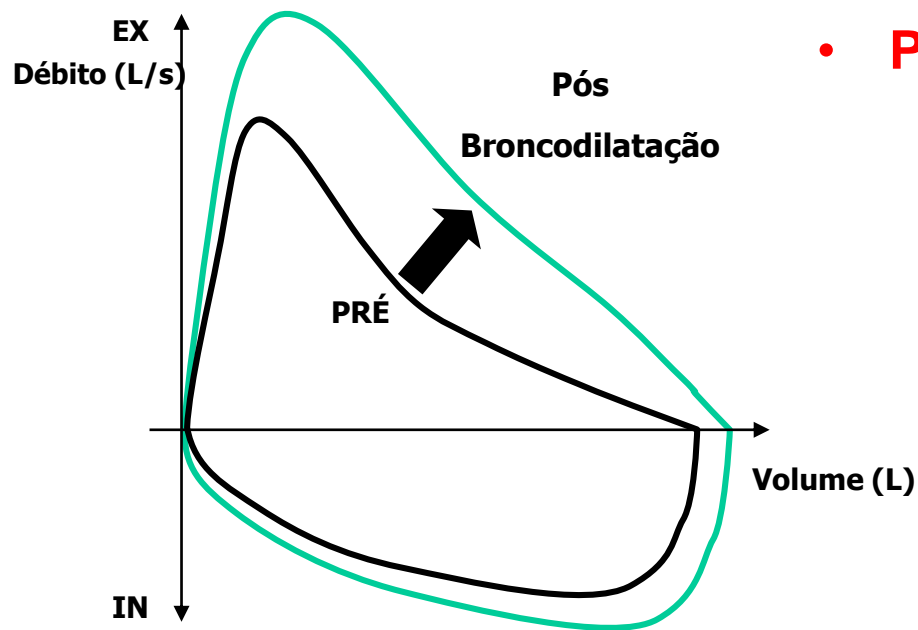
Mild Obstruction	$FEV_1 \geq 80\%$
Moderate Obstruction	$FEV_1 < 80\% \geq 50\%$
Severe Obstruction	$FEV_1 < 50\% \geq 35\%$
Very Severe Obstruction	$FEV_1 < 35\%$

Quick spirometry assesment



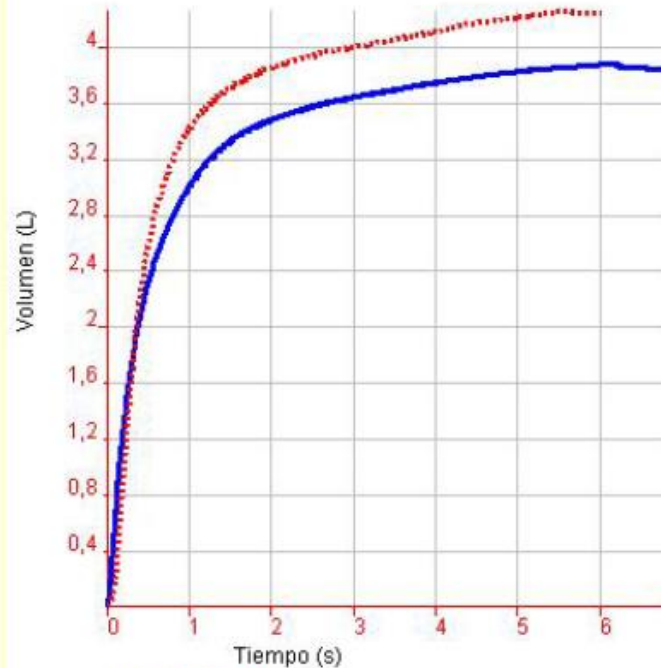
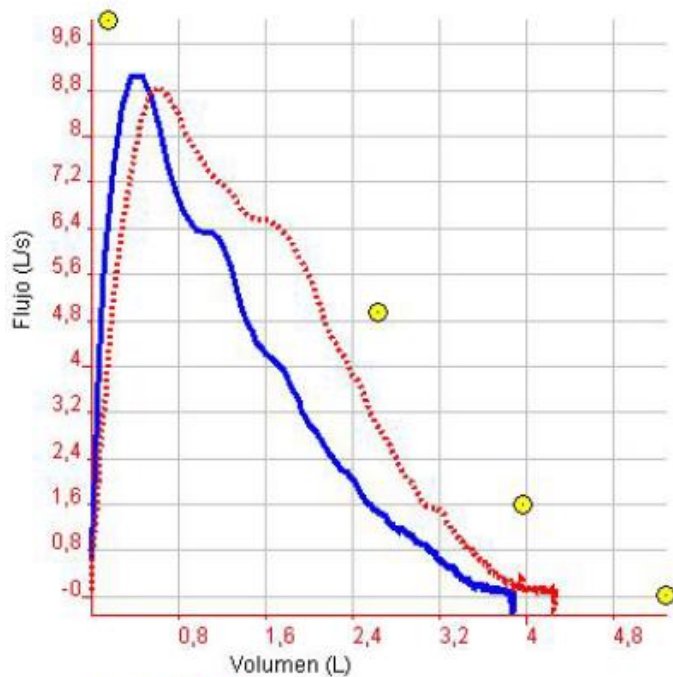
Reversibility Test

- Second full spirometry 15 minutes after inhalation of 400µg of salbutamol or equivalent
- Essential for the diagnosis of respiratory diseases



- **Positive if:**

- Increase in $FEV_1 \geq 12\%$ and 200 ml from basal values



Descripción

Unidad

Valor Basal

% del Valor de
Referencia Basal

Valor
Broncodilatadora

% del Valor
de Referencia
Broncodilatador

% de Cambio

FVC

mL

3880

73.62

4250

80.65

9.54

FEV1

mL

3020

75.12

3480

86.57

15.23

FEV1/FVC

cociente

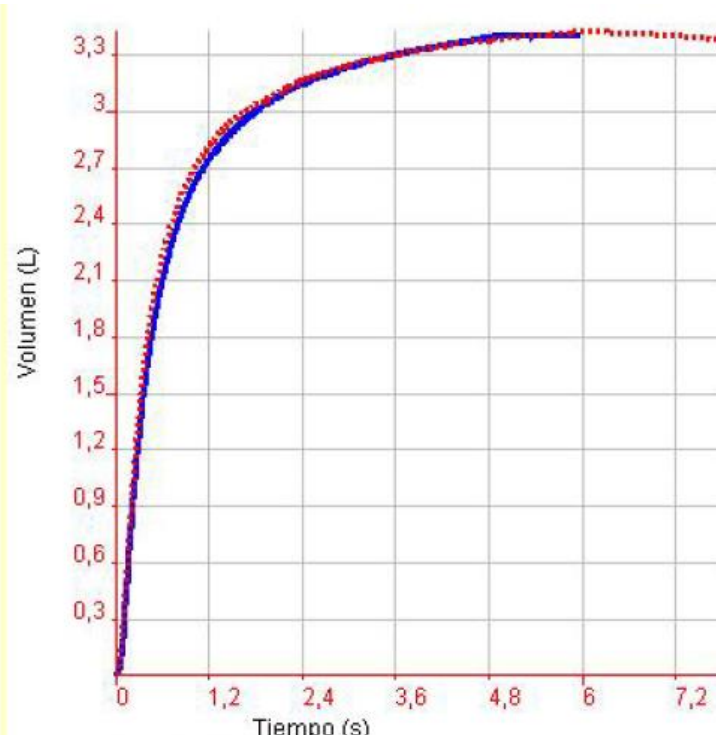
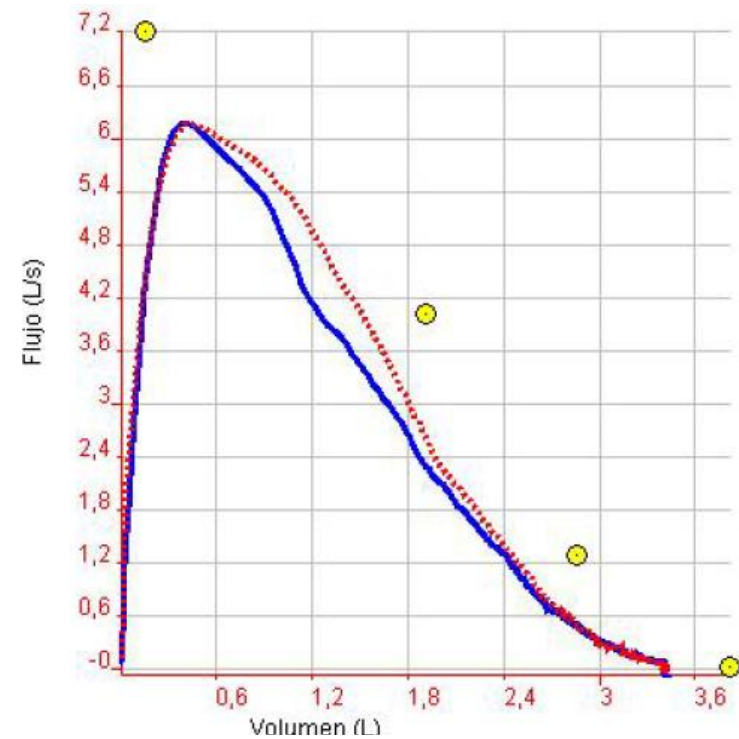
77.83

101.30

81.85

106.53

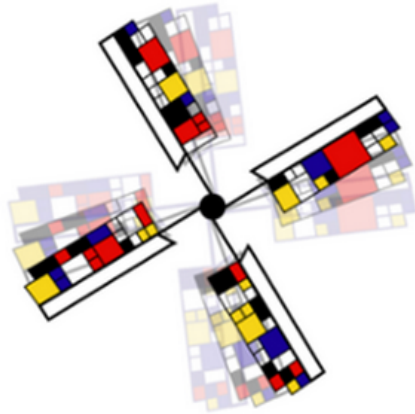
5.17



Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	3400	89.24	3410	89.5	0.29
FEV1	mL	2650	87.75	2720	90.07	2.64
FEV1/FVC	cociente	77.81	103.58	79.83	106.27	2.60



Asthma research priorities survey for healthcare pro





GLOBAL PRACTICE AIRWAYS GROUP
OPTIMAL RESPIRATORY HEALTH

Opinion Sheet

Spirometri



International Primary Care
Respiratory Group

Opinion Sheet IPCRG1.0 / GPIAG 7.2

<p>Hangi spirometri?</p> <p>İdeal olarak, bir spirometride teknik hataların saptanmasına izin veren grafiksel ekran olmalı. Sonucu basılı olarak verebilmeli.</p> <p>Düzenli kalibrasyon gereklidir. Bazı spirometirler bir kalibrasyon şırıngası kullanılarak, her kullanımdan önce kalibre edilmelidir. Diğerleri yıllık servisler ile kalibre edilir. Kullanıcı prospektüsünü kontrol edin.</p> <p>Spirometri nasıl uygulanır?</p> <p>Tam bir inspirasyona başlar ve hasta mümkün olduğunca sert ve hızlı üfleterek değerleri boğabilir.</p> <p>Ayakta mı, oturarak mı? Ayakta olmak daha iyi sonuçlar vermesine rağmen, yaşlılar için oturmak daha güvenlidir.</p> <p>Reversibilite testleri</p> <p>Reversibilite testleri, tedavi öncesi ve sonrası spirometri ölçümlerini içerir ve KOAH ile astmayı ayırtmaya yardımcı olabilir (ancak spirometri stabil astmalı hastalarda normal olabilir)</p> <p>Hastanın hazırlanması: Hastanın durumu stabil olmalıdır (örneğin ataktan en az 6 hafta geçmelidir) Bronkodilatör reversibilite testinden önce hasta kısa etkili β_2 agonistini 6 saat, uzun etkili bronkodilatörünü 12 saat ve theofilini 24 saat önce bırakmalıdır [ve β_2 blokörü 48 saat önce]</p> <p>Eğitim</p> <p>Yeni kullanıcılar için spirometri eğitimi...</p>	<p>Birinci basamakta genellikle üç tip spirometri kullanılır:</p> <p>Küçük, elde taşınan metreler dijital okuma sağlarlar. Bunlar en ucuzdur ve tıbbi malzeme çantasına sığabilecek kadar küçüktürler fakat üfleme bittigi zaman grafik eksikliği olduğu için değerlendirme zor olabilir. Sonuçları değerlendirmede sonuç kartları ve hesap makinası gereklidir.</p> <p>Entegre yazıcı taşınabilir metreler. Bunlar daha pahalıdır fakat reversibilite dahil her türlü hesaplamayı yapabilirler. Hacim-zaman grafiğinin küçük olarak gösterilmesi üfleme monitorize etmeye yardımcı olur ve alınan kopyada akım-hacim eğrisi vardır.</p> <p>Bilgisayar eşliğinde çalışan sistemler grafik oluşturur, predikte ve reversibiliteyi hesaplar ve bir çıktı sağlar. Dahili bellek kayıtları tutmaya veya taşımaya yardımcı olur.</p> <p>Üç talmim edici üfleme yapılmalıdır. Üfleme hacim bir platoya ulaşana kadar devam etmelidir. Bu ağır KOAH'lı hastalarda 12 saniyeden daha fazla zaman alabilir. FVC ve FEV₁ okumaları %5 veya 100ml olmalı Expiratuar hacim-zaman grafiği düzgün olmalı ve düzensizlik olmamalı</p> <p>Uygulama Bazal spirometri uygula Bronkodilatör reversibilite Bronkodilatör ver (genellikle nebulise salbutamol 5mg veya en az 400mcg salbutamol) Bronkodilatör sonrası spirometriyi 15 dakika sonra uygula. Steroid reversibilite Bir steroid uygulaması (günde 30 - 40mg 2 hafta veya üç ay 1,000 ug inhale steroid) uygun olabilir. FEV₁ de >12% ve >200ml artış anlamlandır. >20% ve >400ml artış astma tanısını destekler.</p>
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Meeting, Singapore – 1 week to go

8th IPCRG

World Conference

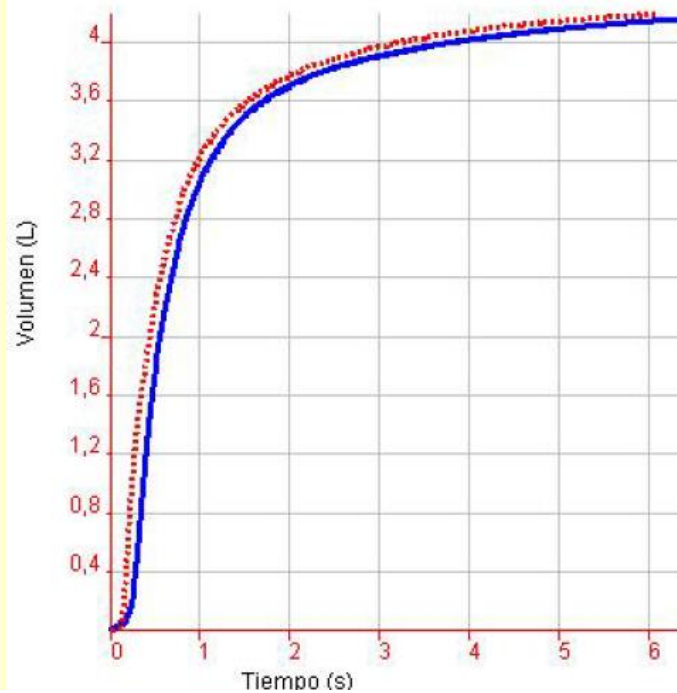
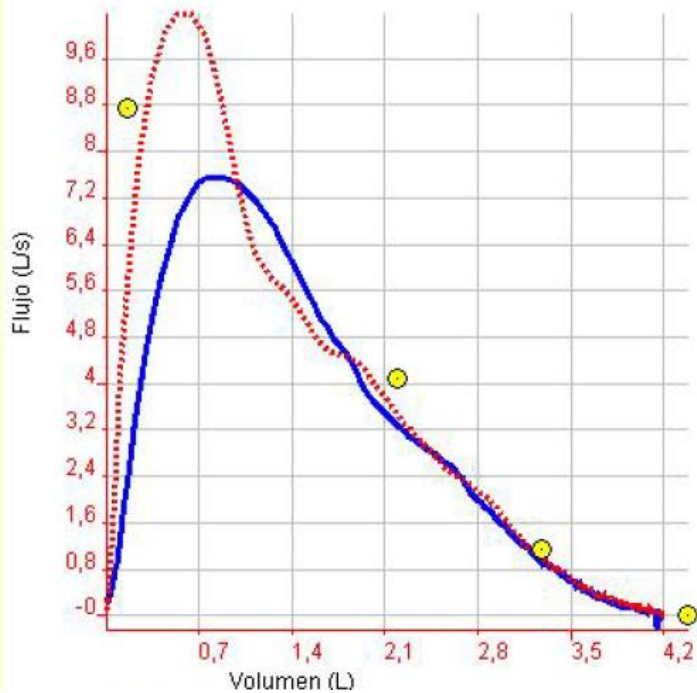
Amsterdam

Rai Auditorium Centre

25-28 May 2016

Teamwork: Who Cares?

The Value of Multidisciplinary Respiratory Care For: Patients, Clinicians & Healthcare Systems



Descripción

Unidad

Valor Basal

% del Valor de
Referencia Basal

Valor
Broncodilatadora

% del Valor
de Referencia
Broncodilatador

% de Cambio

FVC

mL

4150

94.97

4190

95.88

0.96

FEV1

mL

3300

100

3340

101.21

1.21

FEV1/FVC

cociente

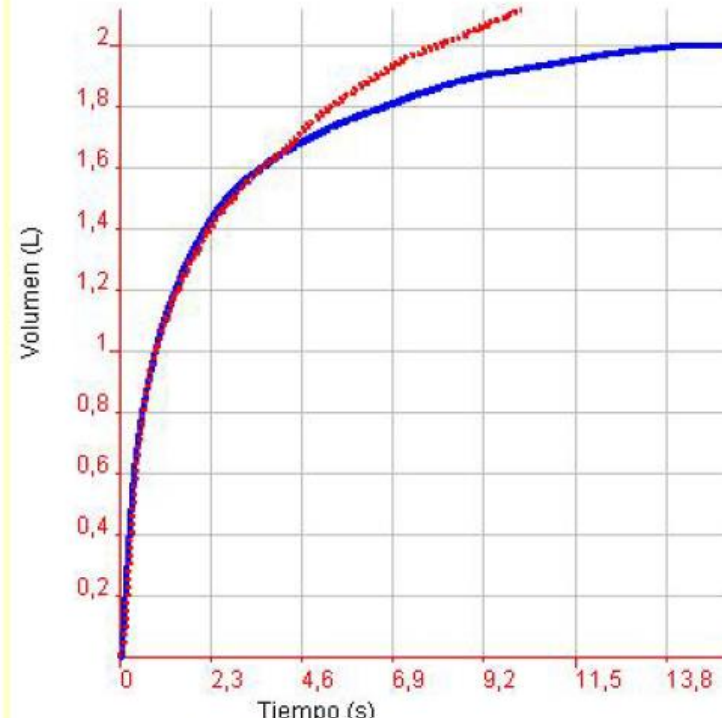
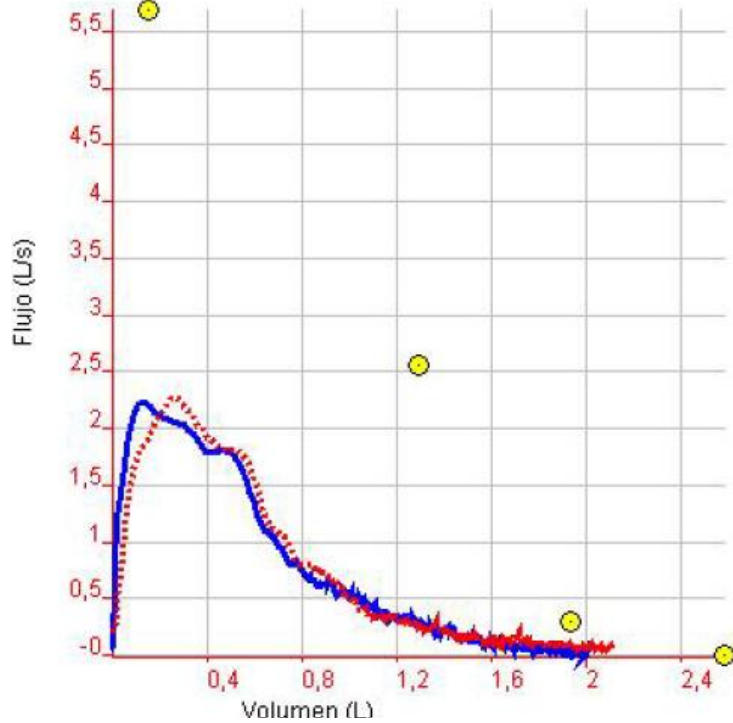
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105.03

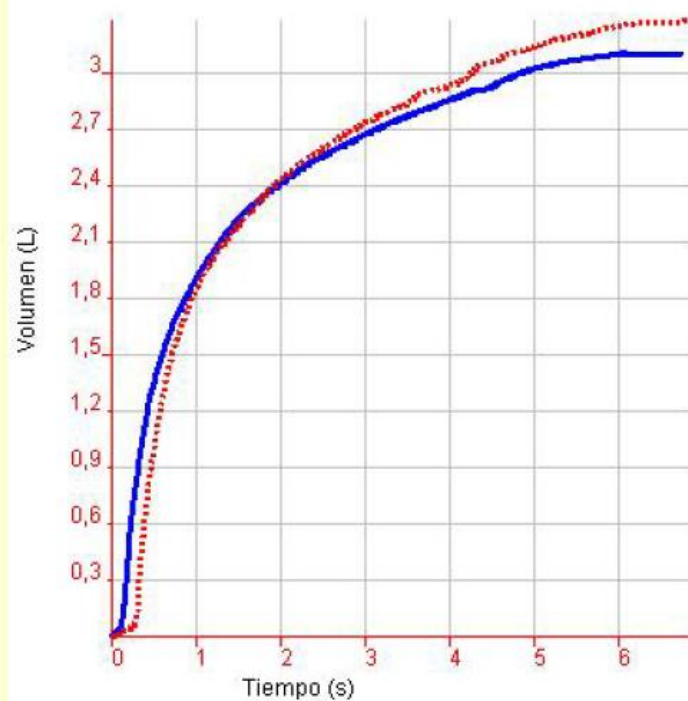
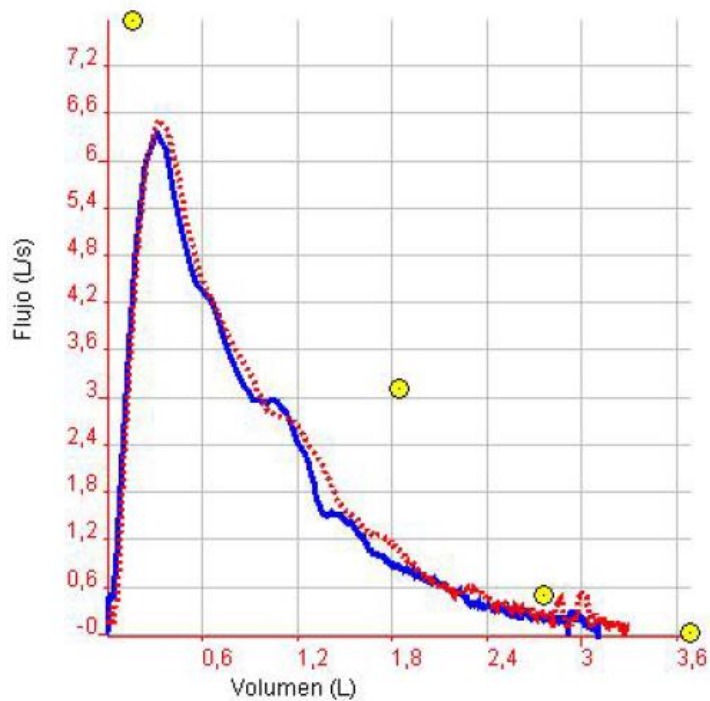
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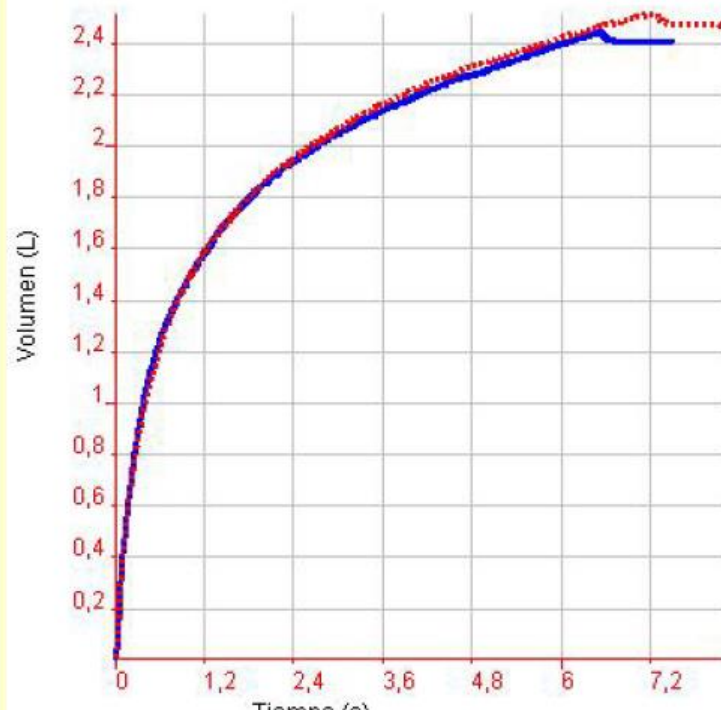
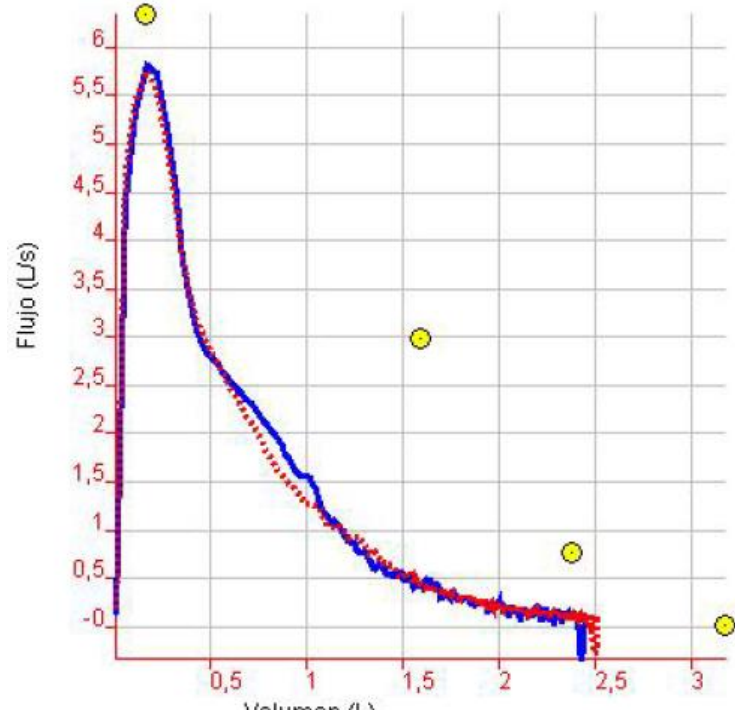
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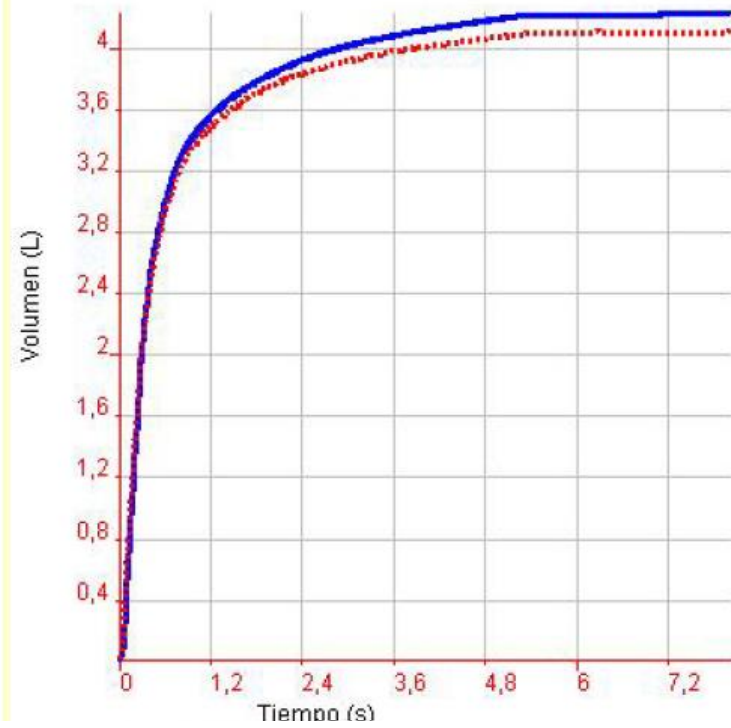
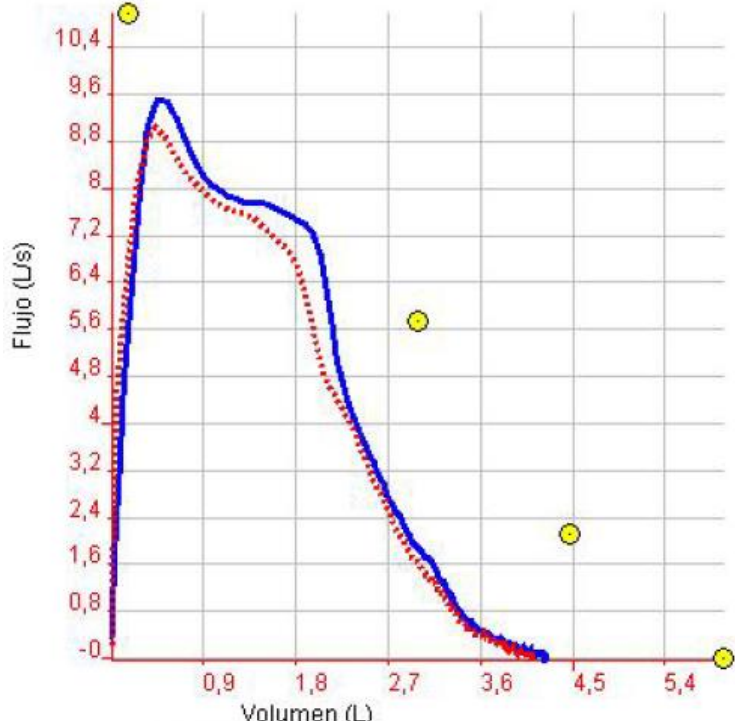
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FVC	mL	1990	77.13	2110	81.78	6.03
FEV1	mL	1070	56.61	1080	57.14	0.93
FEV1/FVC	cociente	53.48	74.99	51.37	72.03	-3.95



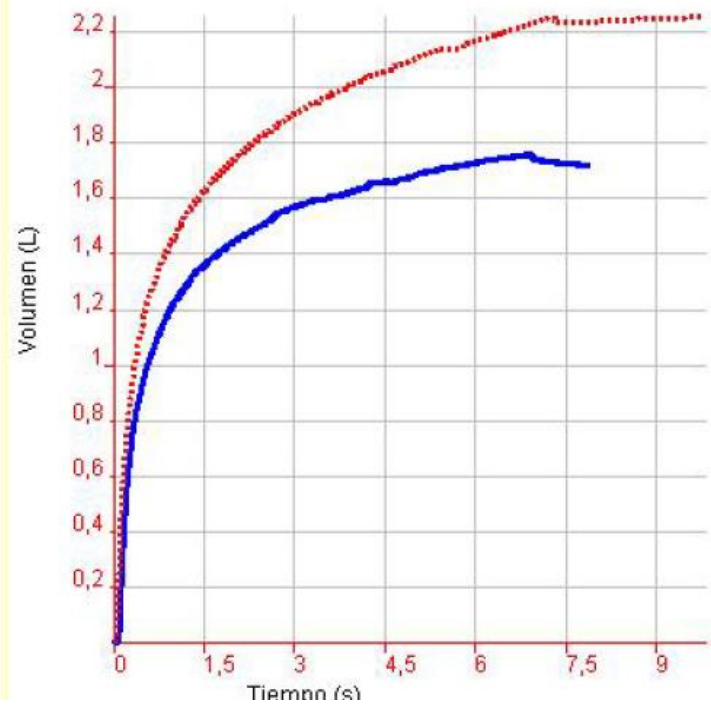
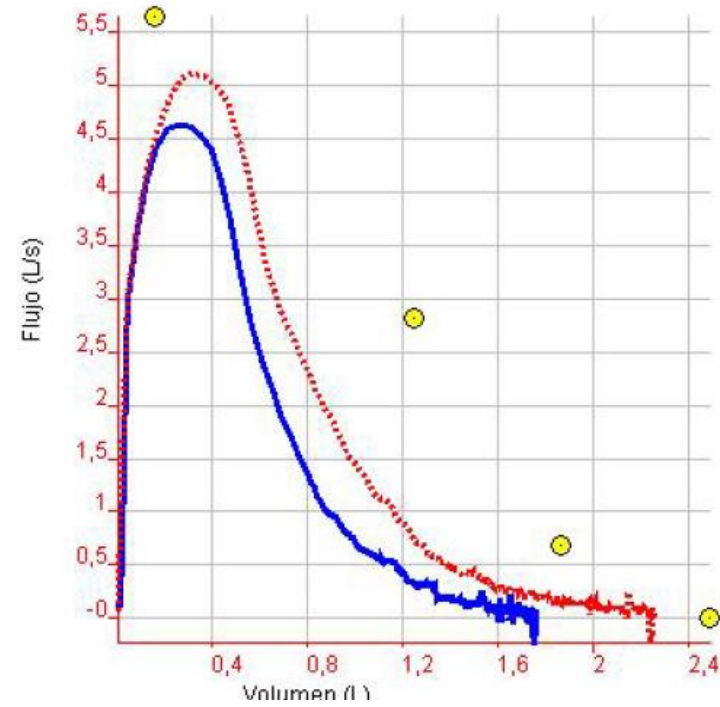
Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	3100	84.24	3280	89.13	5.81
FEV1	mL	1990	75.67	2060	78.33	3.52
FEV1/FVC	cociente	64.11	88.02	63.00	86.49	-1.73



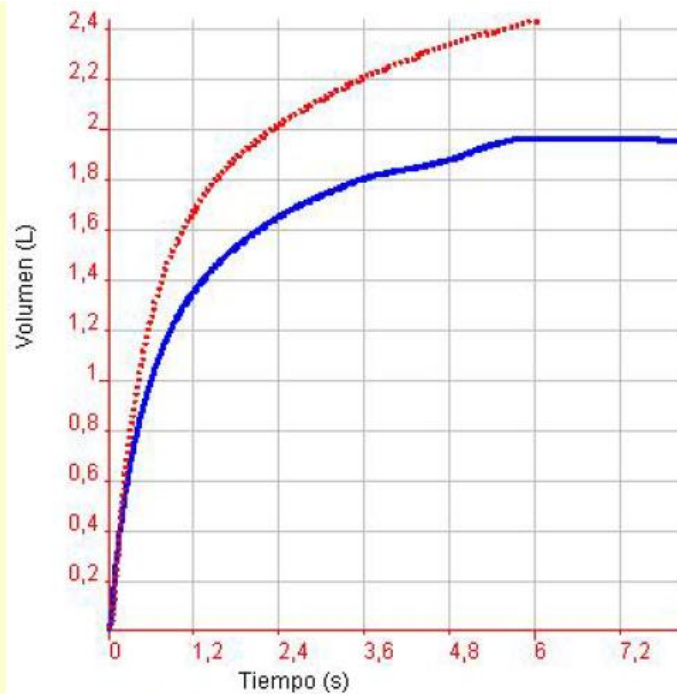
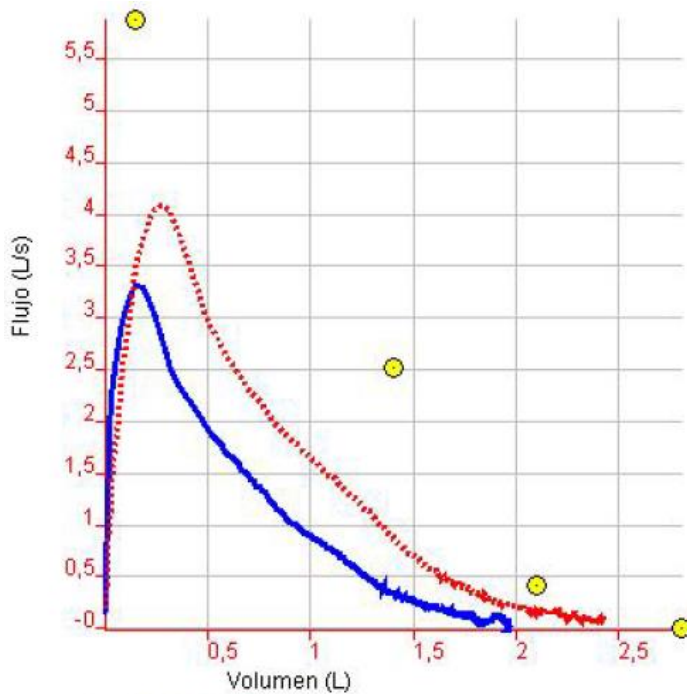
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FVC	mL	2440	76.97	2510	79.18	2.87
FEV1	mL	1490	63.68	1500	64.1	0.67
FEV1/FVC	cociente	61.29	81.94	59.62	79.70	-2.72



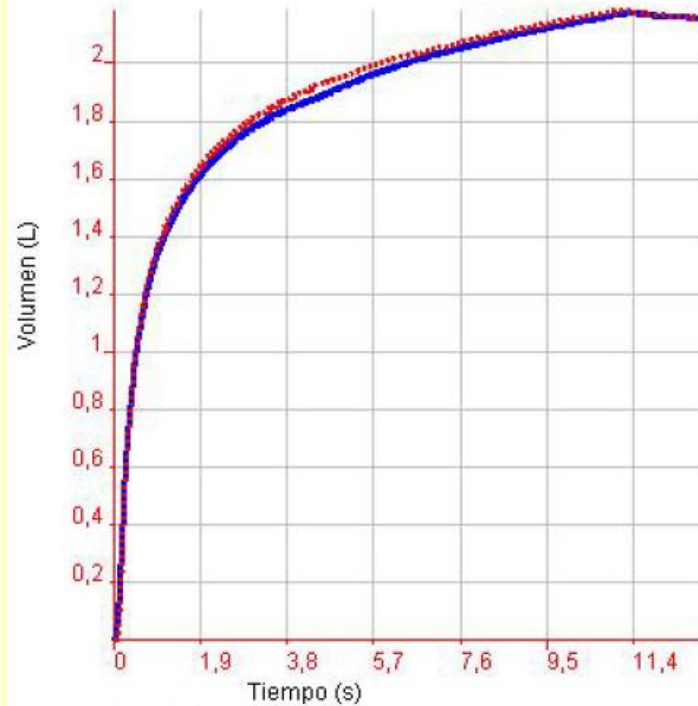
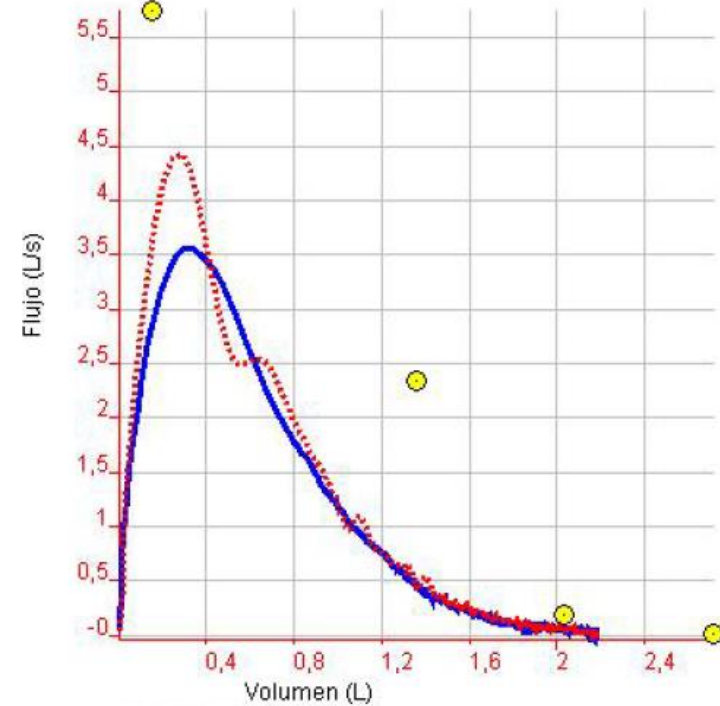
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FVC	mL	4220	70.81	4100	68.79	-2.84
FEV1	mL	3480	75.16	3390	73.22	-2.59
FEV1/FVC	cociente	82.38	104.63	82.78	105.14	0.49



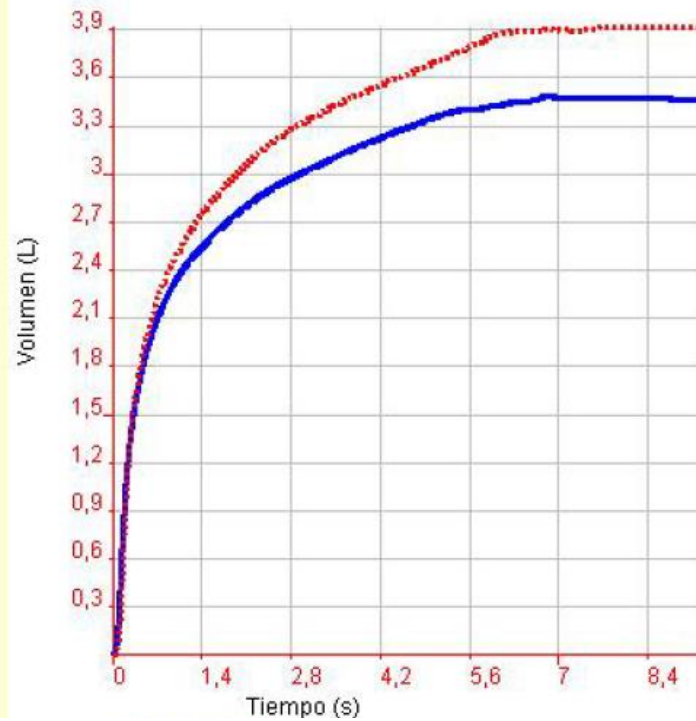
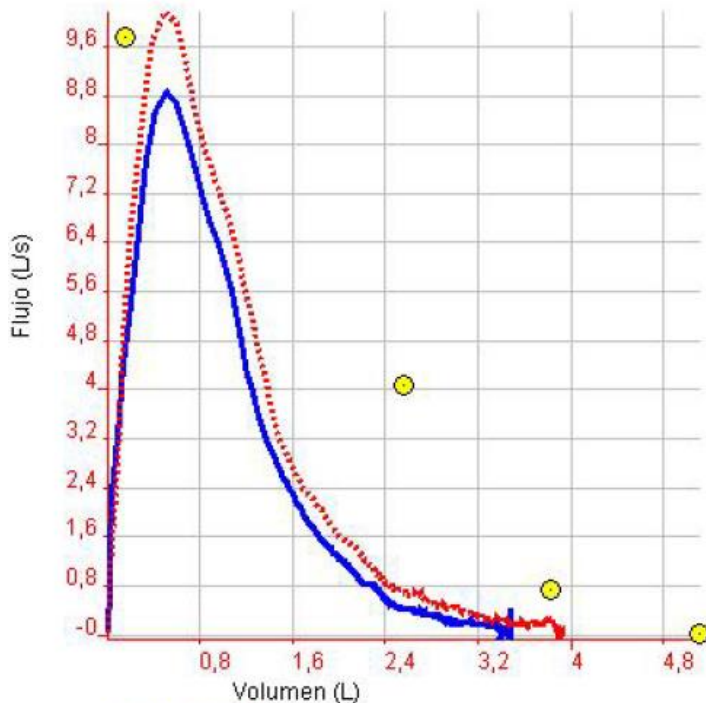
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FVC	mL	1750	70.56	2240	90.32	28.00
FEV1	mL	1250	65.1	1470	76.56	17.60
FEV1/FVC	cociente	71.15	91.54	65.78	84.64	-7.55



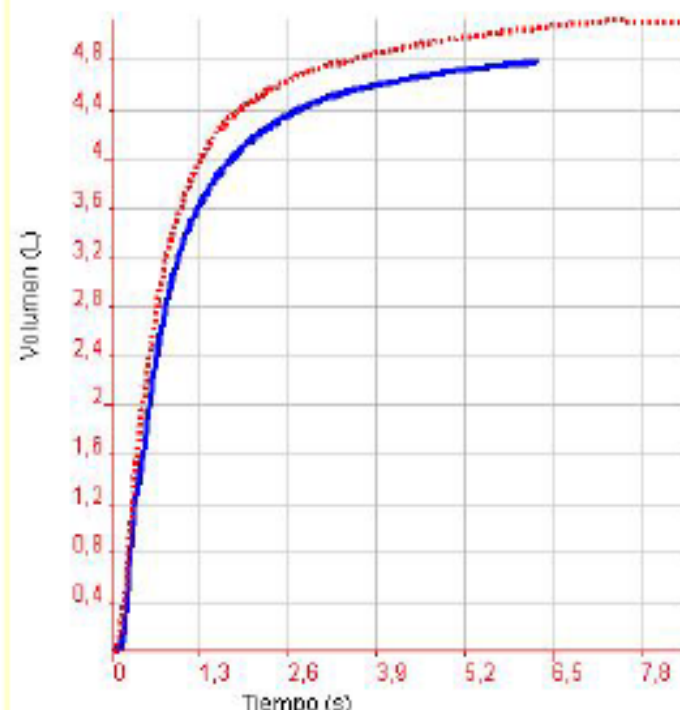
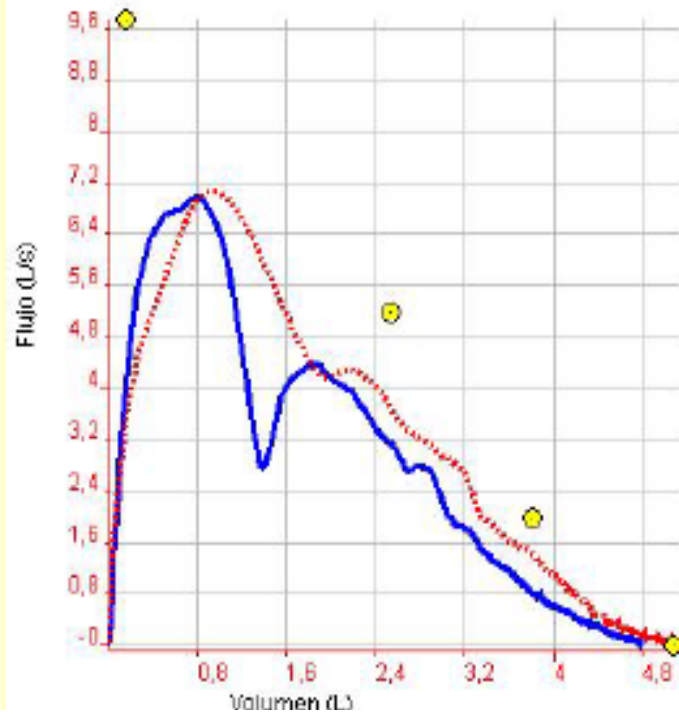
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FVC	mL	1960	70	2430	86.79	23.98
FEV1	mL	1280	64.32	1600	80.4	25.00
FEV1/FVC	cociente	65.18	89.41	65.77	90.22	0.91



Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	2160	79.7	2170	80.07	0.46
FEV1	mL	1390	73.54	1420	75.13	2.16
FEV1/FVC	cociente	64.44	91.64	65.48	93.12	1.61
FEF 25%-75%	mL/s	640	46.72	680	49.64	6.25

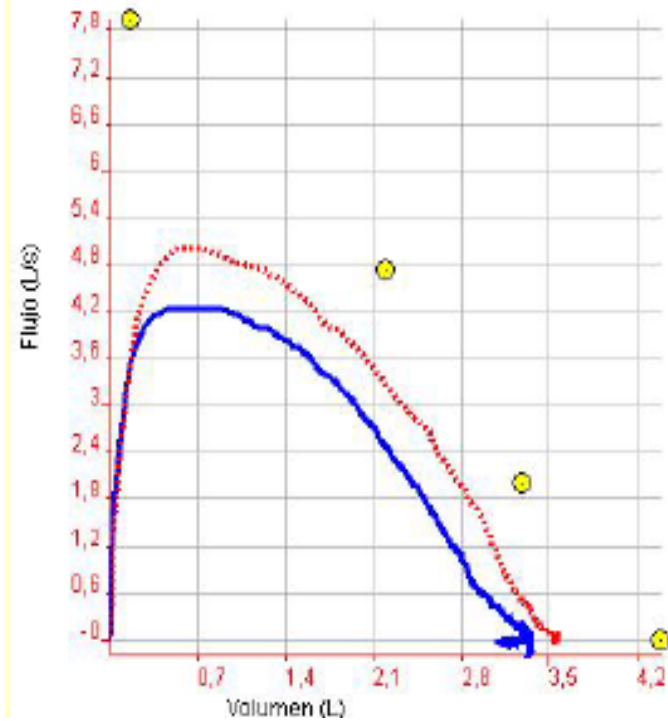


Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	3470	68.04	3900	76.47	12.39
FEV1	mL	2380	65.75	2550	70.44	7.14
FEV1/FVC	cociente	68.74	95.62	65.43	91.02	-4.82
FEF 25%-75%	mL/s	1270	45.36	1240	44.29	-2.36

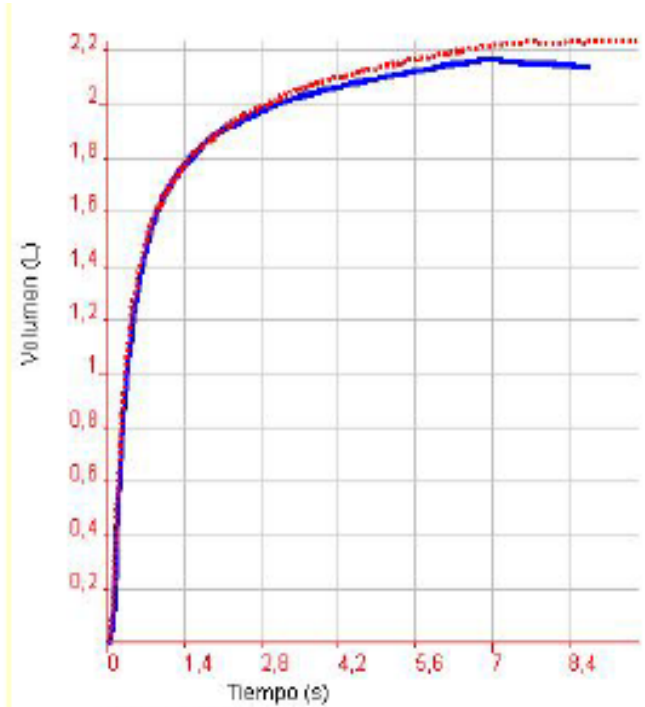
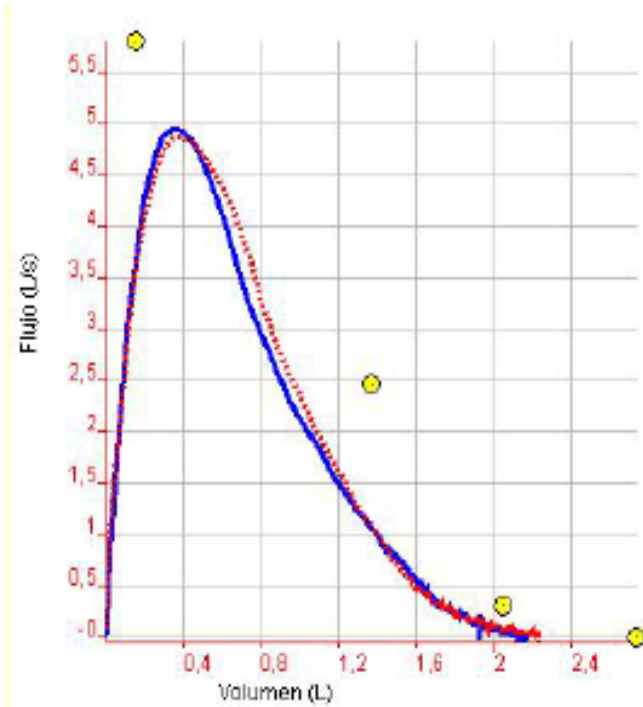


Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	4780	93.78	5120	100.99	7.11
FEV1	mL	3460	90.07	3770	93.78	8.96
FEV1/FVC	cociente	72.43	91.11	73.53	92.50	1.52

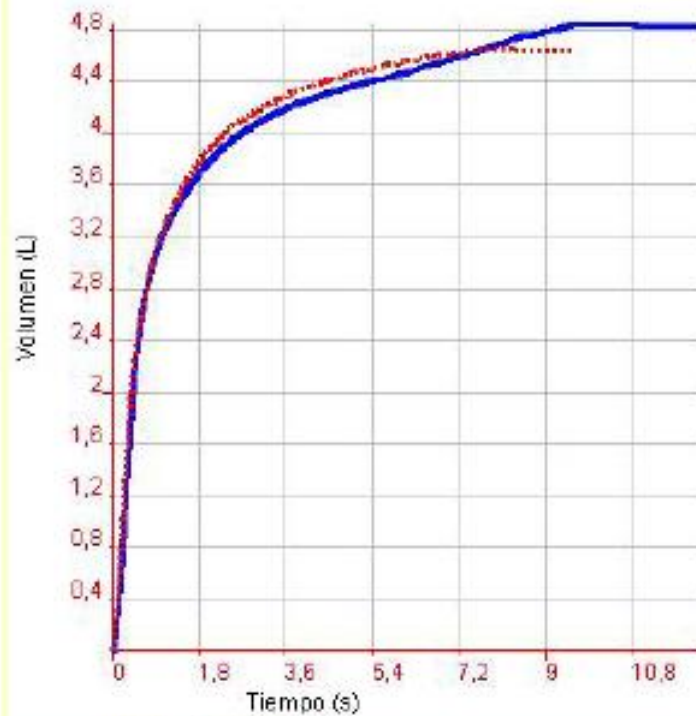
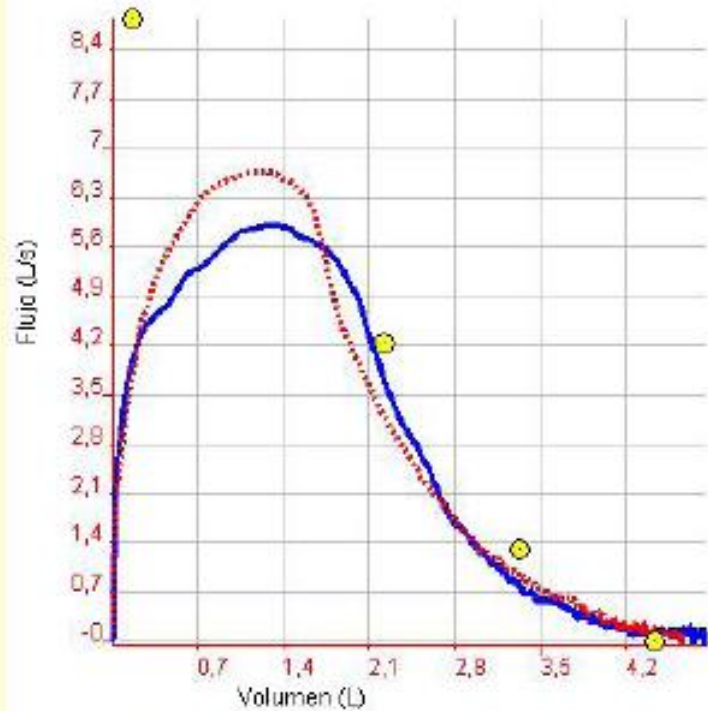




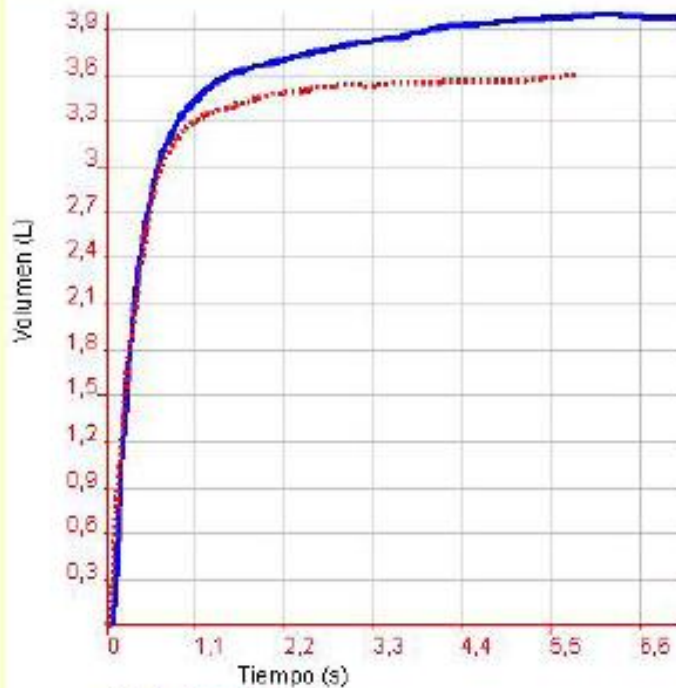
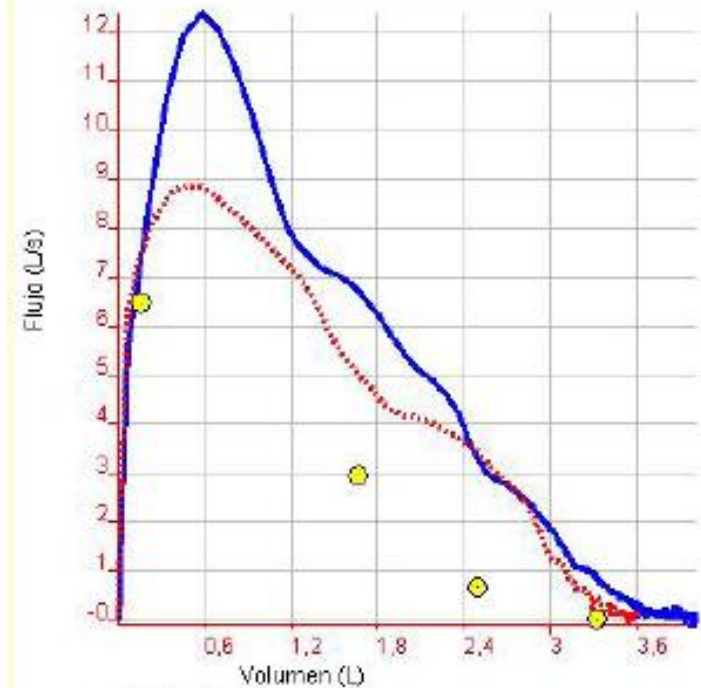
Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	3350	79.78	3560	81.28	6.27
FEV1	mL	2840	79.78	3160	88.76	11.27
FEV1/FVC	coeficiente	84.74	104.39	88.72	109.29	4.70



Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	2150	78.75	2230	81.68	3.72
FEV1	mL	1680	87.05	1670	86.53	-0.60
FEV1/FVC	cociente	78.06	108.93	75.17	104.89	-3.70



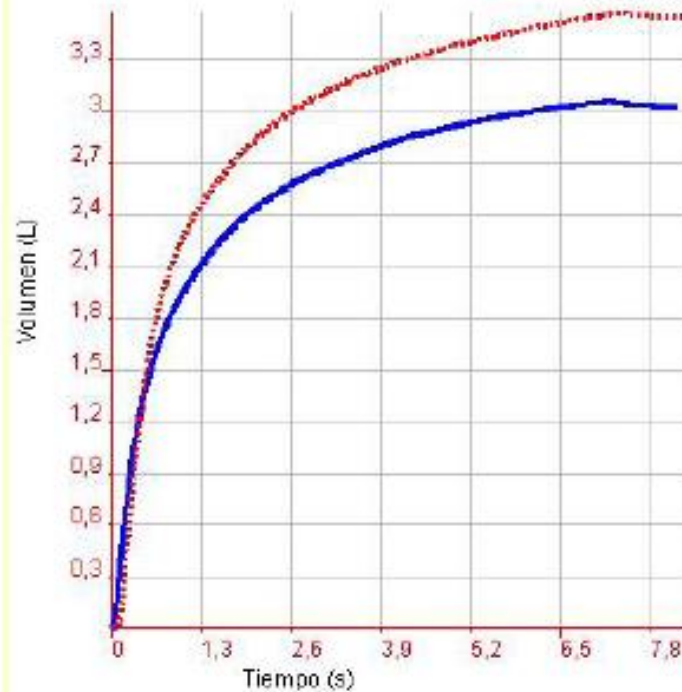
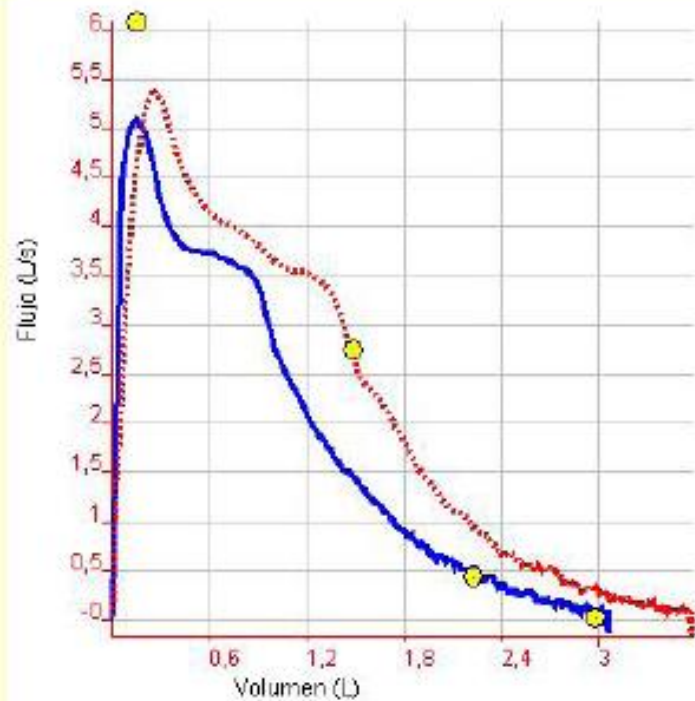
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FVC	mL	4820	108.8	4830	104.51	-3.94
FEV1	mL	3240	95.86	3250	96.15	0.31
FEV1/FVC	cociente	67.10	87.77	70.18	91.80	4.59



Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
Nombre y apellidos		Jose Maria				
Fecha de Nacimiento		1949/07/27		Sexo		Femenino

DATOS DEL CENTRO

Identificador nacional	2.16.724.4.21.5.2 - 121587
Nombre	SON PISA



Descripción

Unidad

Valor Basal

% del Valor de
Referencia Basal

Valor
Broncodilatadora

% del Valor
de Referencia
Broncodilatador

% de Cambio

FVC

mL

3060

103.03

3570

120.2

18.67

FEV1

mL

1950

90.7

2340

108.84

20.00

FEV1/FVC

cociente

63.99

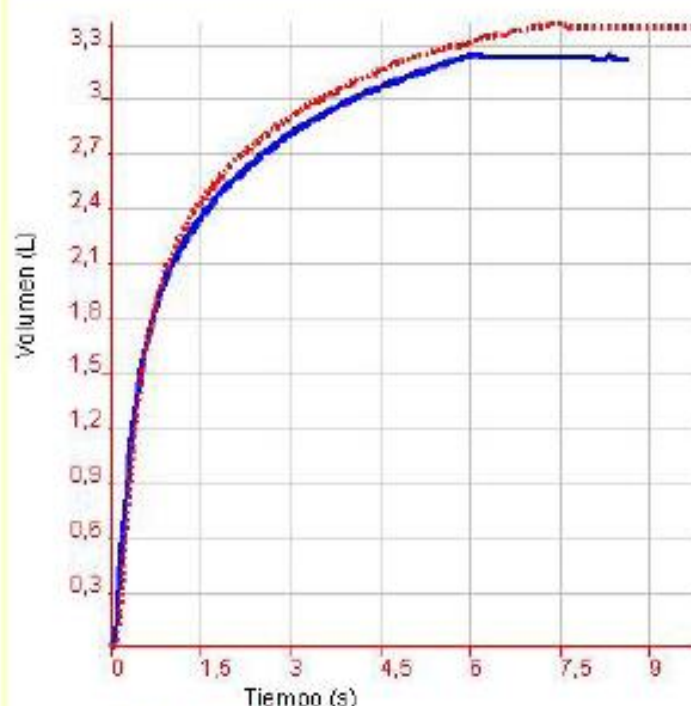
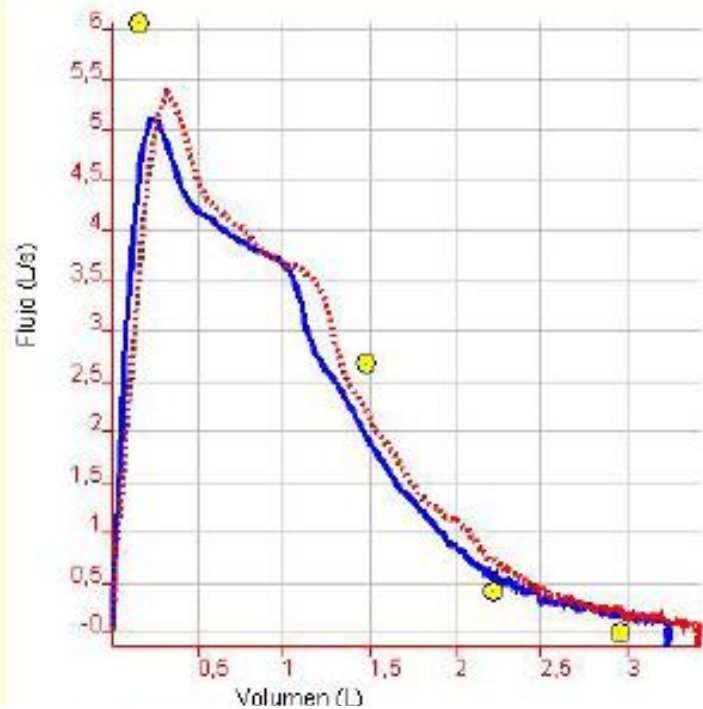
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65.53

92.17

2.41

21-10-2014



Descripción	Unidad	Valor Basal	% del Valor de Referencia Basal	Valor Broncodilatadora	% del Valor de Referencia Broncodilatador	% de Cambio
FVC	mL	3230	109.49	3400	115.25	5.26
FEV1	mL	2120	99.53	2220	104.23	4.72
FEV1/FVC	cociente	65.88	92.88	65.30	92.14	-0.58

3-2-2015