Asthma – an overview

Definition of asthma

"A **Chronic Inflammatory Disorder** of the airways … in susceptible individuals, inflammatory symptoms are usually associated with widespread but variable airflow obstruction and an increase in airway response to a variety of stimuli.
Obstruction is often **Reversible**, either spontaneously or with treatment."

Diagnosis and natural history. Thorax 2003; 58 (Suppl I): i1-i92

Adam and Eve
and
Christopher Robin

Eve is a 5-year old girl with:

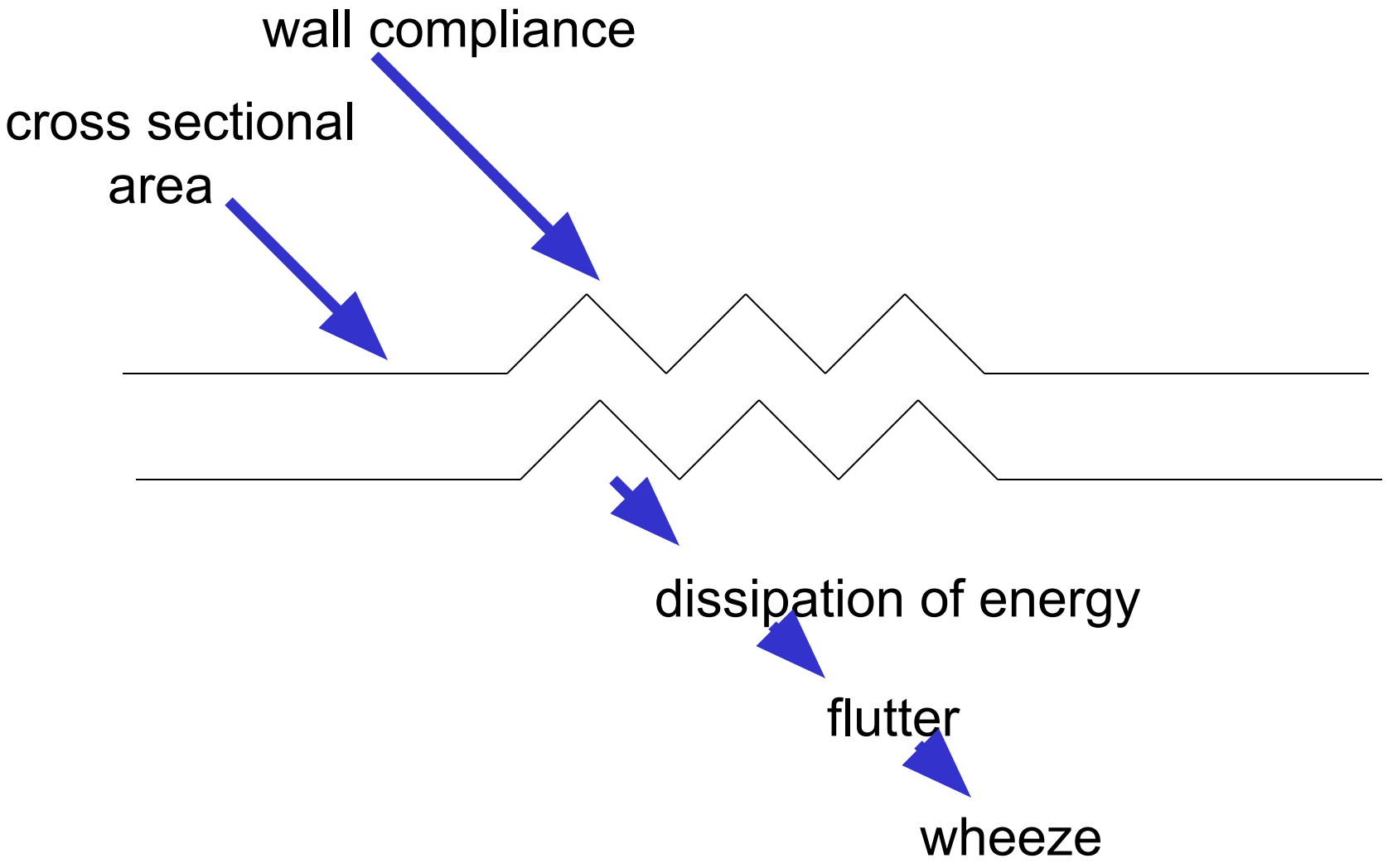
- Personal and family history of allergy
- Wheeze on laughing and exercise
- Severe attacks with colds
- Bronchodilator-responsive and dependent on inhaled corticosteroid
- Persistent symptoms and PEF variability on a depressed baseline
- Evidence of allergy
- Eosinophilic airway inflammation
- Evidence of allergy
- Eosinophil airway inflammation

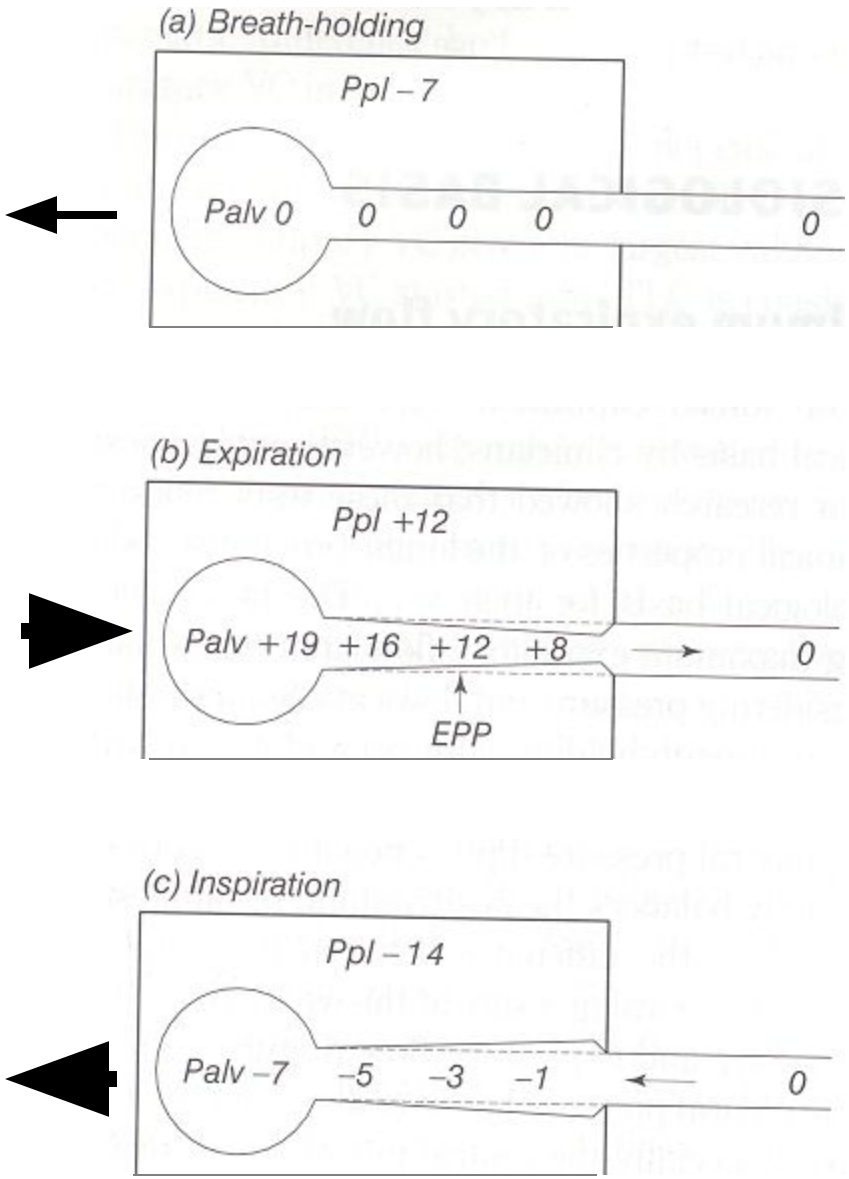
Adam is a 14-month old boy with:

- A single, smoking non-allergic mother
- Multiple admissions to hospital with viral, episodic wheeze
- Poor response to nebulised ß agonist
- No symptoms between episodes
- No evidence of allergy
- No inflammation between episodes

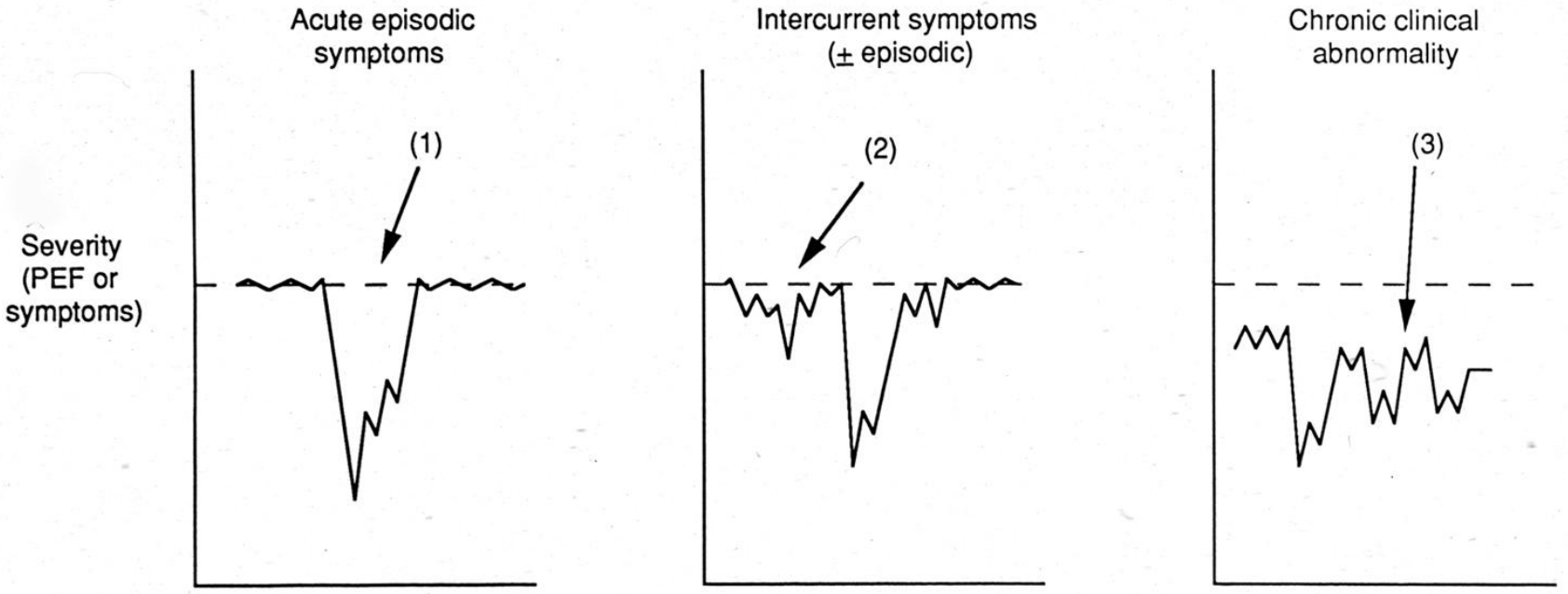
What is “Wheeze”?

Flow limitation and wheeze



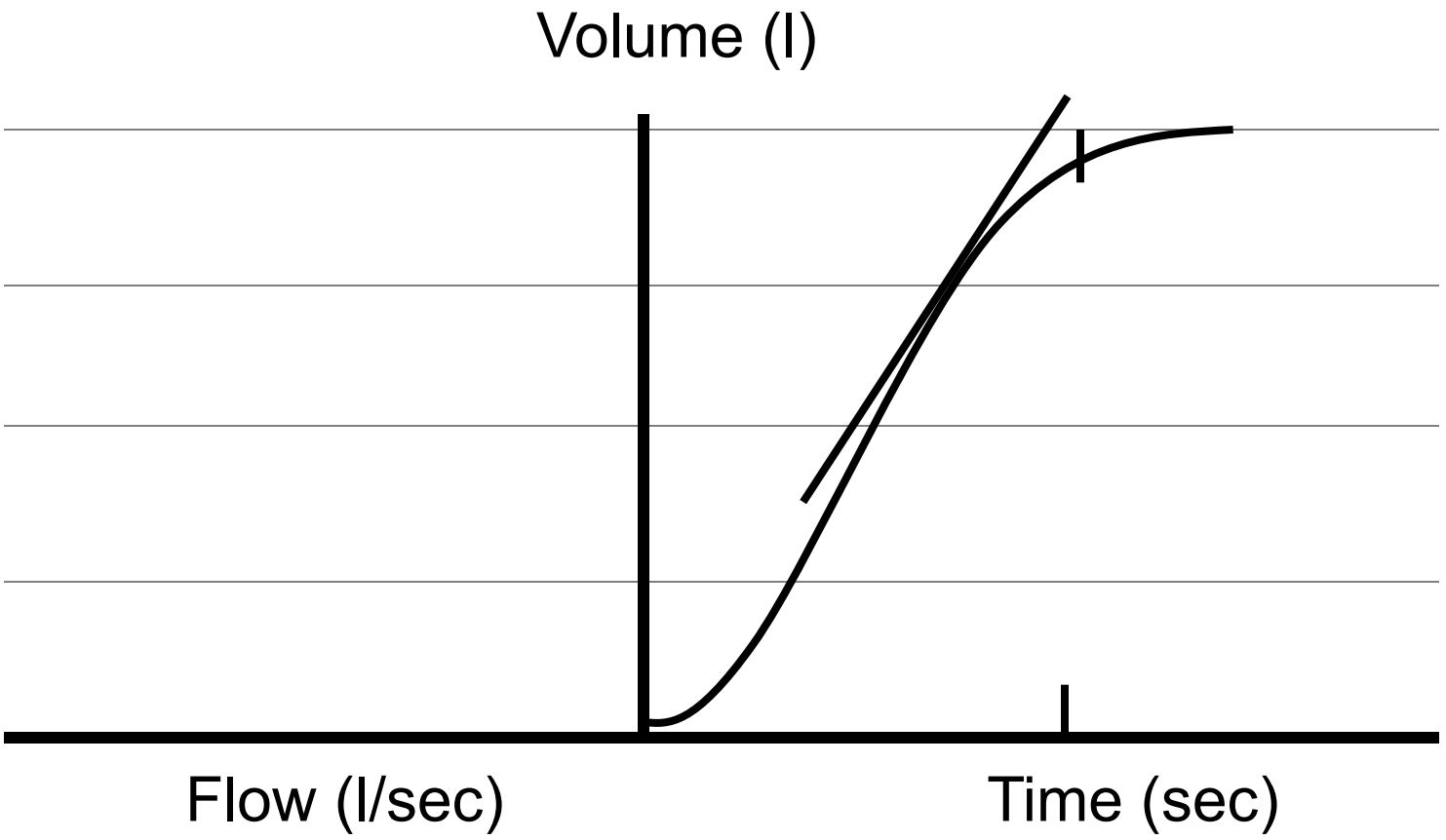

(a) Breath-holding
Ppl −7
Palv 0
0
0
0
0
(b) Expiration
Ppl +12
Palv +19
+16
+12
+8
0
EPP
(c) Inspiration
Ppl −14
Palv −7
−5
−3
−1
0

How can airway narrowing be measured?

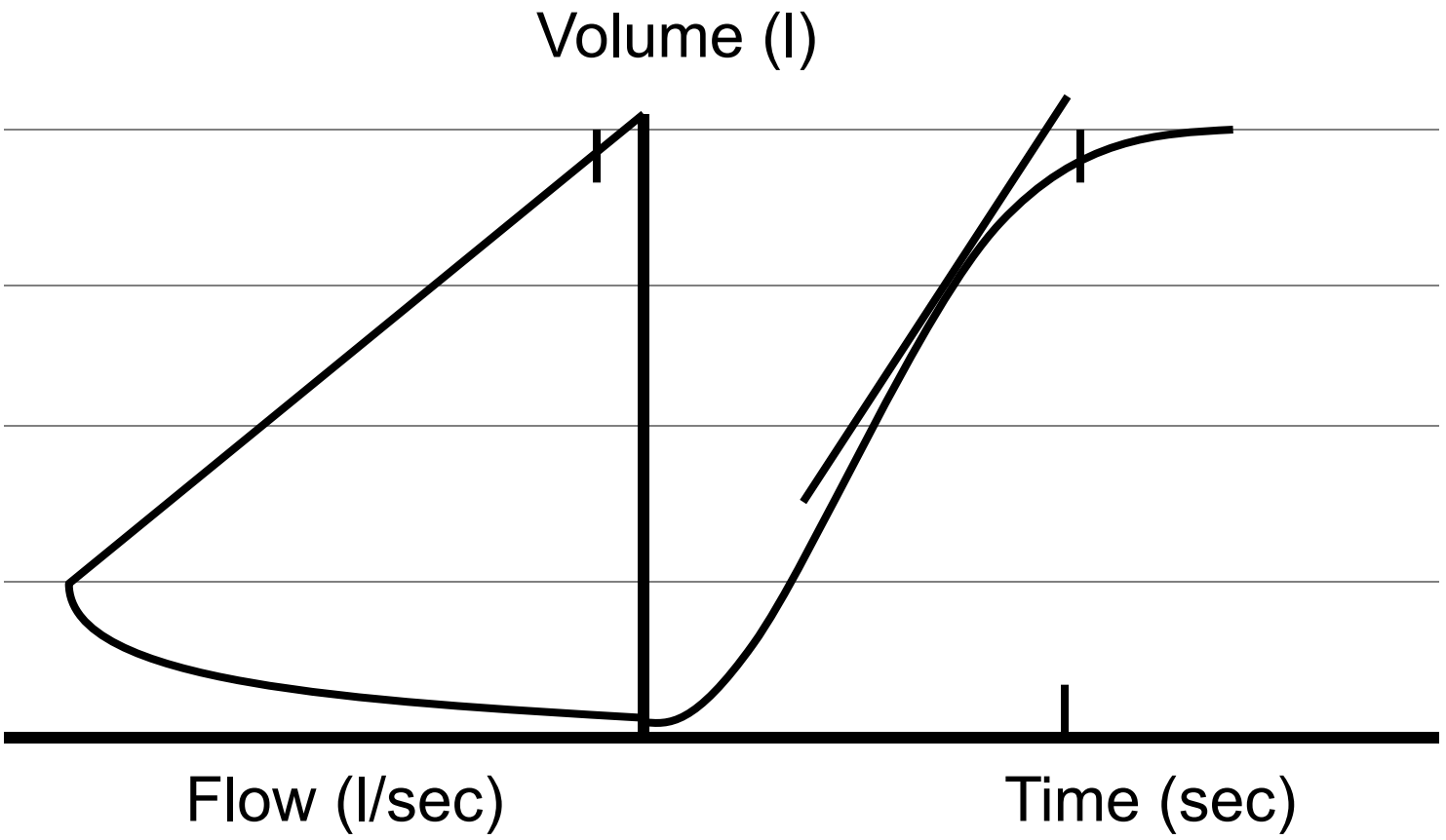

Acute episodic symptoms
Intercurrent symptoms (± episodic)
Chronic clinical abnormality
Severity (PEF or symptoms)
(1)
(2)
(3)


VC
FVC
MVV
TD
FLOW
PRINT
FEED
START
STOP
CLR
ENT

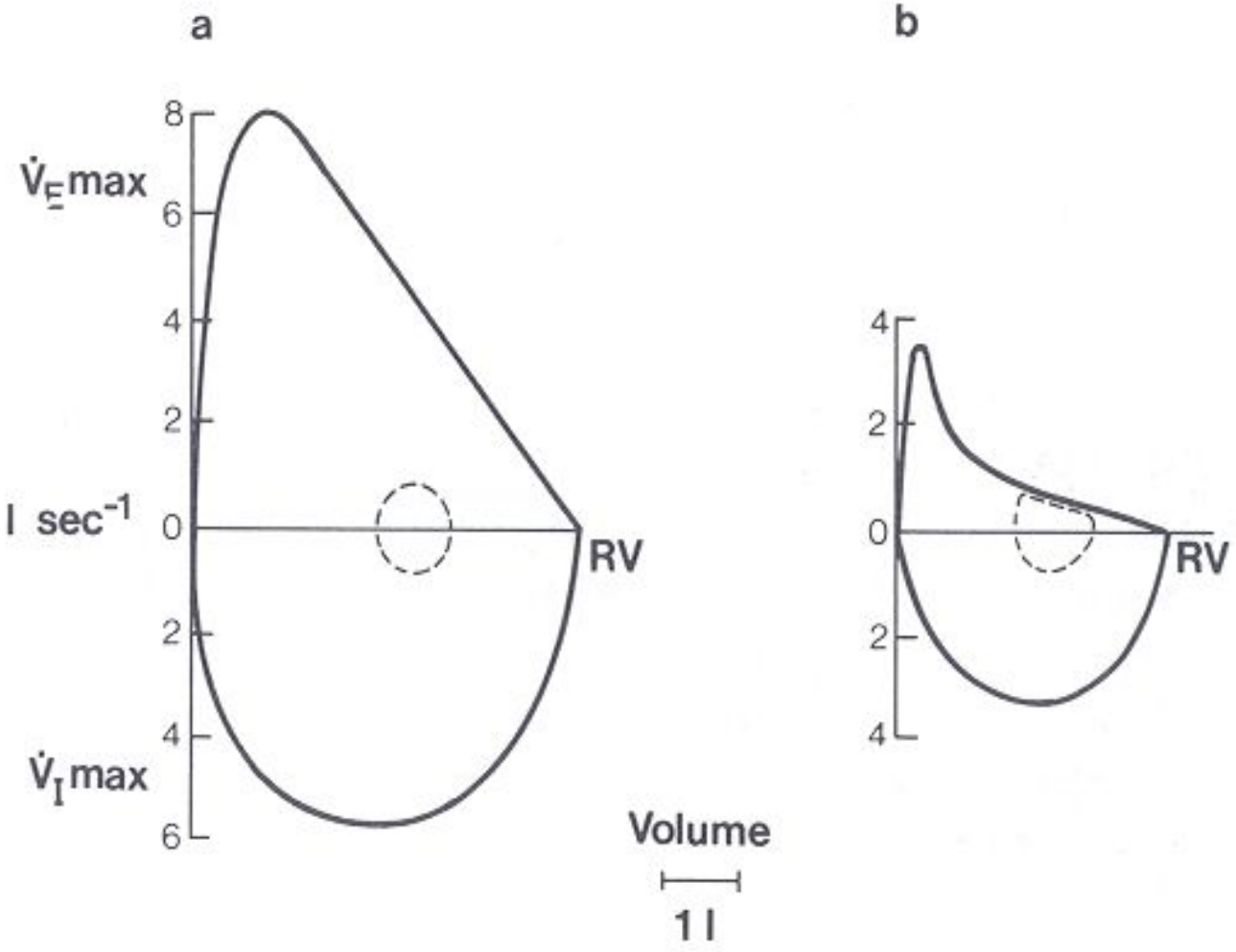
Volume, time and flow



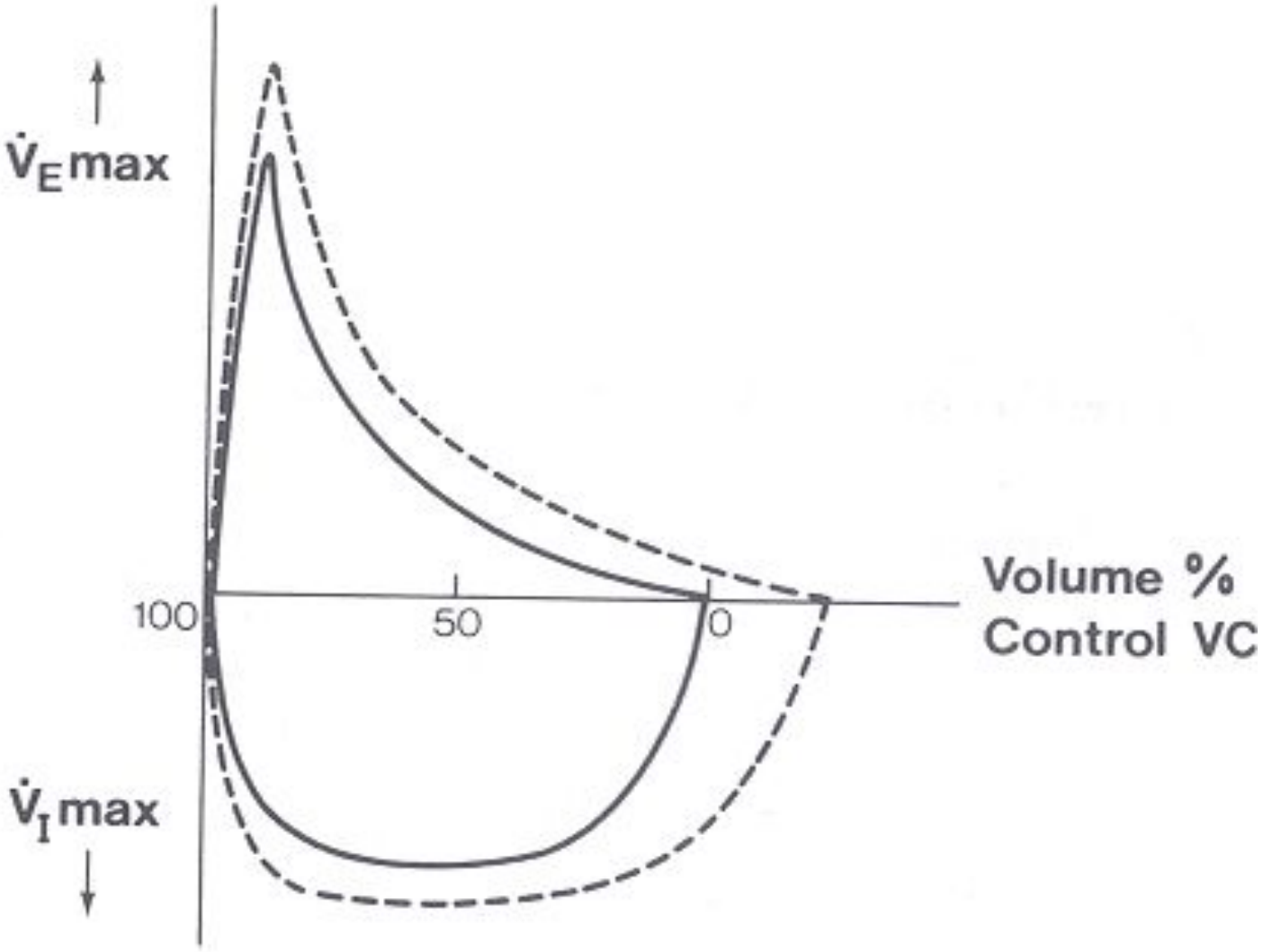
Volume, time and flow



Flow-volume curves

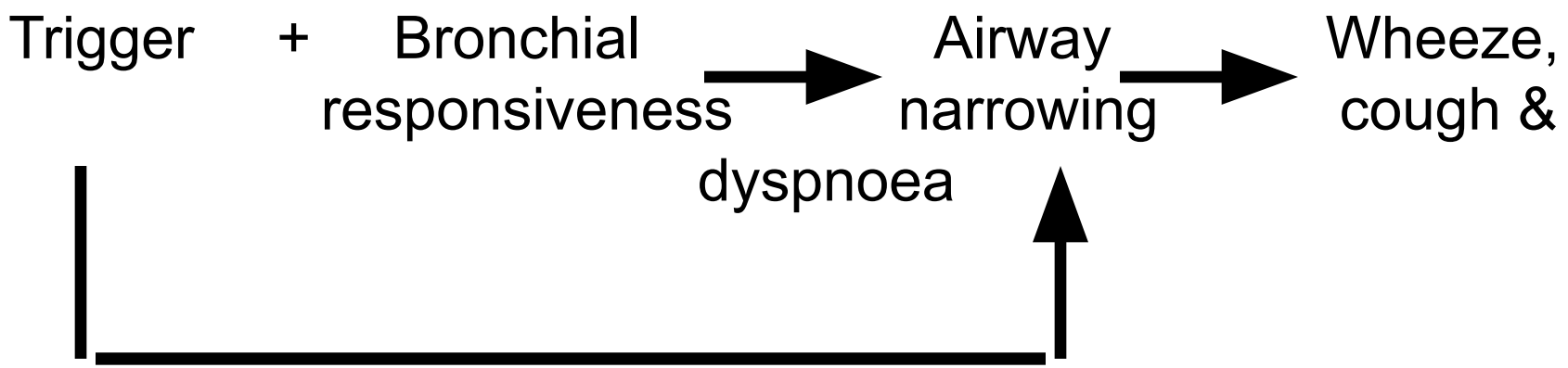


Bronchodilator response

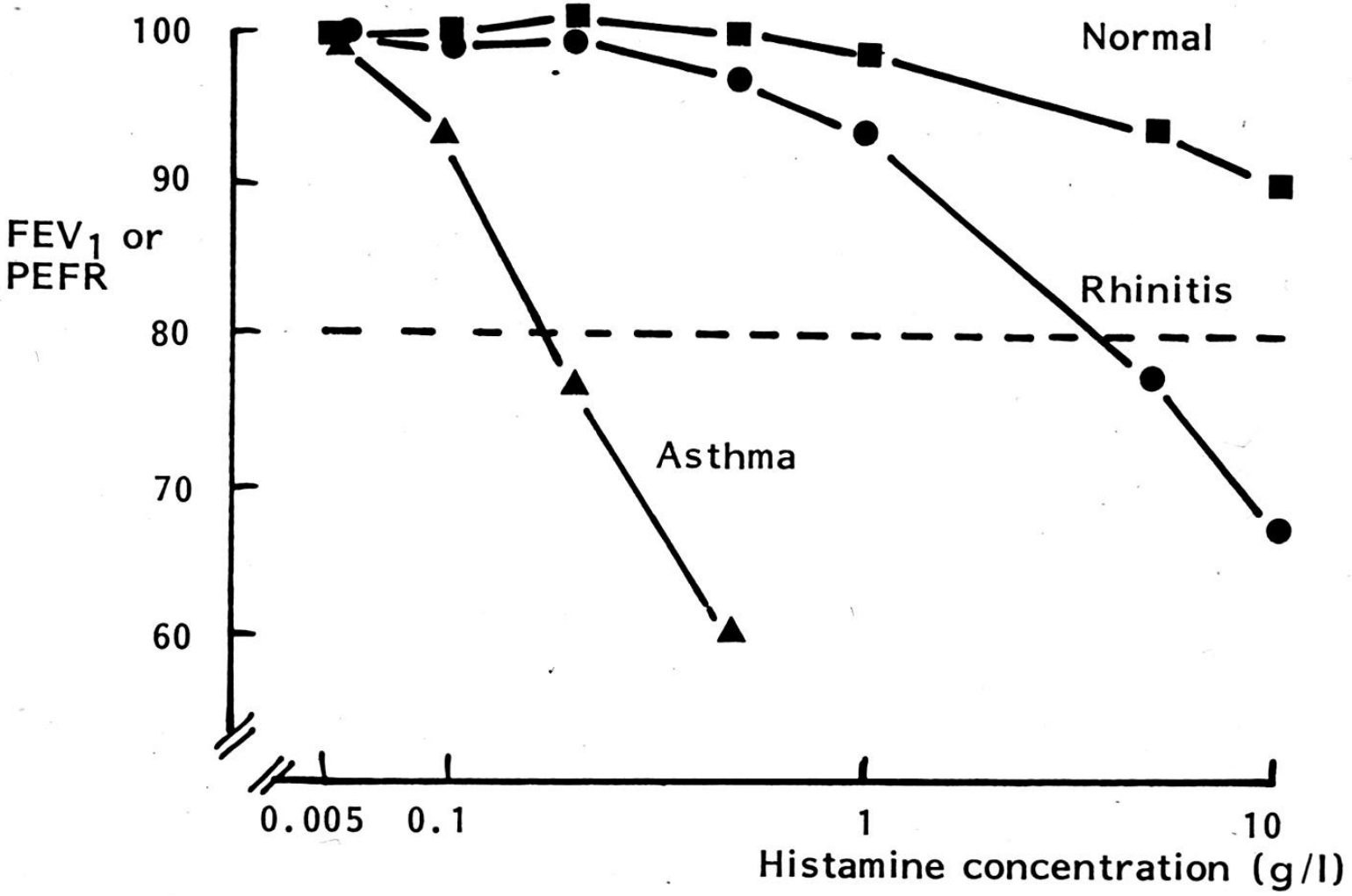


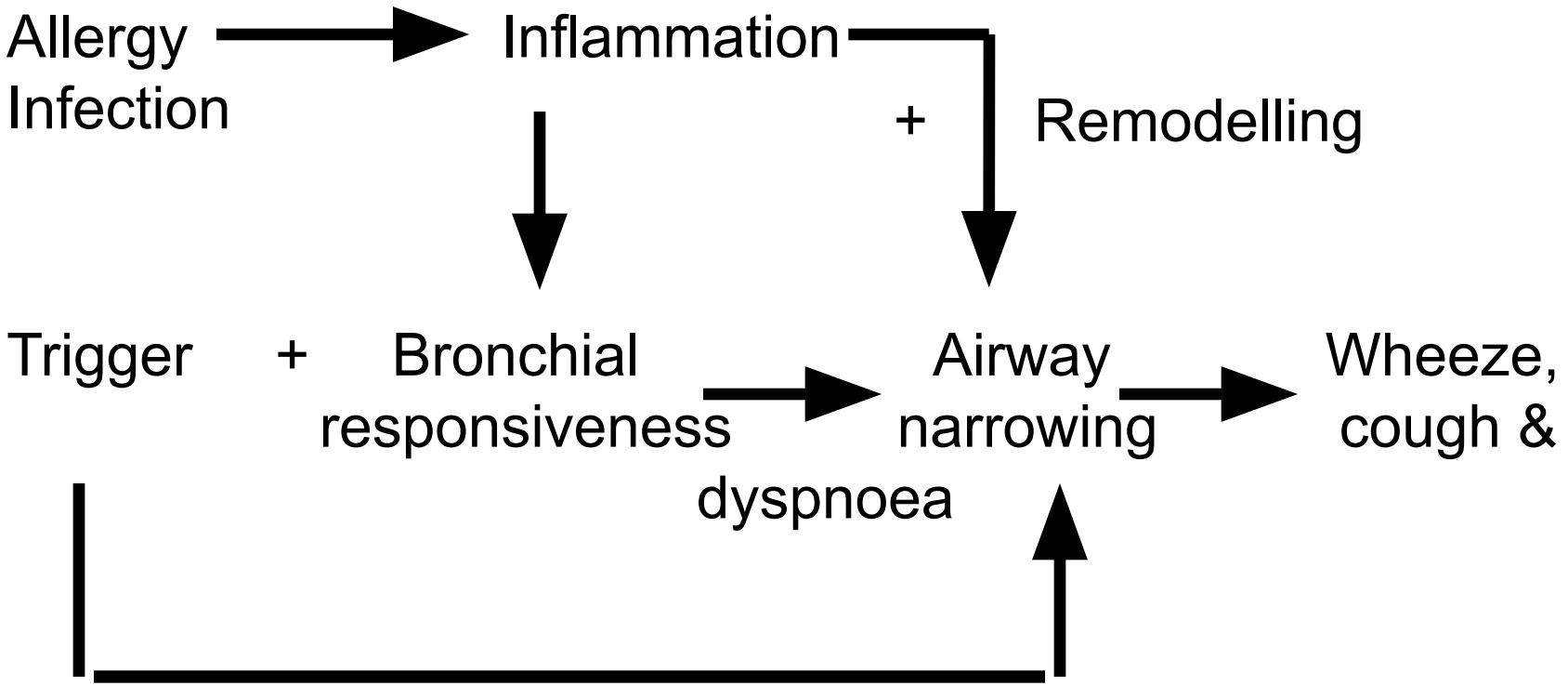
What's bronchial responsiveness?

(or hyper responsiveness: BHR)

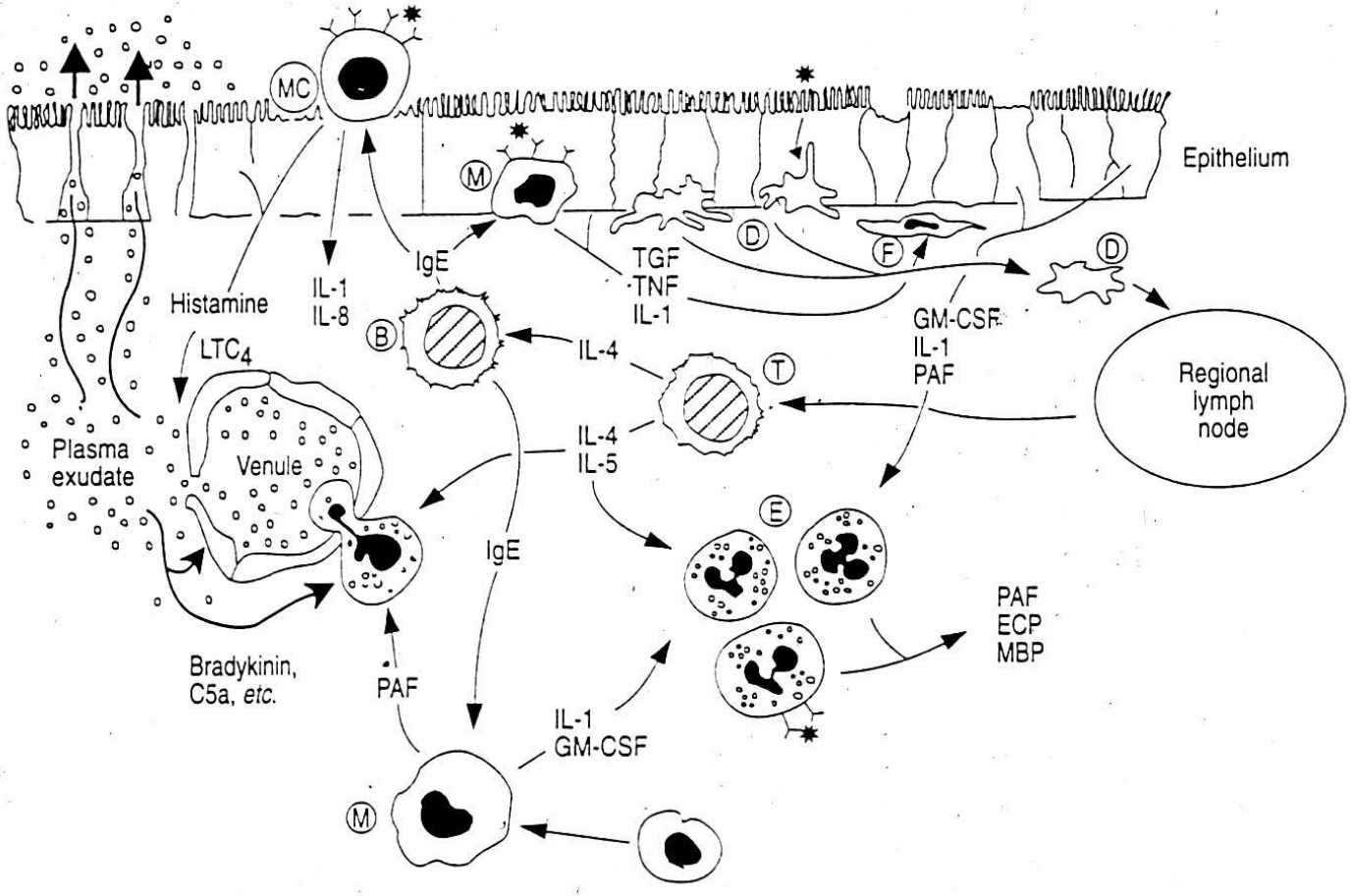

Trigger
+
Bronchial responsiveness
Airway narrowing
Wheeze, cough & dyspnoea


H

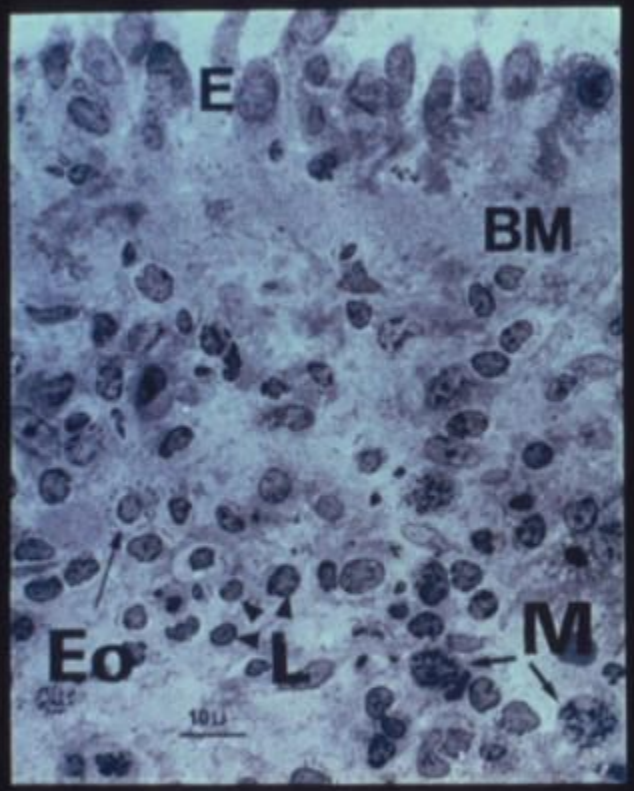

100
90
80
70
60
FEV1 or
PEFR
Normal
Rhinitis
Asthma
0.005
0.1
1
10
Histamine concentration (g/l)


Allergy
Infection
Inflammation
+
Remodelling
Trigger
+
Bronchial
responsiveness
Airway
narrowing
Wheeze,
cough &
dyspnoea

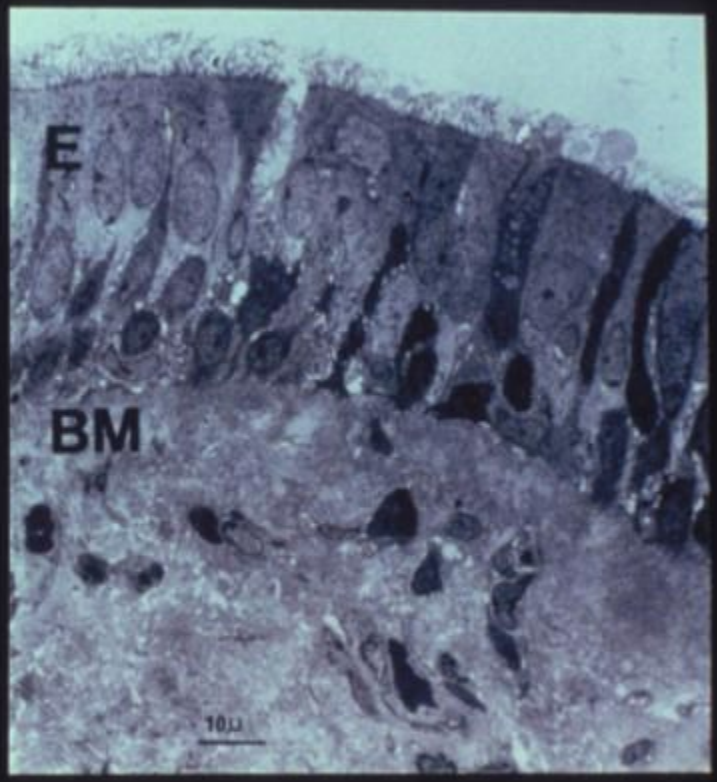
Airway inflammation



From Persson, *Eur Respir Rev* 1994



Asthmatic



Steroid – treated Asthmatic

Inflammatory Effects in Asthma

ACUTE

Airway Constriction

Microvascular leakage / oedema

Vasodilatation

Mucus hypersecretion

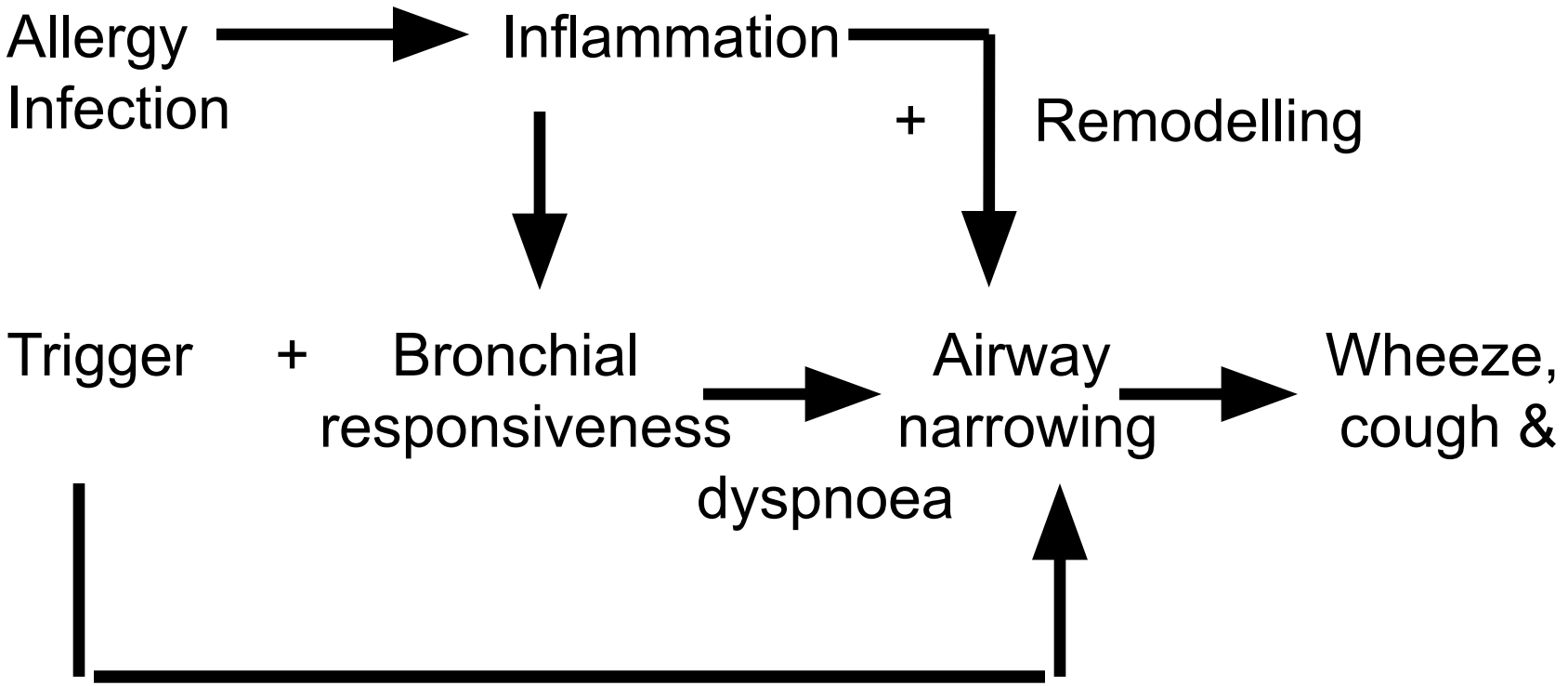
CHRONIC (REMODELLING)

Subepithelial fibrosis

Smooth muscle hyperplasia / hypertrophy

Goblet cell hyperplasia

New vessel formation


Allergy
Infection
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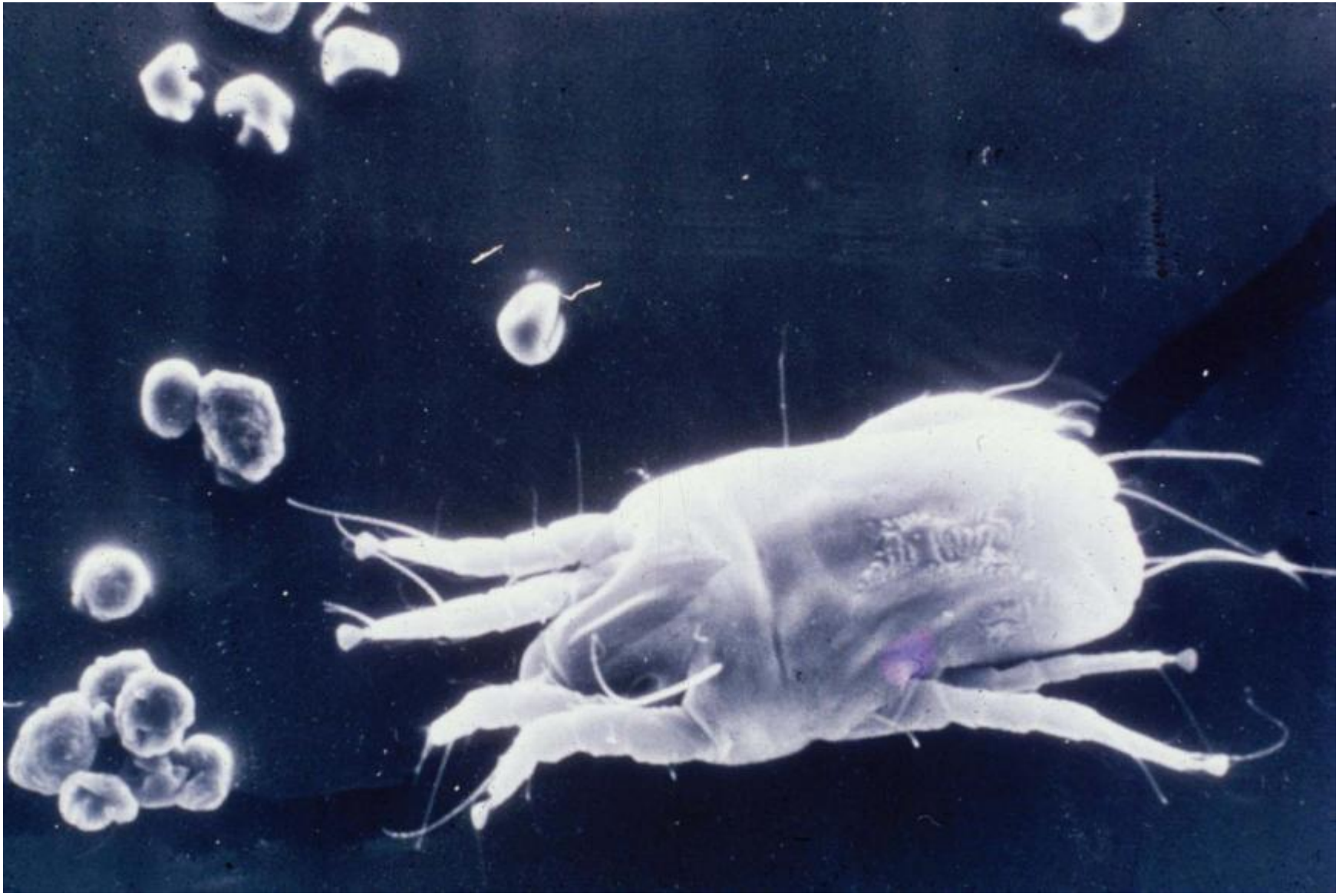
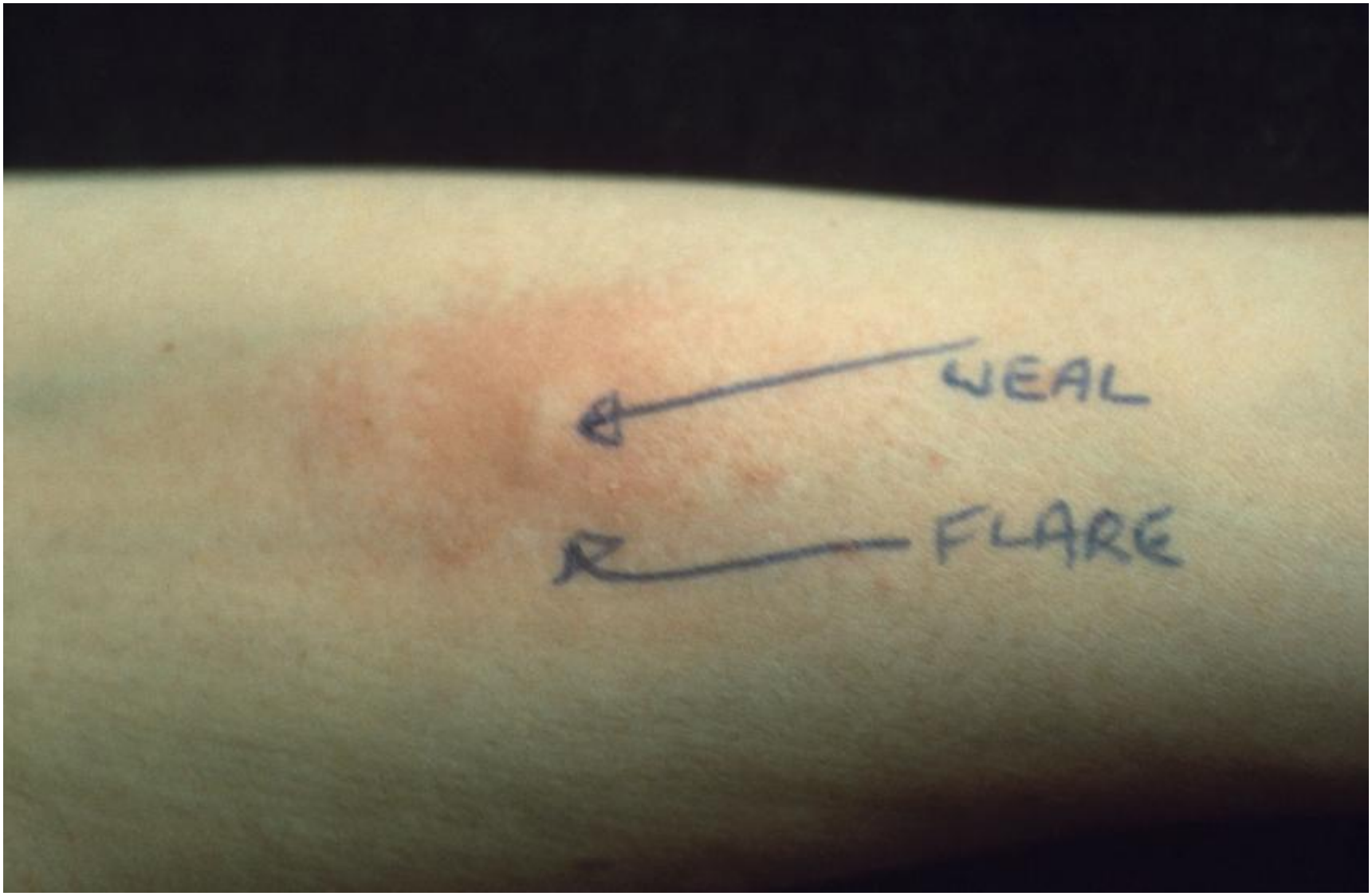
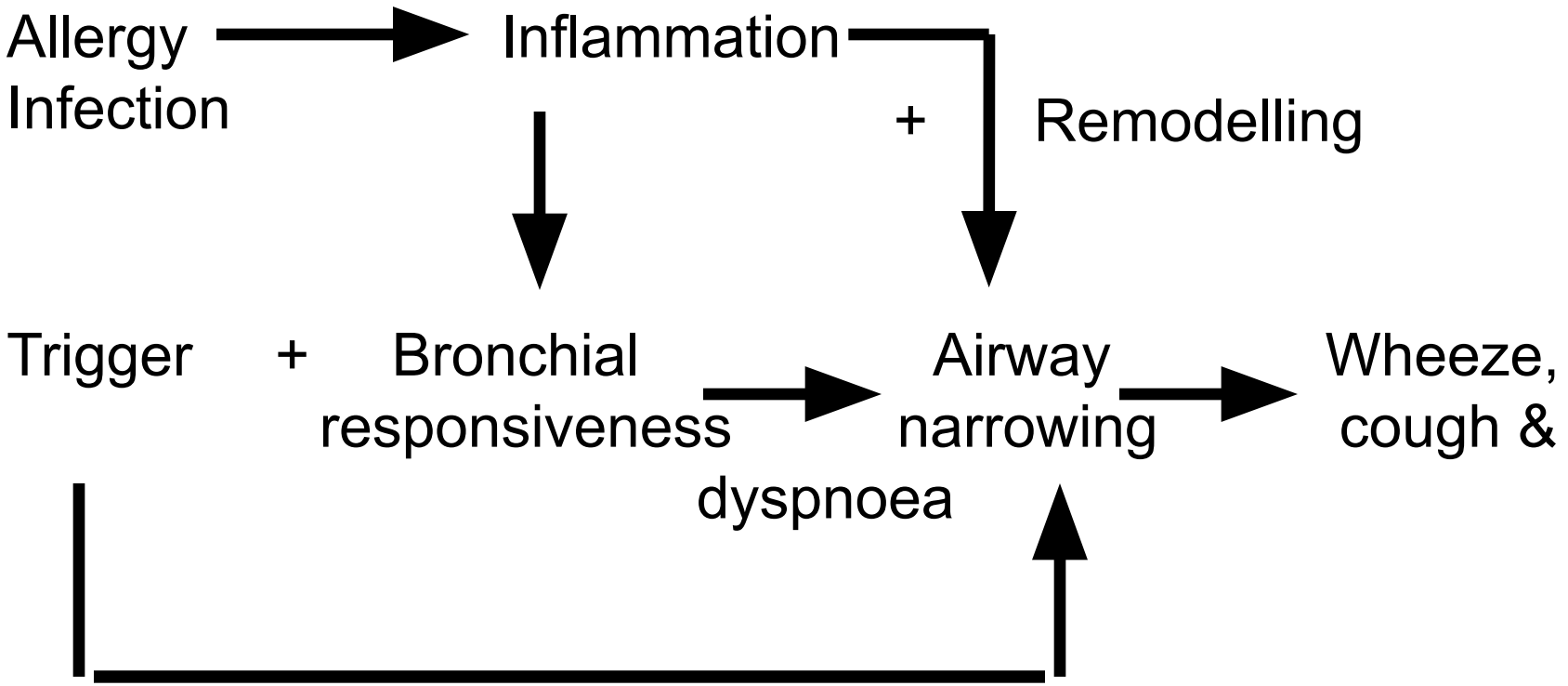



WEAL
FLARE


Allergy
Infection
Inflammation
+
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+
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responsiveness
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Wheeze,
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dyspnoea

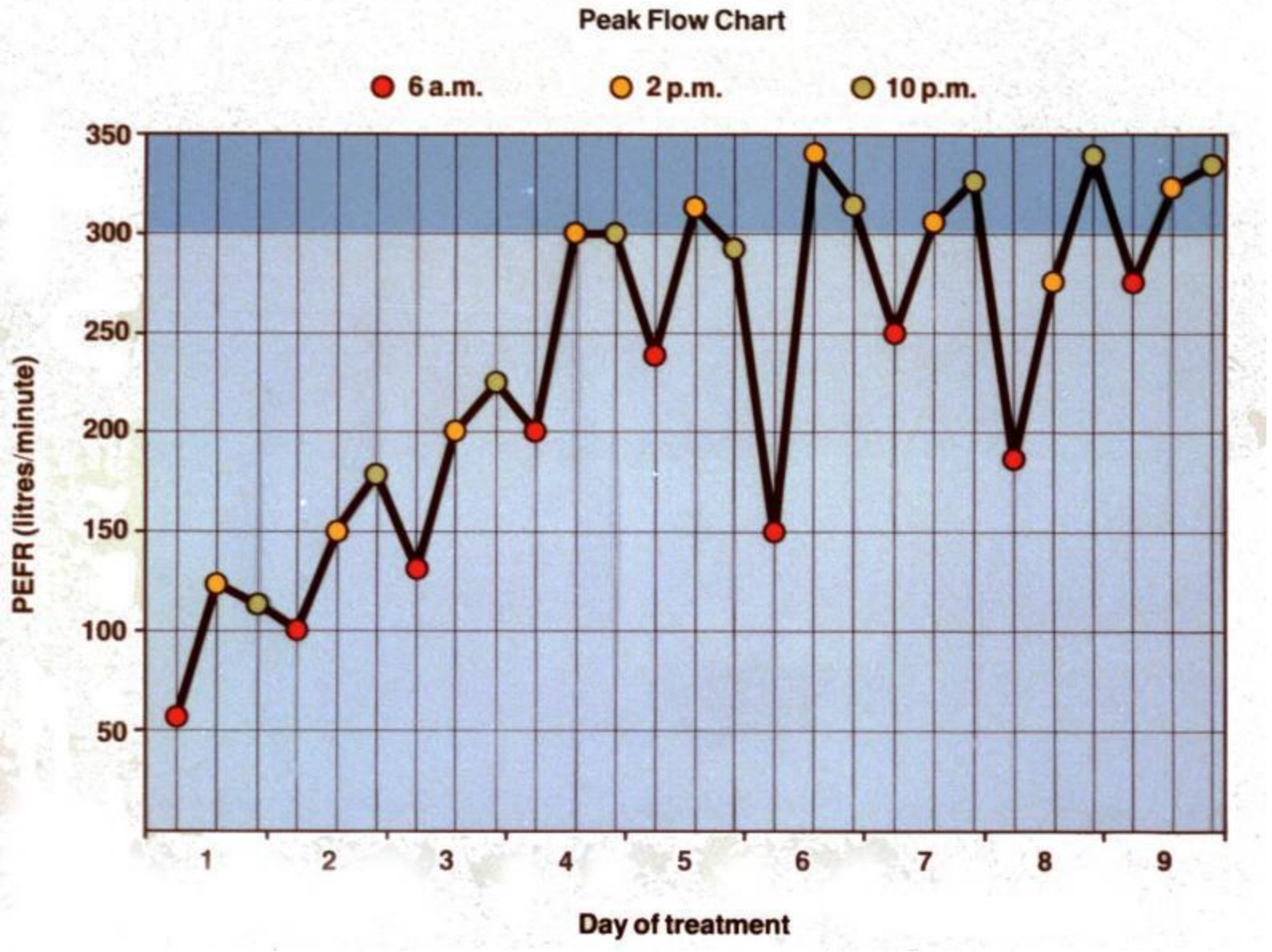
Triggers

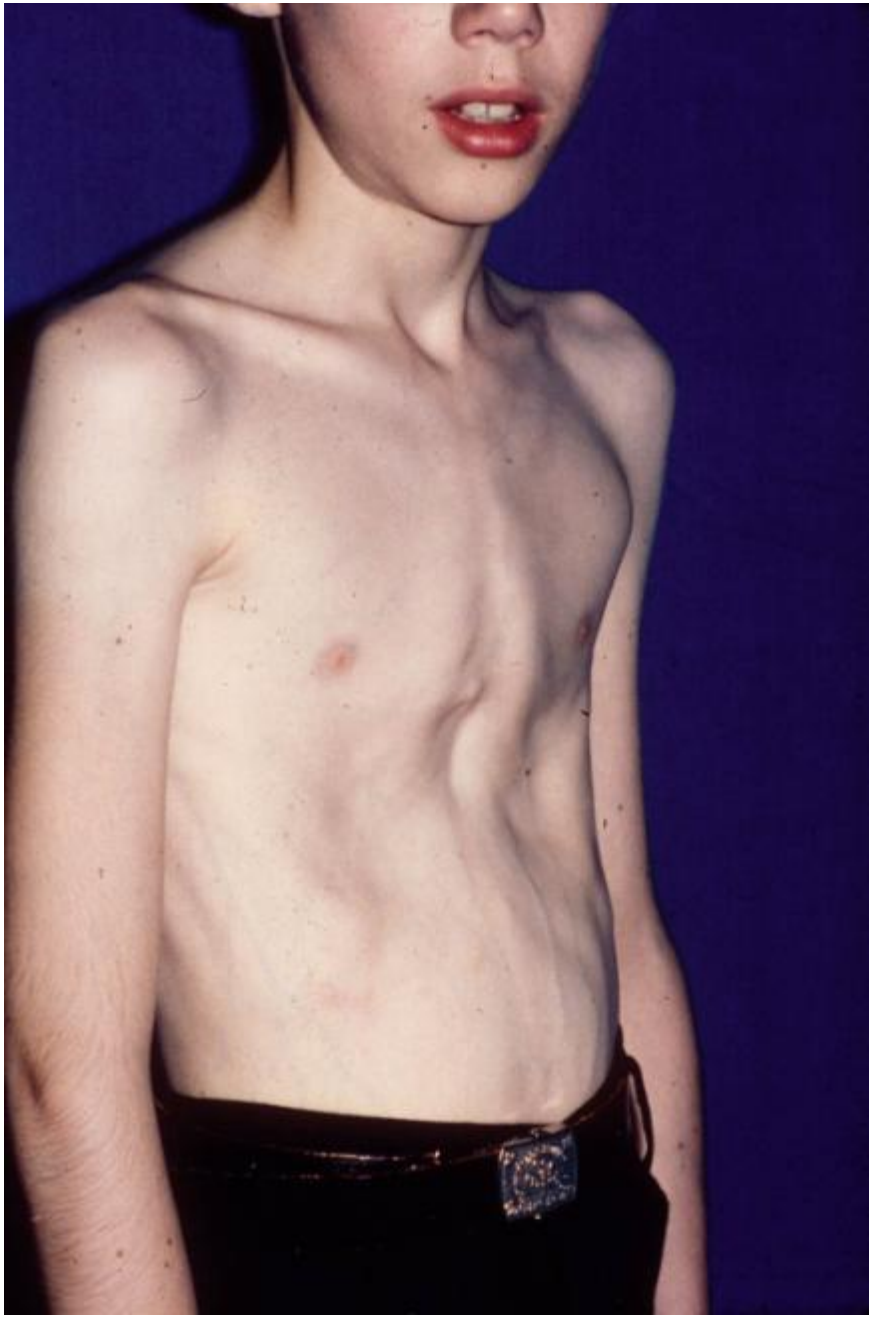
- Allergen (pollen, cat…)
- Air pollution (smoke…)
- Infection (URTI)
- Exercise, etc.

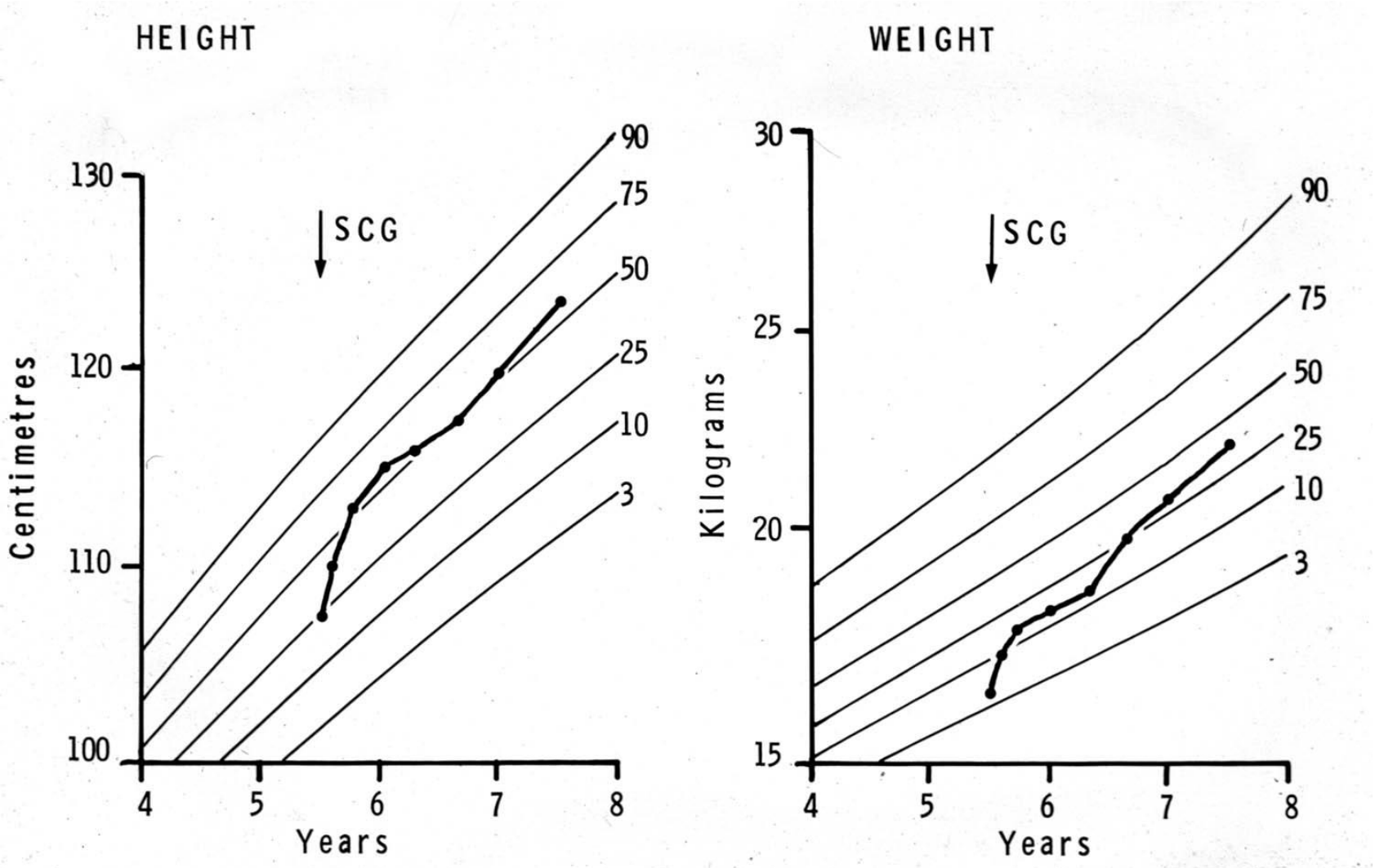
Asthma history questionnaire

- age of onset of symptoms
- pattern of symptoms
- amount of disturbance to everyday life, schooling etc.
- definite association with precipitating factors
  - allergic, infective, emotional, exercise, environmental
- family background and other illnesses
- previous treatment
  - appropriateness and technique
  - response

				12	13	14	15
	Date at start					AUG	
NIGHT	COUGH 咳	None .... 唔..咳....	0				
		Coughing in sleep ..睡時..咳....	1		1	1	
		Sleep disturbed by cough ..咳到..不能..睡	2				
	WHEEZE	None ....喘 喘	0				
		Slept but wheezy 時喘 .能..睡	1				
		Disturbed once by wheeze ....一 somewhat 二次..喘	2		2		
		Very disturbed by wheeze ..喘到不能入睡	3				
	WHEEZE/COUGH ON EXCERCISE 運動	None 唔 咳.. 唔..喘....	0				
		Slight 些少..	1			1	
		Limits excercise 不能..運動..	2		2		
DAY	COUGH	None .... 完全唔..咳....	0				
		Occasional ..間中..咳....	1				
		Frequent 時常咳..	2	2	2	2	2
	WHEEZE	None .... 完全唔..喘....	0				
		Mild (relieved by medicine) 吃完藥後唔喘	1				
		Moderately bad 中等..程度..	2				
		Severe 厲害	3				3
	PEAK FLOW READINGS	Before morning medicines 早 M			M	M	M
		Before night time medicines 晚 N			N	N	N
	DRUGS Number of doses actually taken during the past 24 hours	Name of Drug	Dose Ordered				
		SALBUTAMOL	4				
	COMMENTS	(Only if there is anything unusual to report)					


Peak Flow Chart
6 a.m.
2 p.m.
10 p.m.
PEFR (litres/minute)
350
300
250
200
150
100
50
1
2
3
4
5
6
7
8
9
Day of treatment




HEIGHT
Centimetres
130
120
110
100
SCG
90
75
50
25
10
3
4
5
6
7
8
Years
WEIGHT
Kilograms
30
25
20
15
SCG
90
75
50
25
10
3
4
5
6
7
8
Years

Chronic Wheeze: Non-Asthmatic

Cystic fibrosis (host-defence)

Bronchiectasis

Foreign body aspiration

Congenital airway disease

Recurrent aspiration syndrome

other!!

British Guideline on the Management of Asthma

A national clinical guideline

Thorax 2003; **58** (Suppl I): i1-i92

British Guidelines on Asthma Management

Key issues

Revision stresses:

- The importance of making the correct diagnosis
- The need to gain control of disease
- Certain therapeutic changes
- Attention being paid to inhaler characteristics
- The importance of self management

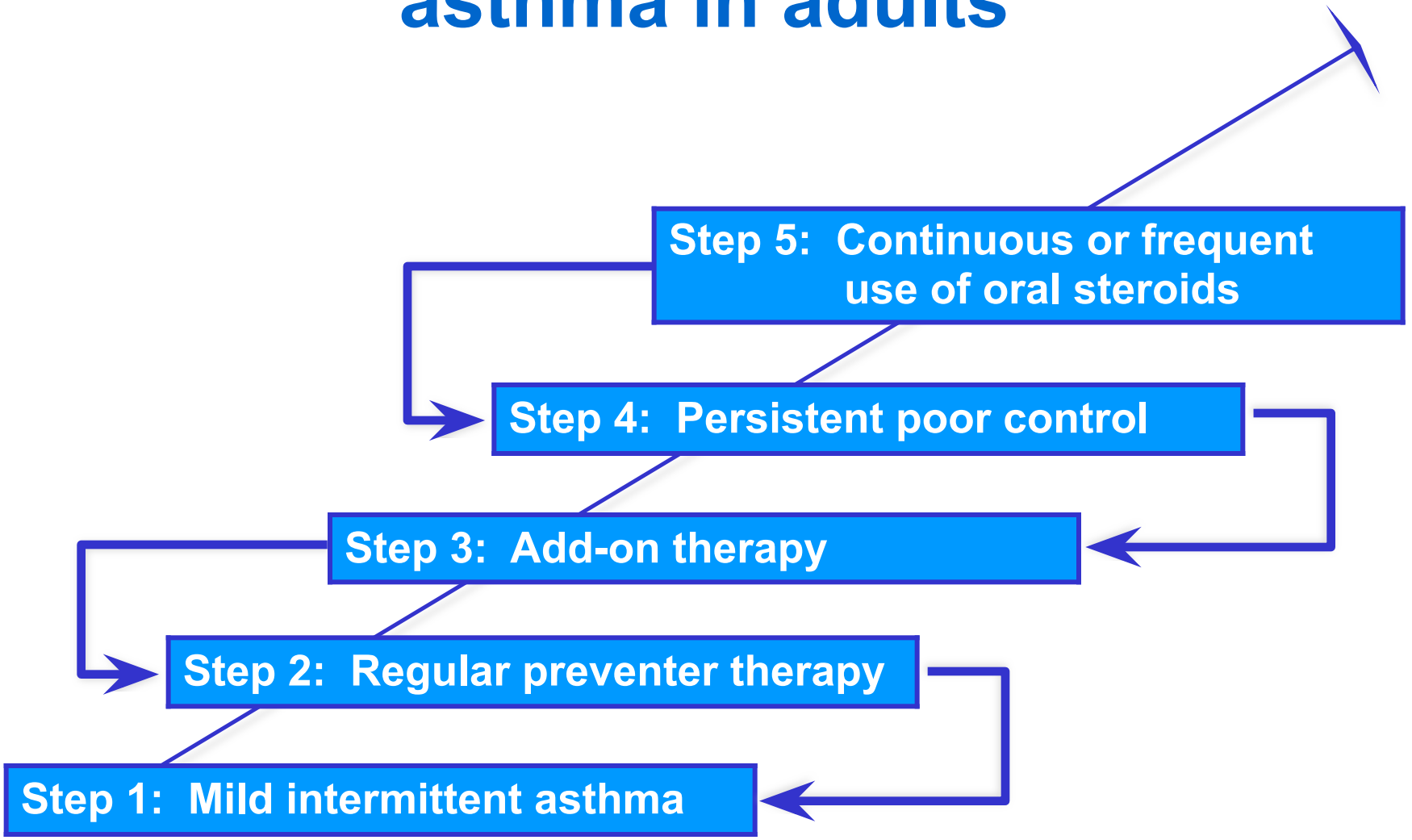
Asthma control

Asthma control means:

- minimal symptoms during day and night
- minimal need for reliever medication
- no exacerbations
- no limitation of physical activity
- normal lung function (FEV_1 and/or PEF >80% predicted or best)

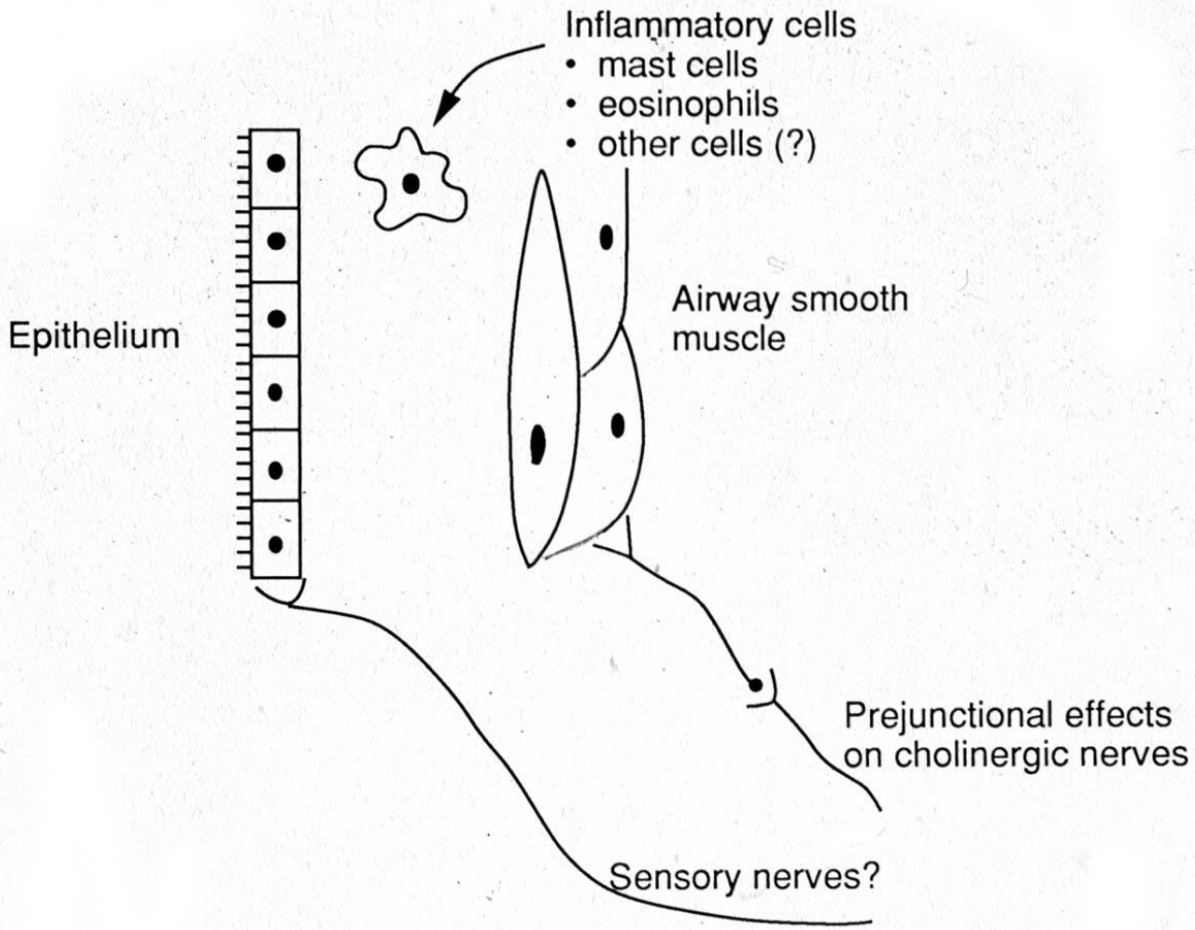
Pharmacological management. Thorax 2003; 58 (Suppl I): i1-i92

Stepwise management of asthma in adults

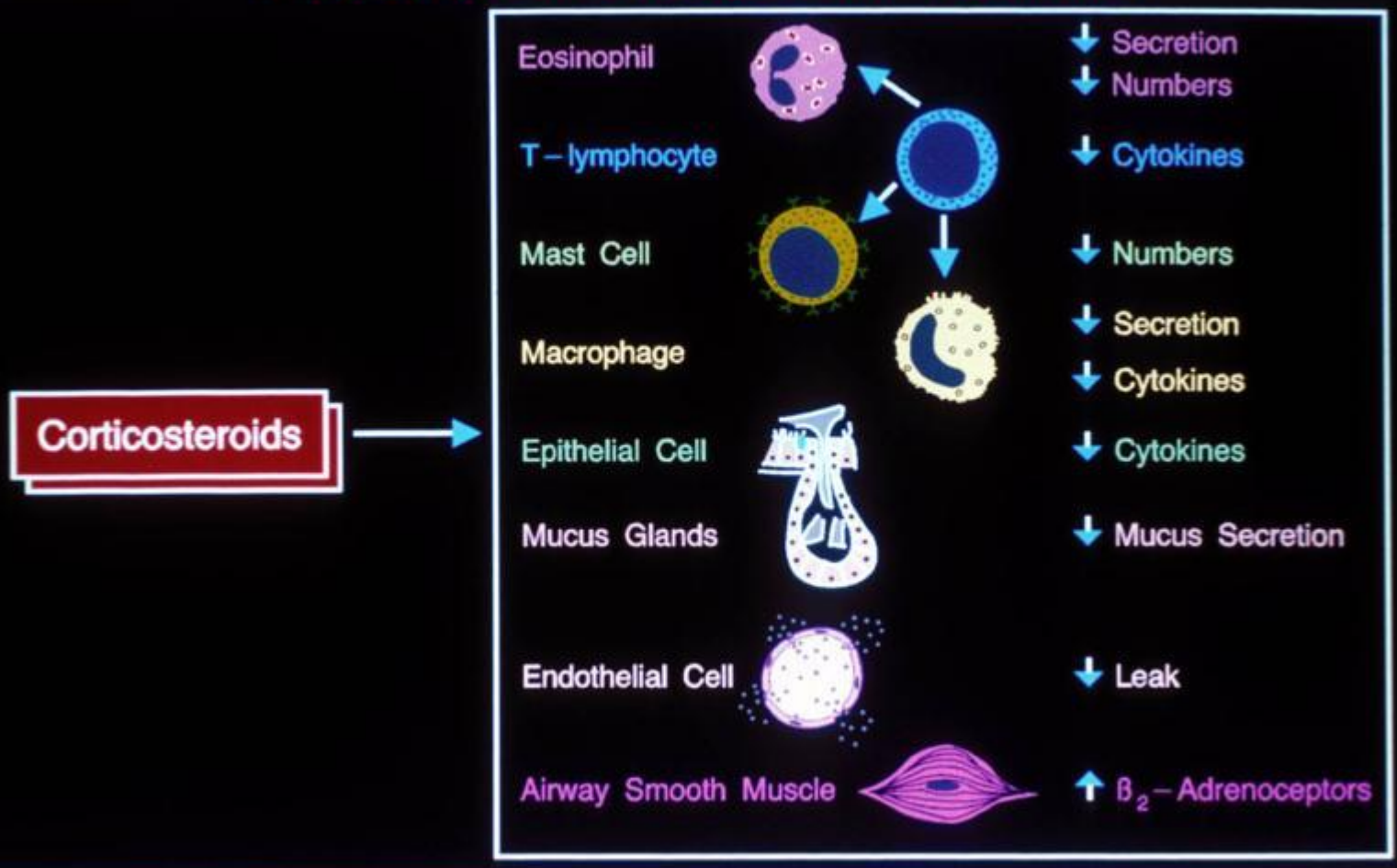


Pharmacological management. Thorax 2003; 58 (Suppl I): i1-i92

Potential sites of action of β_2 agonists in asthma



Actions of Steroids in Asthma




DRUGS FOR ASTHMA
Robitussin
PE
DECONGESTANT
COUGH FORMULA
Dimetapp
Elixir
Bronkaid
THEO-DUR
ASTRA


Children's Hospital


TUBES

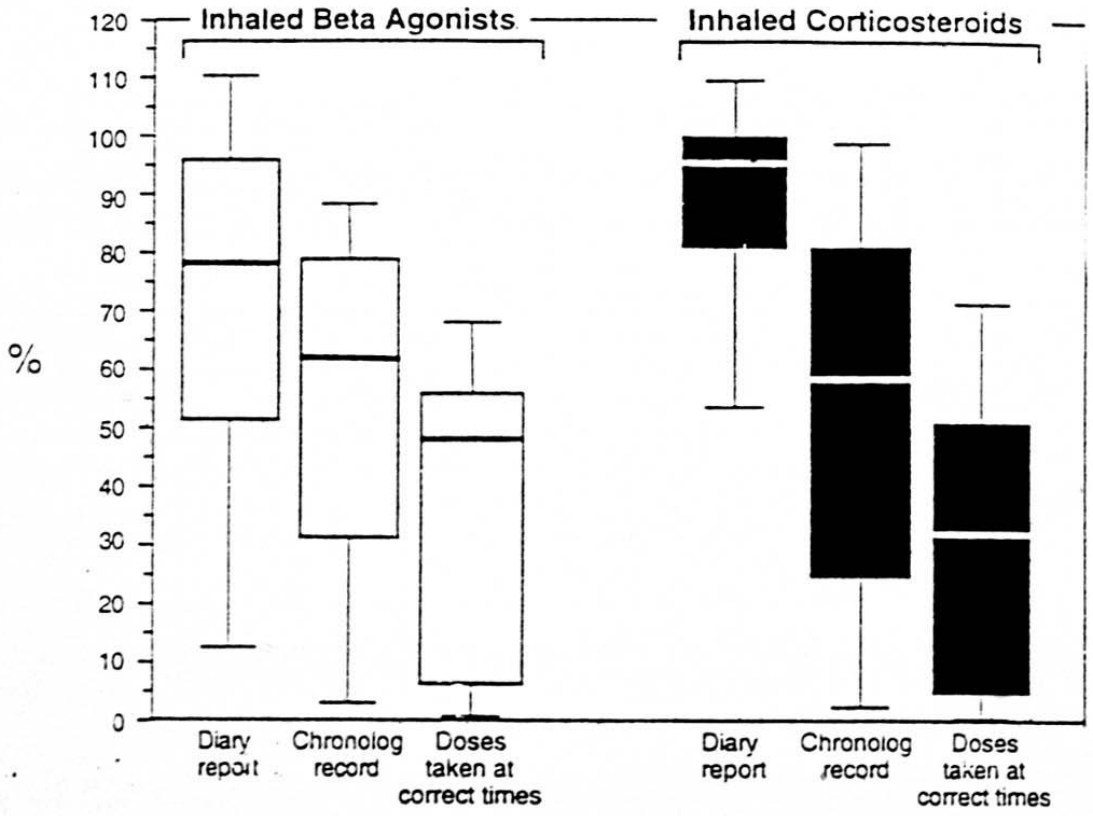
Summary

- outline of asthma
- fill in the details
  British Guidelines
  British Thoracic Society
- pharmacology of drugs

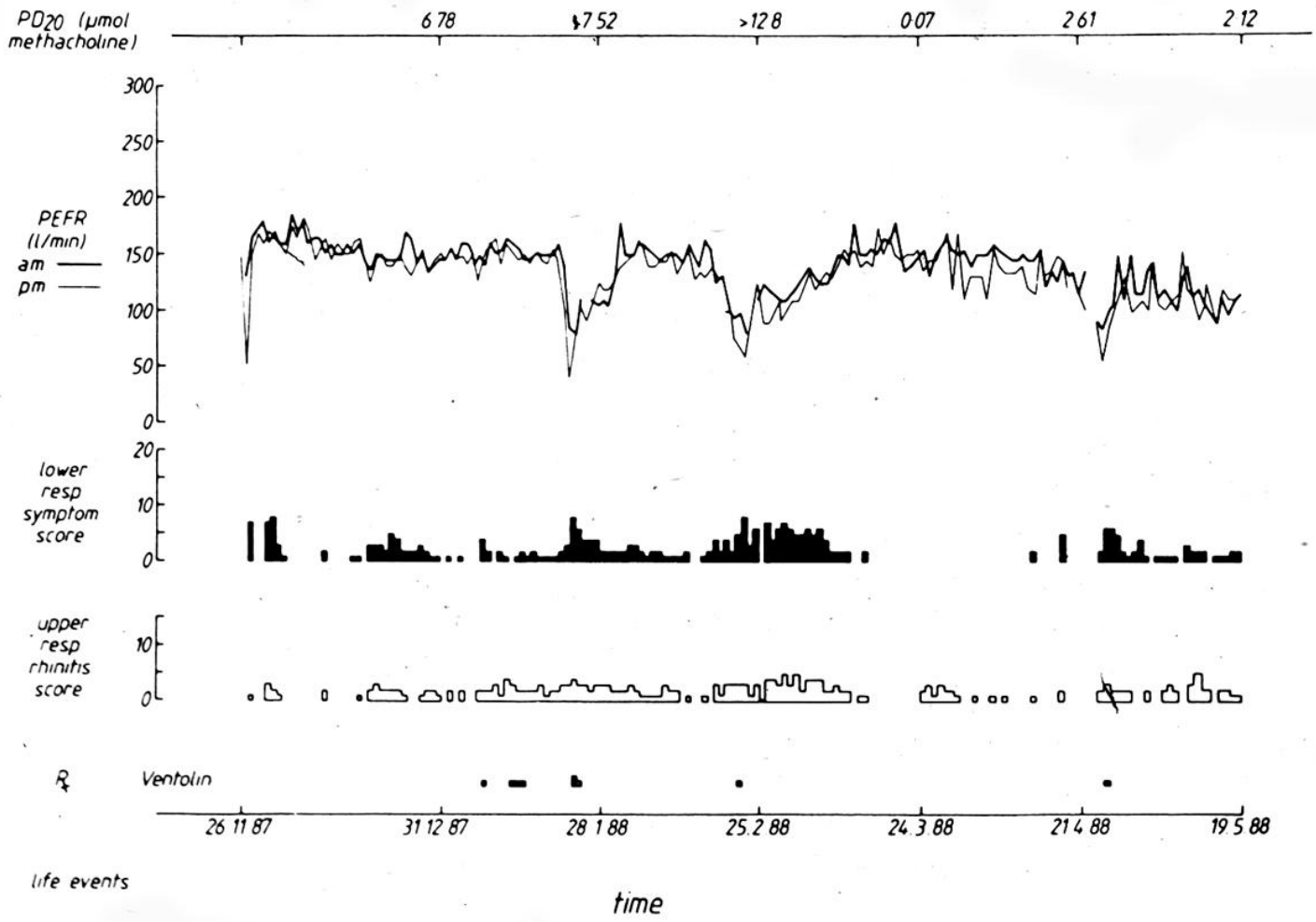
Any questions?

Adherence with inhaled therapy in children

Milgrom et al, *J Allergy Clin Immunol* 1996;98:1051



Six months home monitoring in 7 year old atopic boy with wheeze



Clough et al, ARRD 1991