

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.”

Adam and Eve
and
Christopher Robin

Eve is a 5-year old girl with:

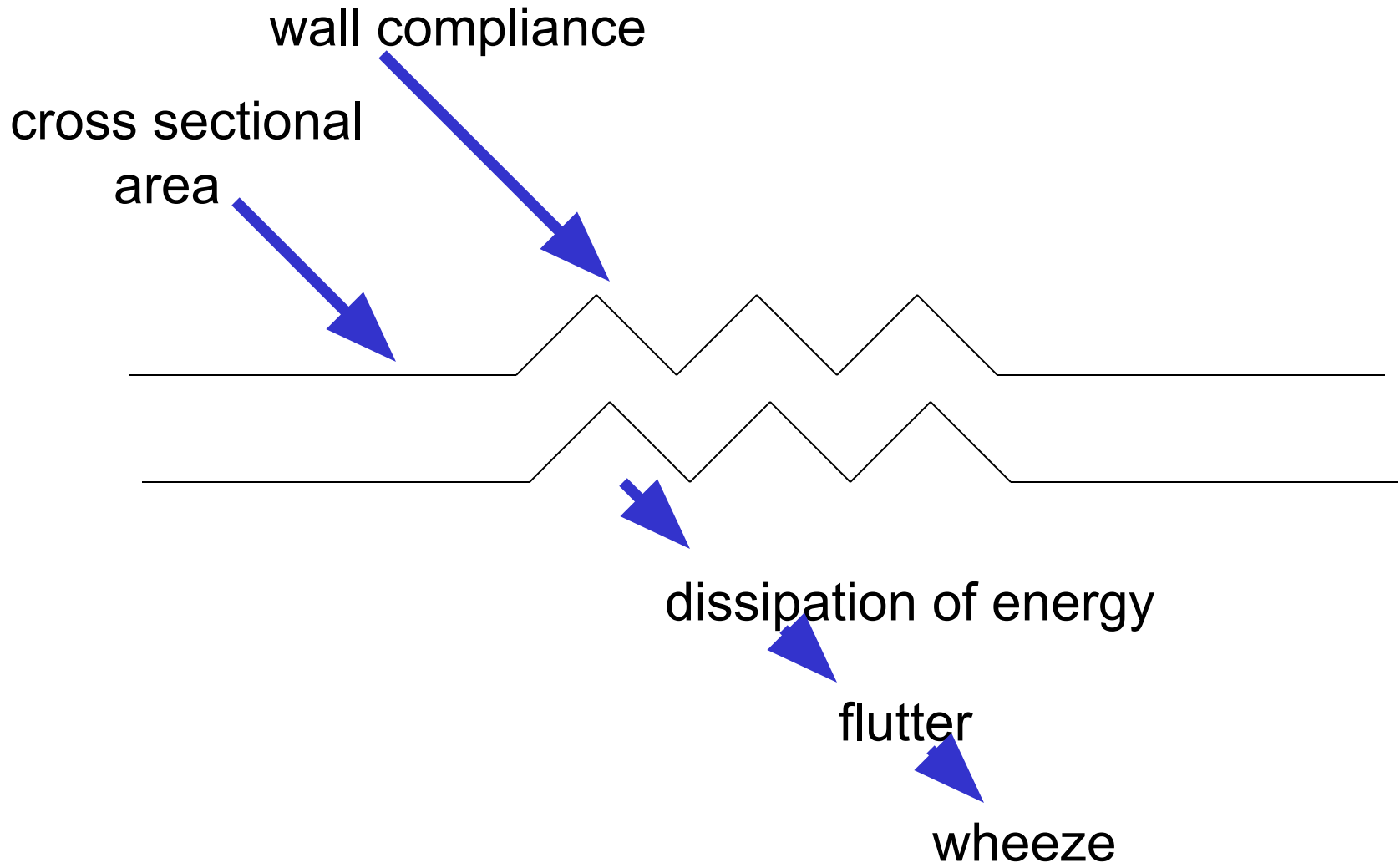
- Personal and family history of allergy
- Wheeze on laughing and exercise
- Severe attacks with colds
- Bronchodilator-responsive and dependent on inhaled corticosteroid
- Persistent symptoms and PEF variability on a depressed baseline
- Evidence of allergy
- Eosinophilic airway inflammation
- Evidence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

Adam is a 14-month old boy with:

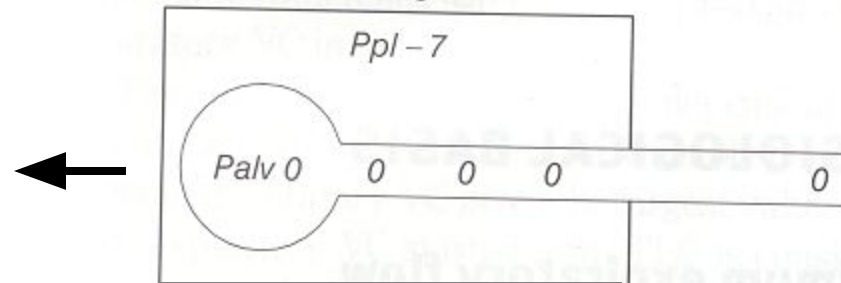
- A single, smoking non-allergic mother
- Multiple admissions to hospital with viral, episodic wheeze
- Poor response to nebulised β agonist
- No symptoms between episodes
- No evidence of allergy
- No inflammation between episodes

**What is
“Wheeze”?**

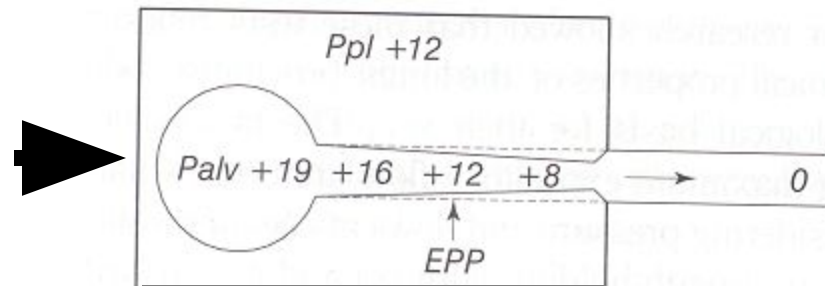
Flow limitation and wheeze



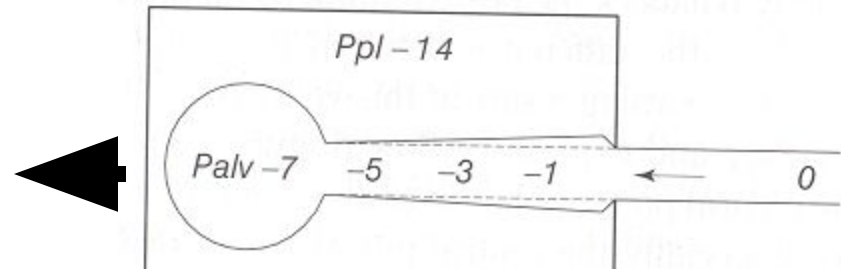
(a) Breath-holding



(b) Expiration

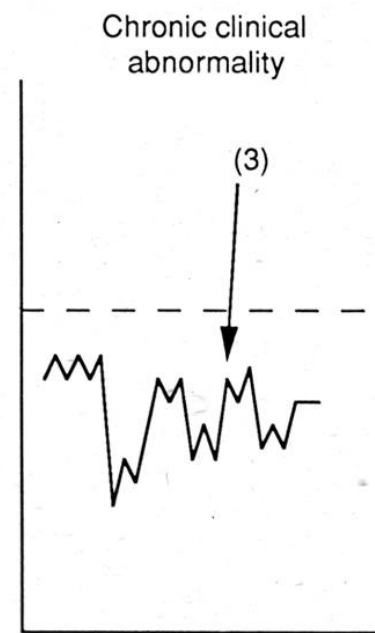
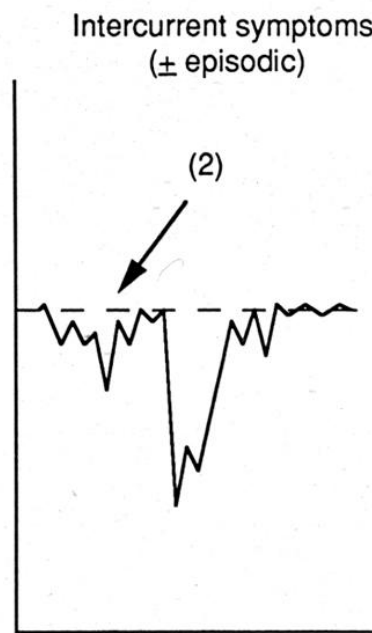
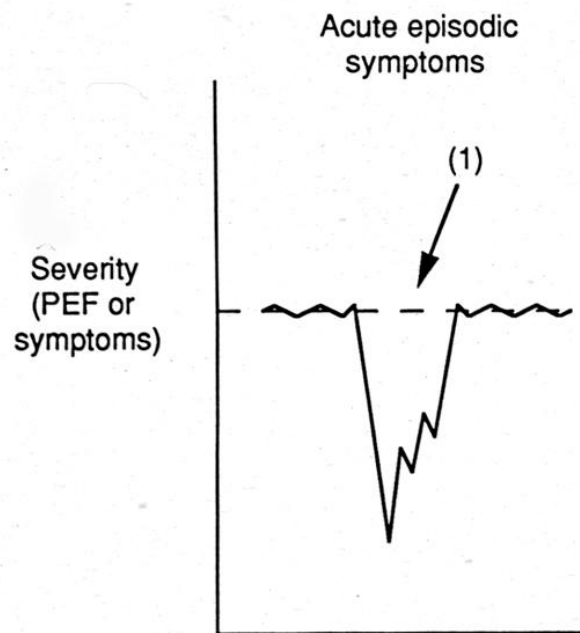


(c) Inspiration



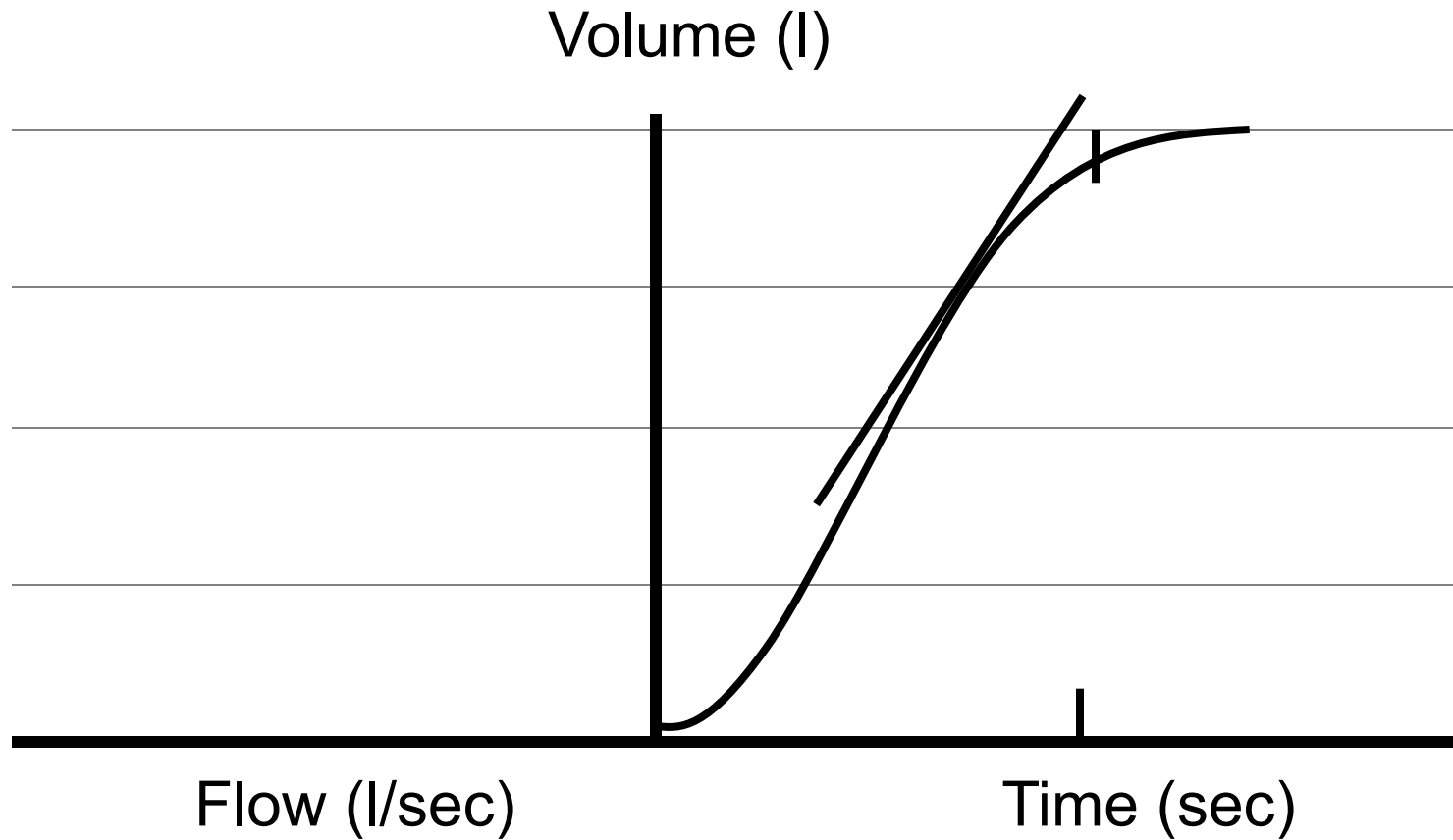
**How can airway narrowing
be measured?**



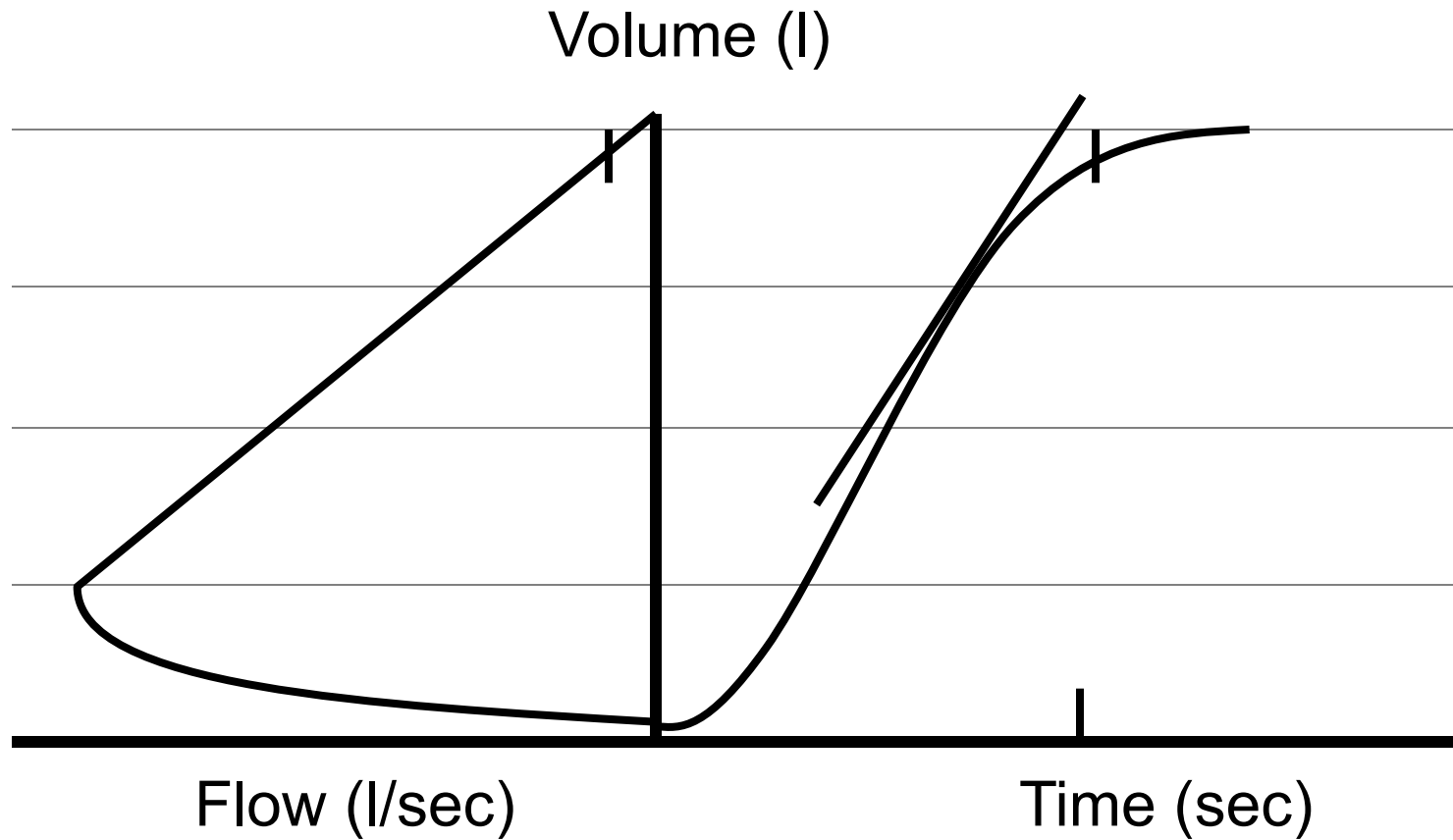




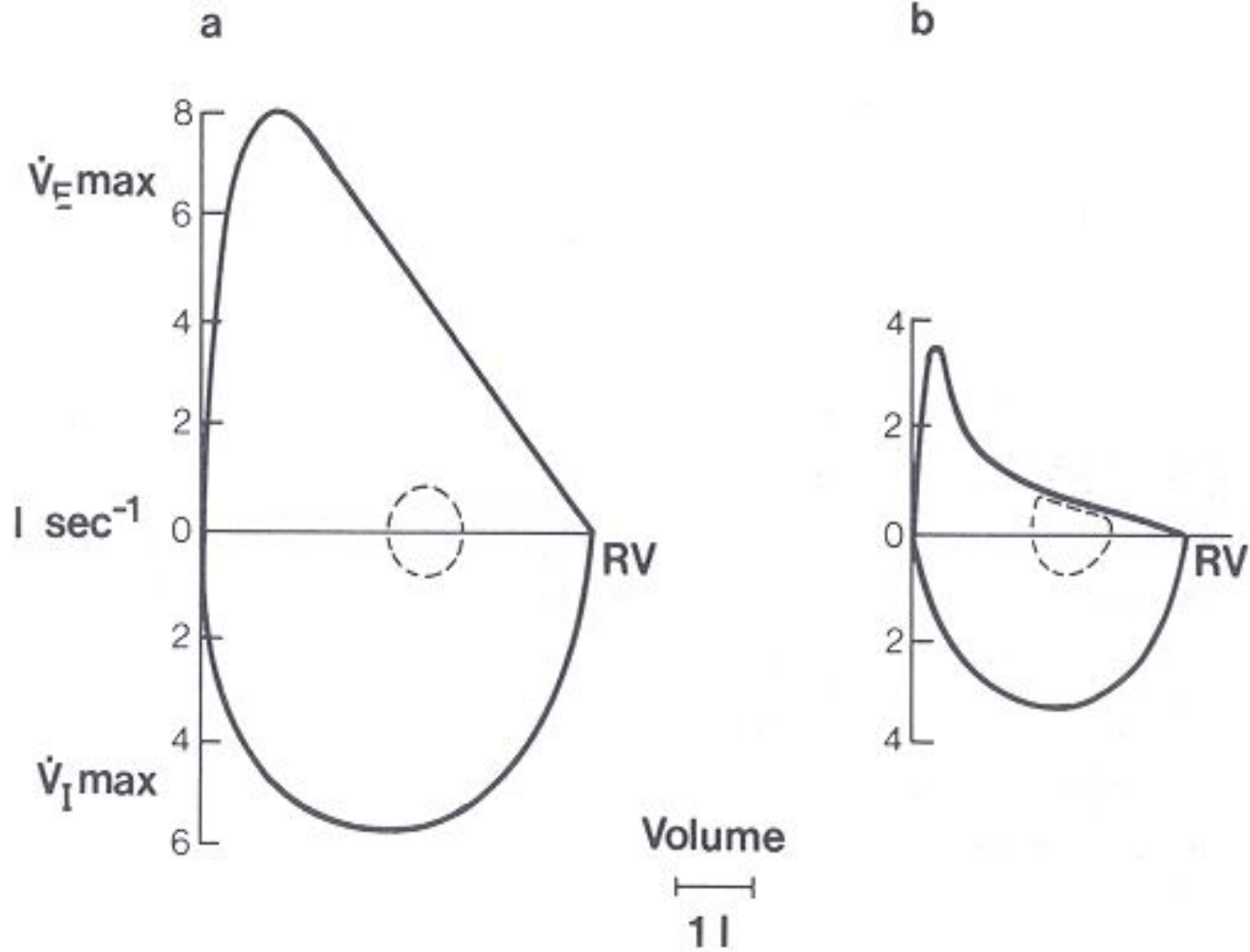
Volume, time and flow



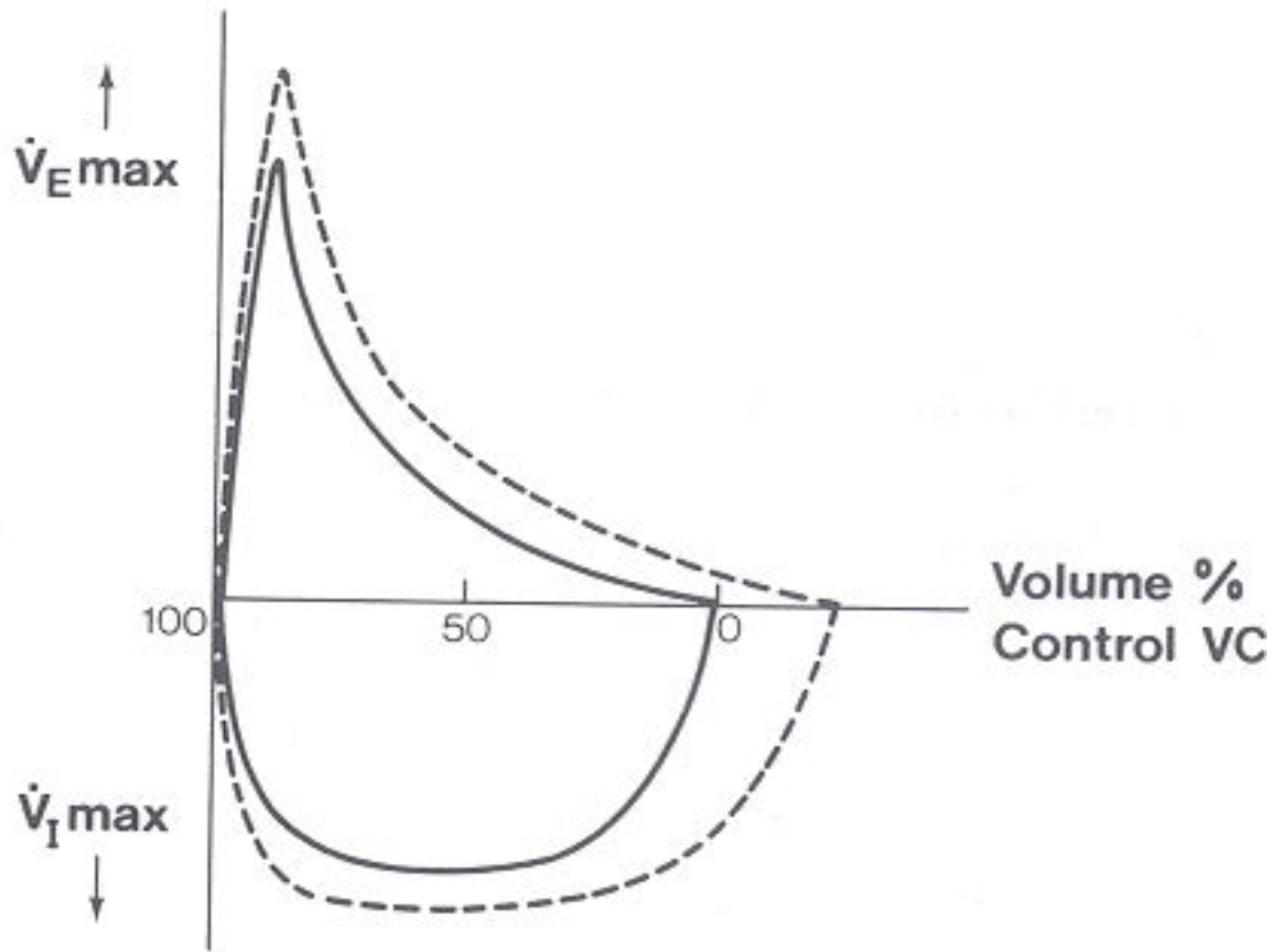
Volume, time and flow



Flow-volume curves

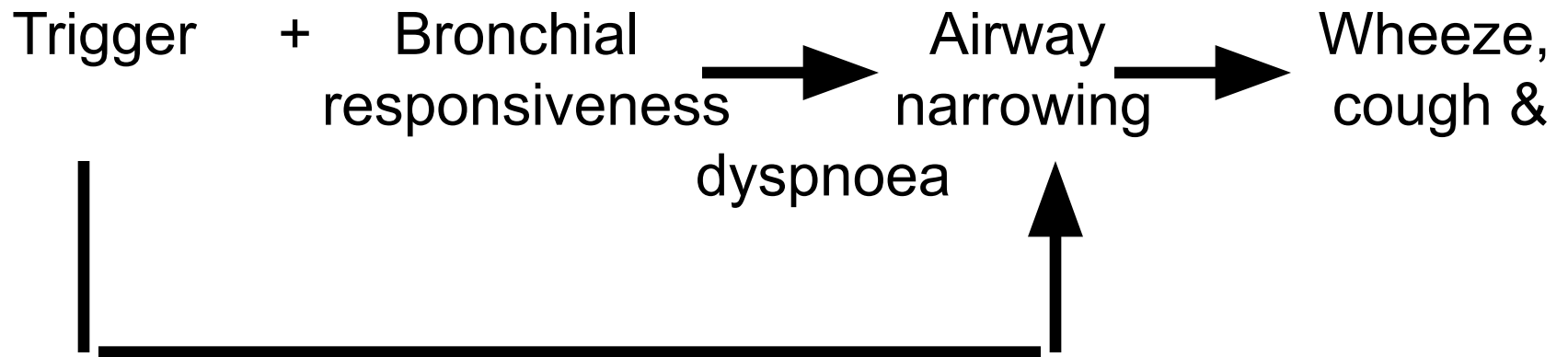


Bronchodilator response

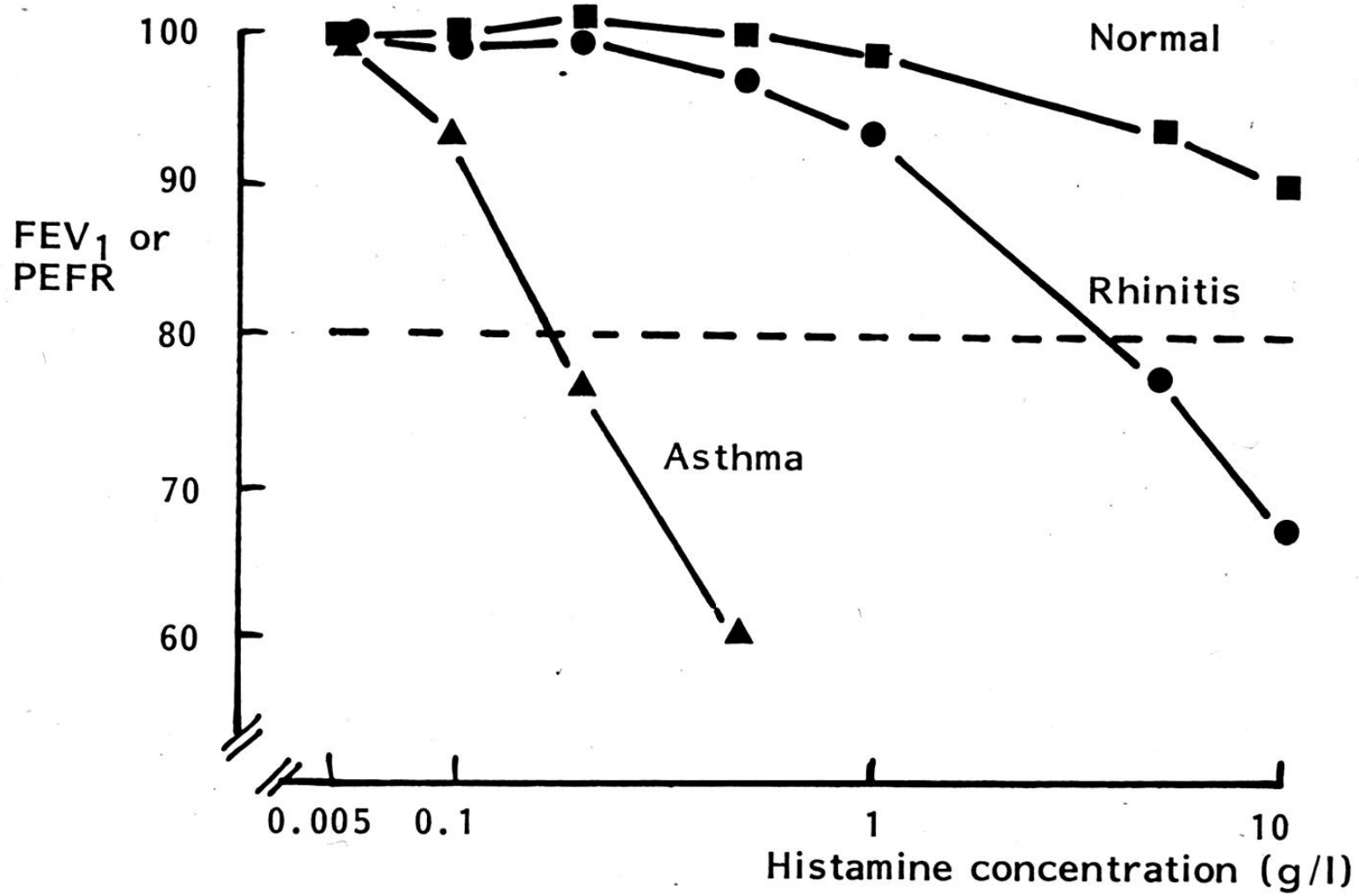


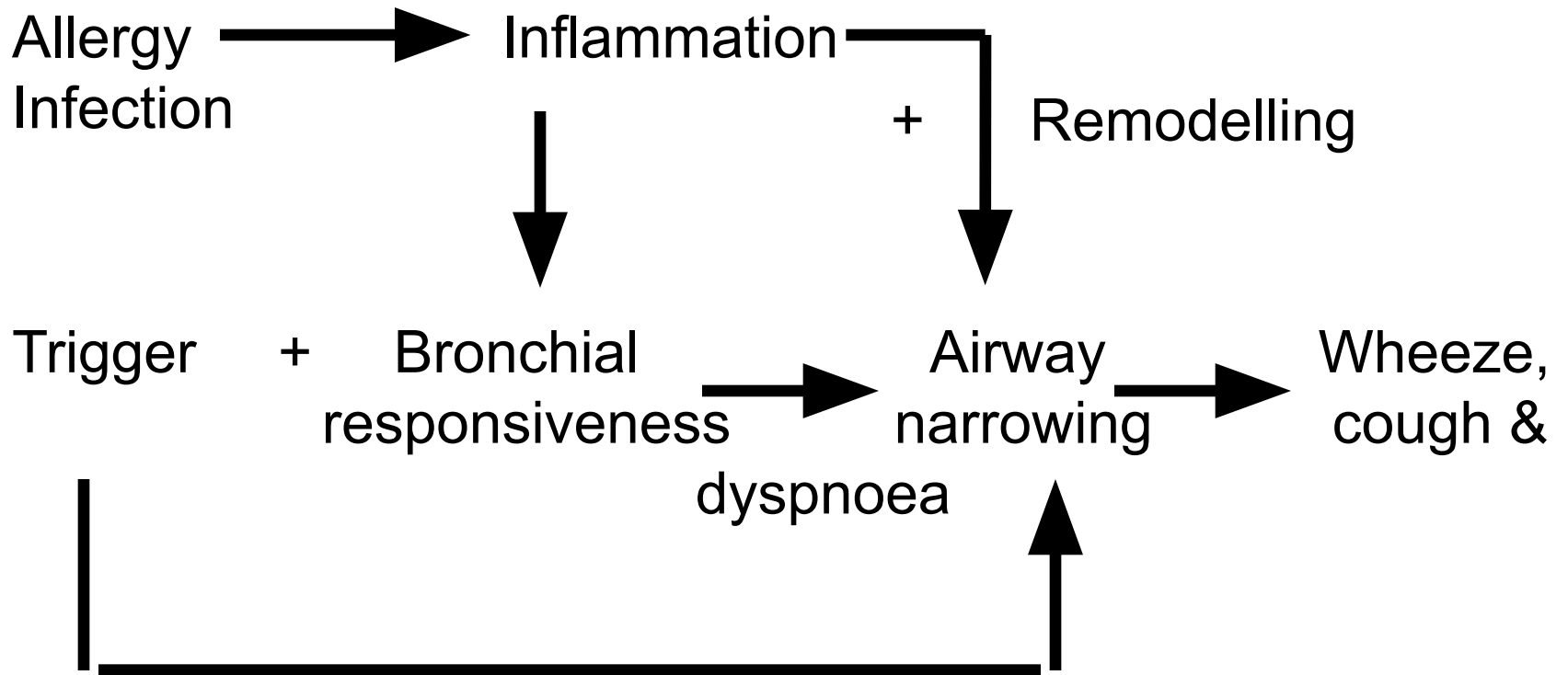
**What's bronchial
responsiveness?**

(or hyper responsiveness: BHR)

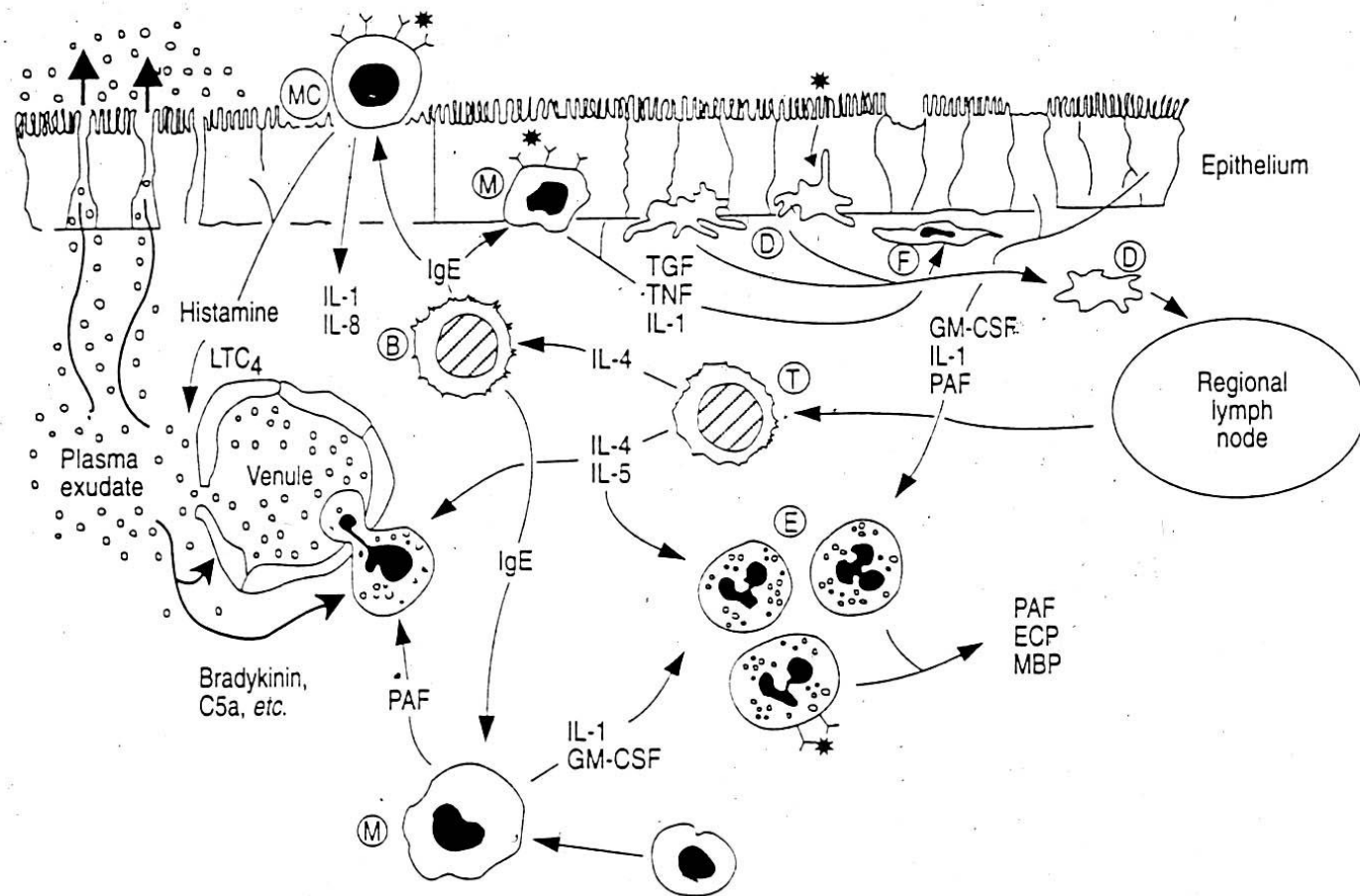




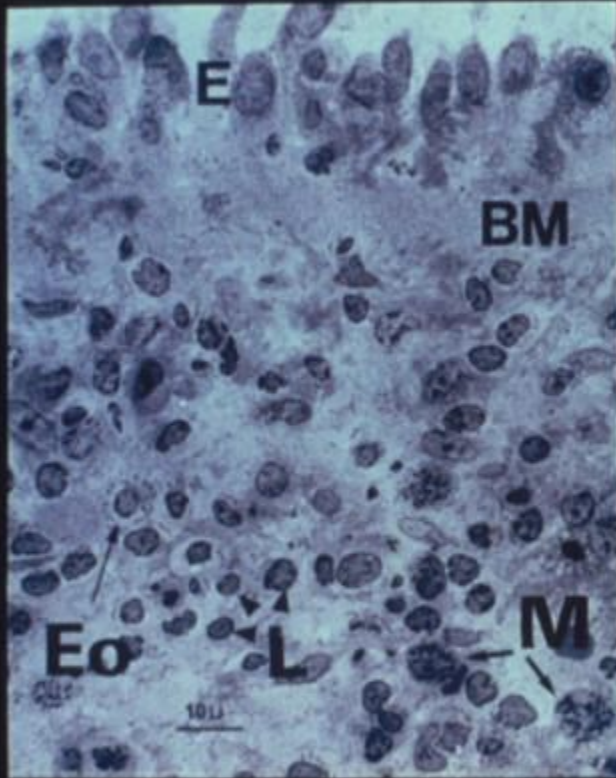




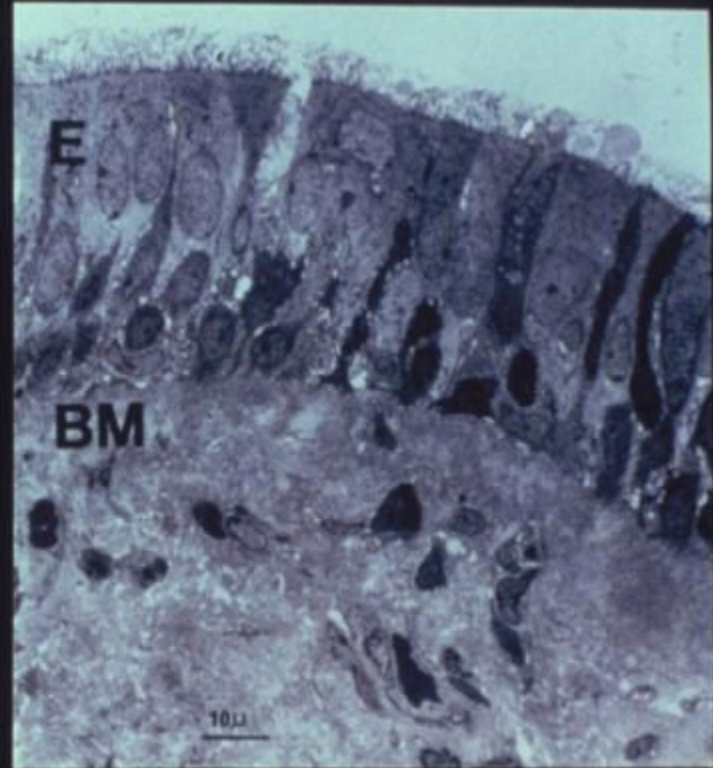
Airway inflammation



From Persson, *Eur Respir Rev* 1994



Asthmatic



Steroid – treated Asthmatic

Inflammatory Effects in Asthma

ACUTE

Airway Constriction

Microvascular leakage / oedema

Vasodilatation

Mucus hypersecretion

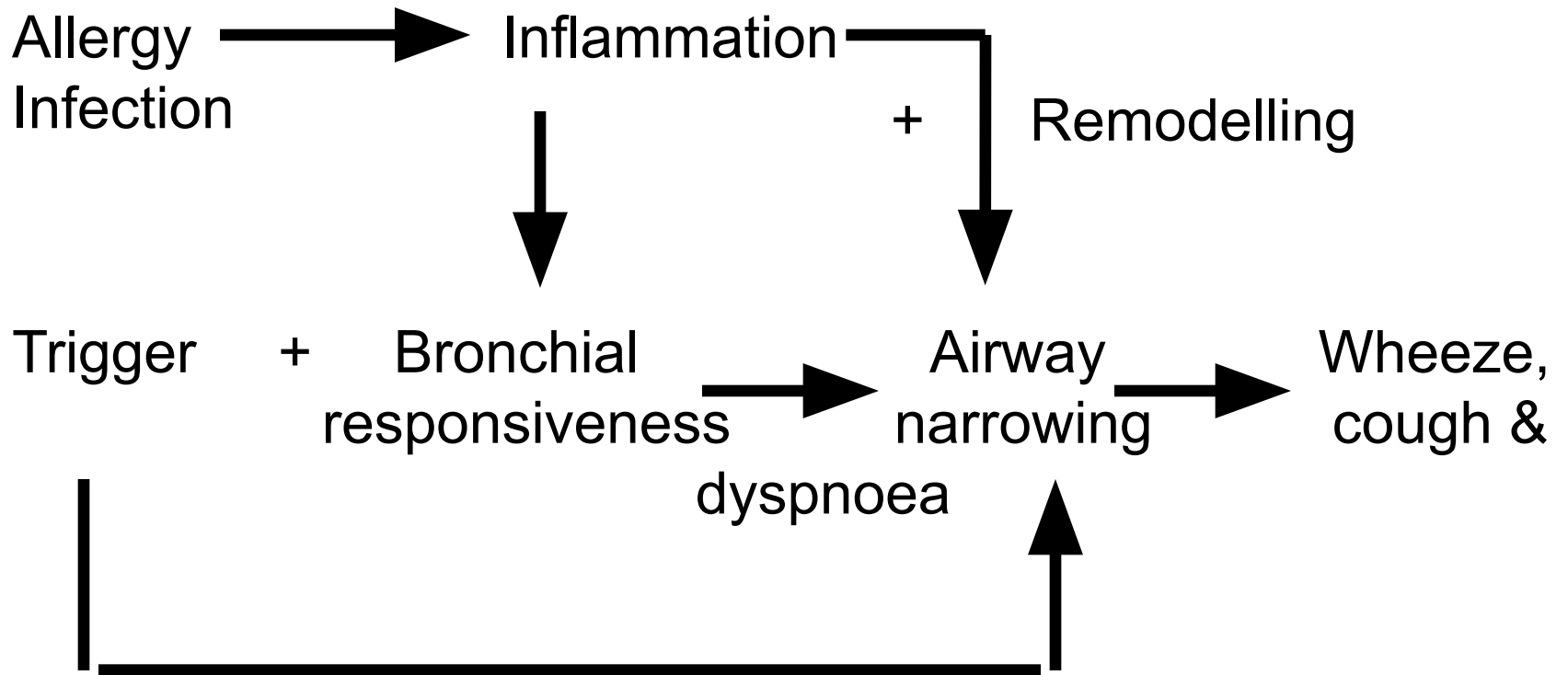
CHRONIC (REMODELLING)

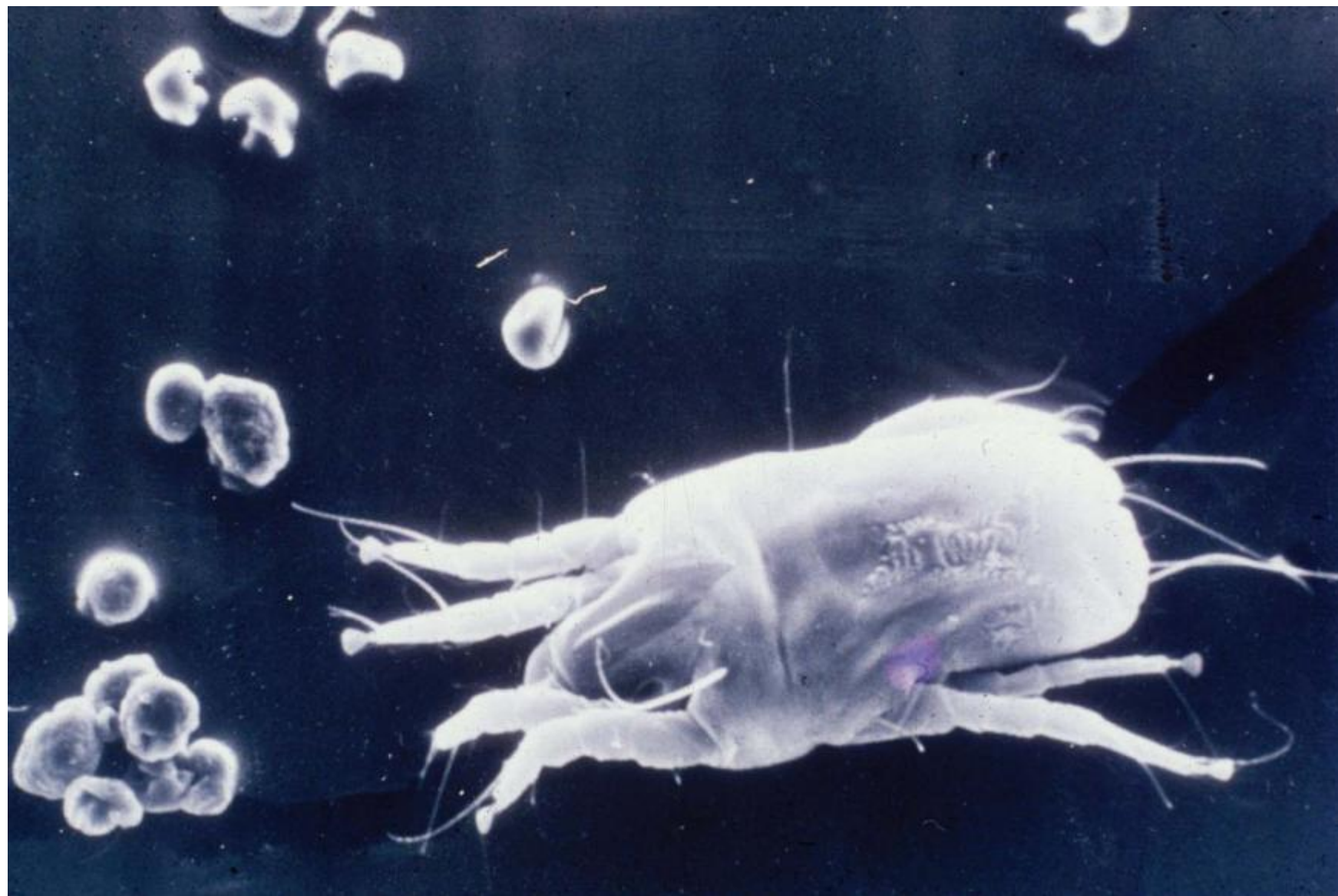
Subepithelial fibrosis

Smooth muscle hyperplasia / hypertrophy

Goblet cell hyperplasia

New vessel formation



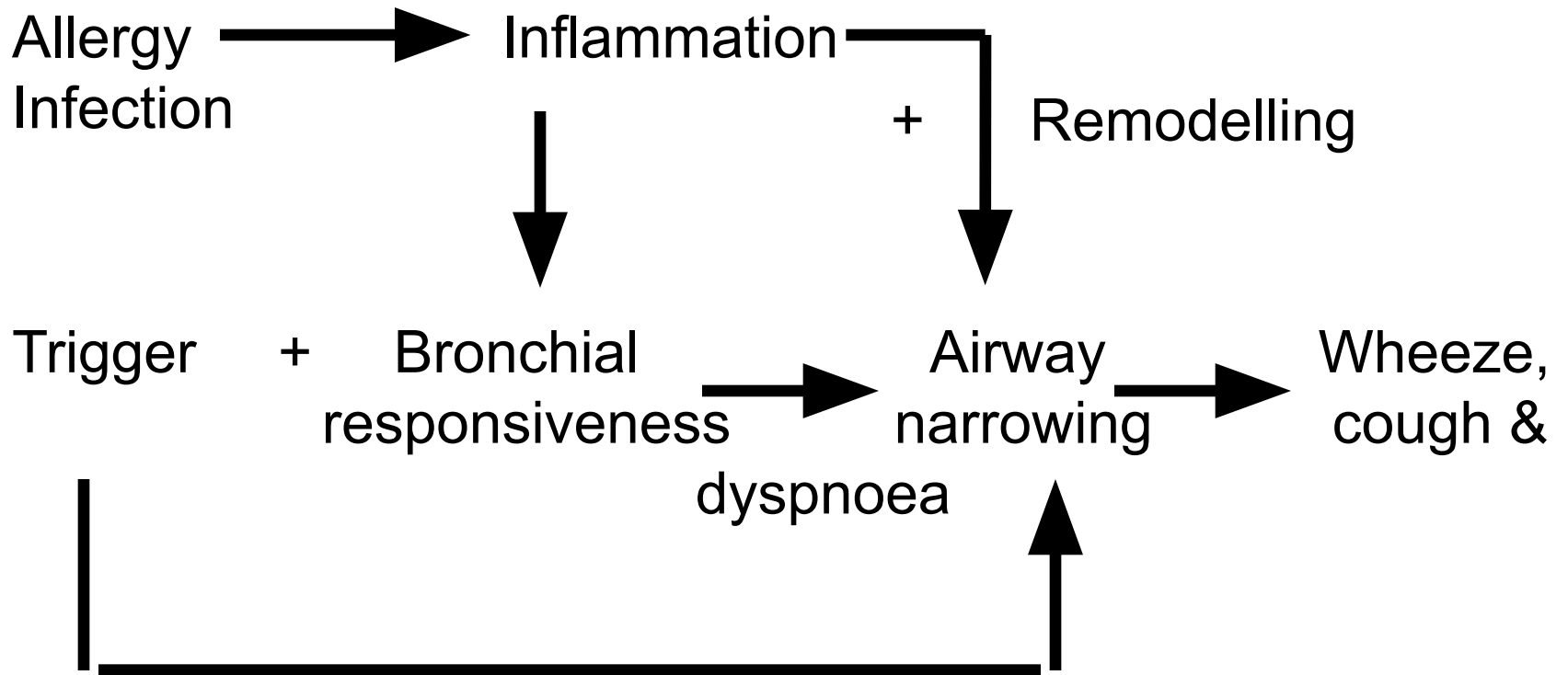






WEAL

FLARE



Triggers

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

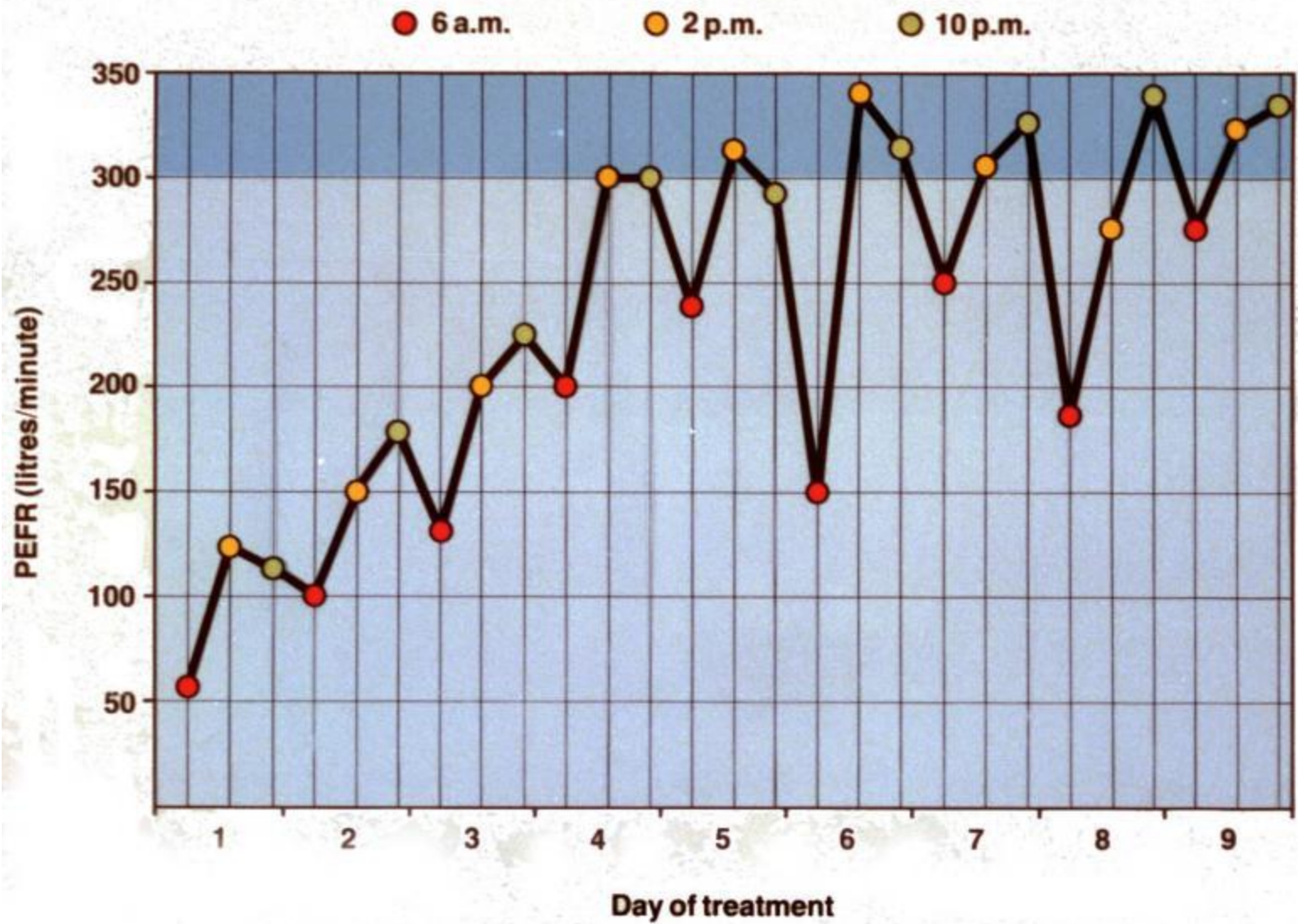


Asthma history questionnaire

- 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

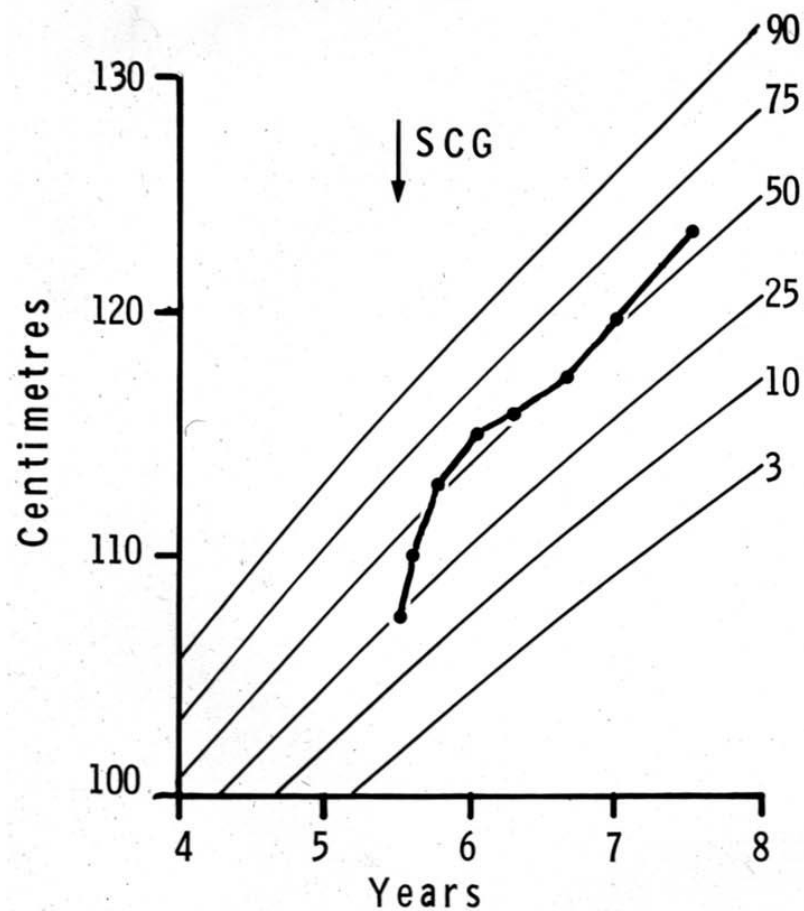
Date at start		12	13	14	15
			AUG		
NIGHT	COUGH	None 咳...咳... .. 0			
	Coughing in sleep .. 睡...咳... .. 1		1	1	
	Sleep disturbed by cough .. 咳...到...不能... .. 2				
	WHEEZE	None 喘... .. 0			
	Slept but wheezy .. 睡...喘... .. 1				
	Disturbed once by wheeze ... 一...次...喘... .. 2		2		
	Very disturbed by wheeze .. 喘...到...不能入... .. 3				
DAY	WHEEZE/COUGH ON EXERCISE	None .. 喘...咳... .. 0			
	Slight .. 轻... .. 1			1	
	Limits exercise .. 不能... .. 2		2		
	COUGH	None 完全...咳... .. 0			
	Occasional .. 间...咳... .. 1				
	Frequent .. 时...咳... .. 2	2	2	2	2
	WHEEZE	None 完全...喘... .. 0			
	Mild (relieved by medicine) .. 吃完药后...喘... .. 1				
	Moderately bad .. 中...程... .. 2				
	Severe .. 重... .. 3				3
PEAK FLOW READINGS	Before morning medicines	早 M	M	M	M
	Before night time medicines	晚 N	N	N	N
DRUGS	Name of Drug	SALBITAMOL			
	Dose Ordered	4			
	Number of doses actually taken during the past 24 hours				
COMMENTS		(Only if there is anything unusual to report)			

Peak Flow Chart

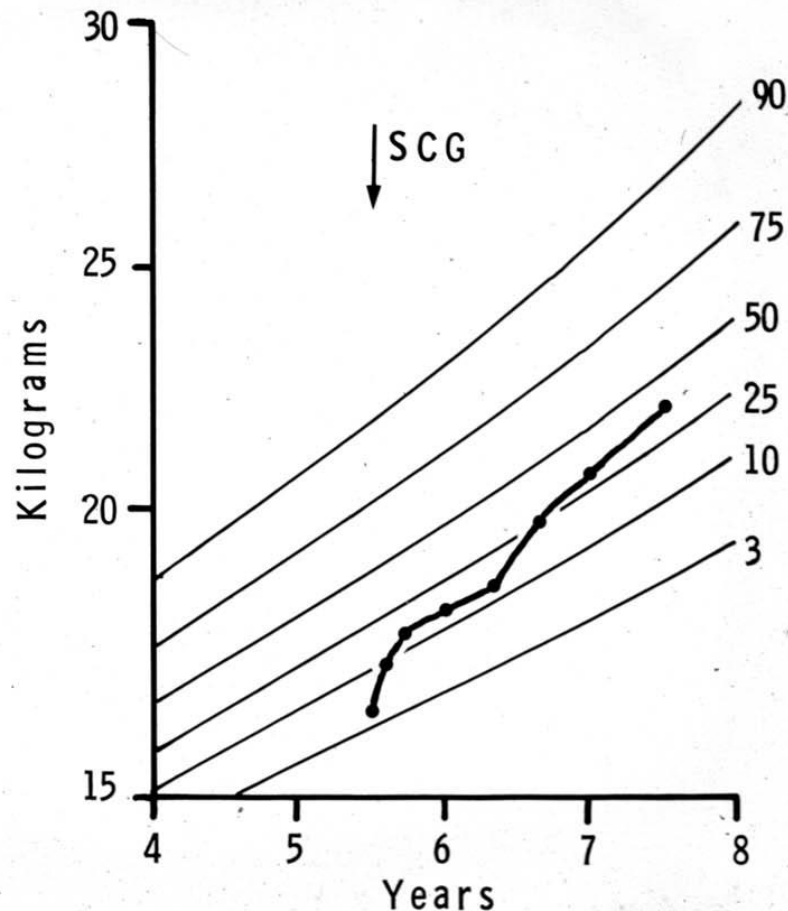




HEIGHT



WEIGHT



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



Information on the Guidelines is available on the website of the British Society for Allergy and Clinical Immunology (BSACI) at www.bsaci.org

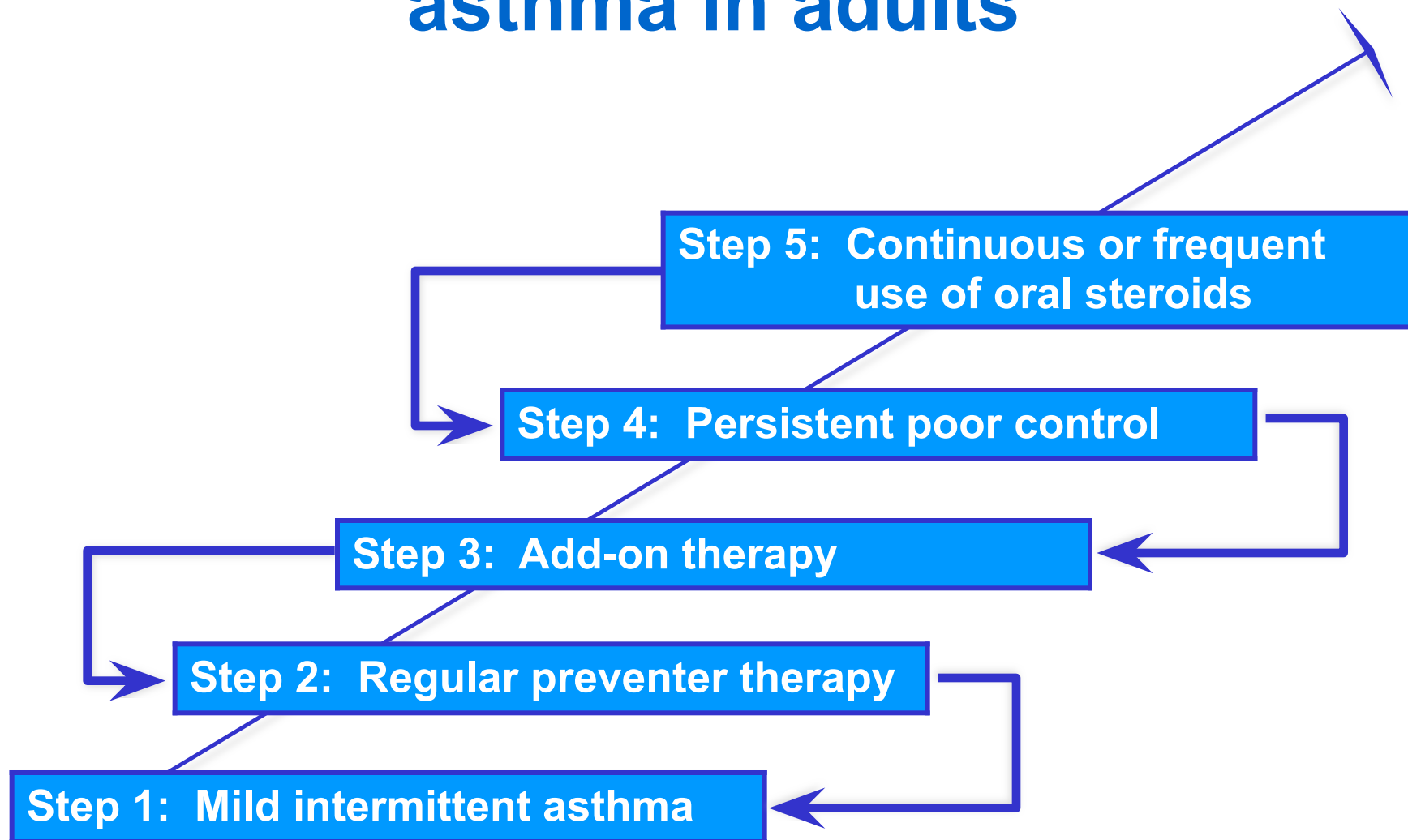


Asthma control

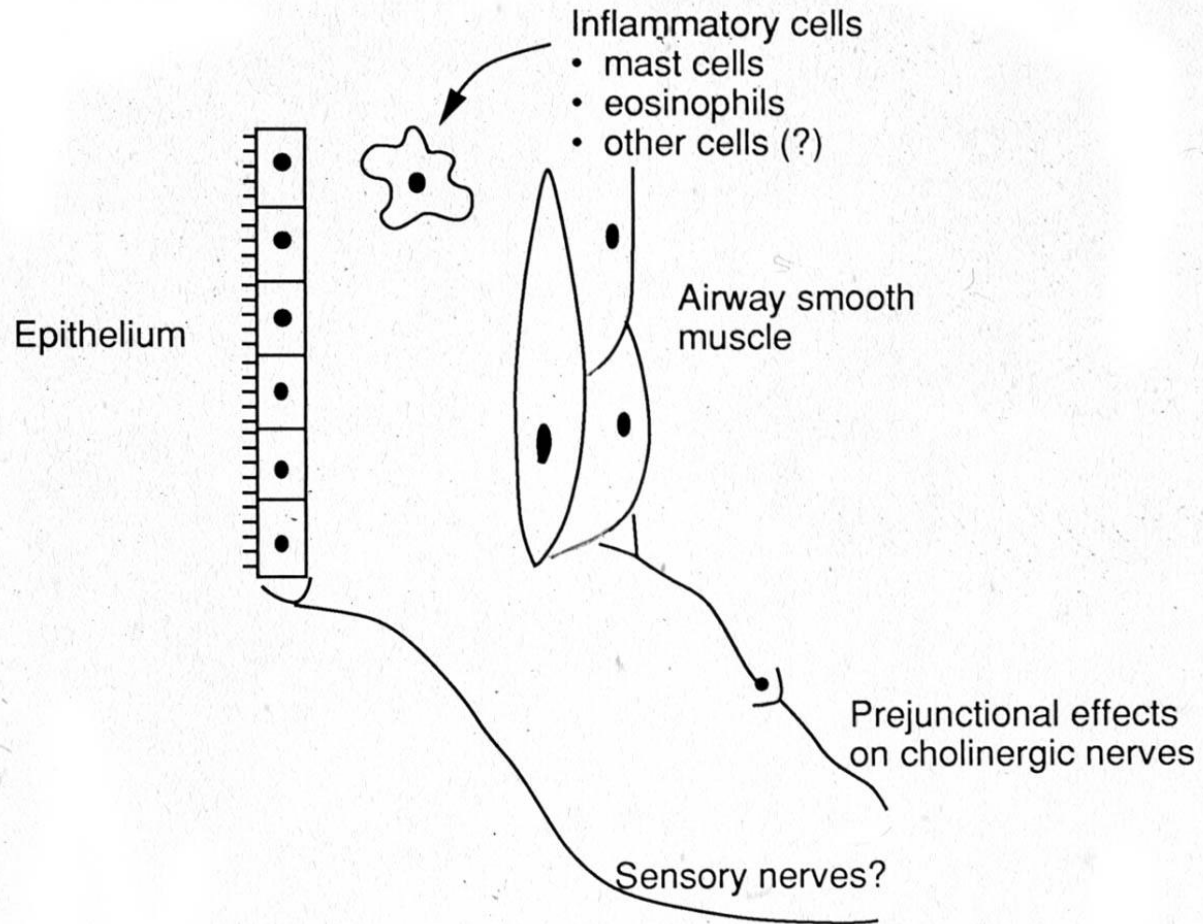
Asthma control means:

- 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)

Stepwise management of asthma in adults



Potential sites of action of β_2 agonists in asthma



Actions of Steroids in Asthma

Corticosteroids



Eosinophil



↓ Secretion
↓ Numbers

T-lymphocyte



↓ Cytokines

Mast Cell



↓ Numbers

Macrophage



↓ Secretion
↓ Cytokines

Epithelial Cell



↓ Cytokines

Mucus Glands



↓ Mucus Secretion

Endothelial Cell



↓ Leak

Airway Smooth Muscle



↑ β_2 -Adrenoceptors

DRUGS FOR ASTHMA







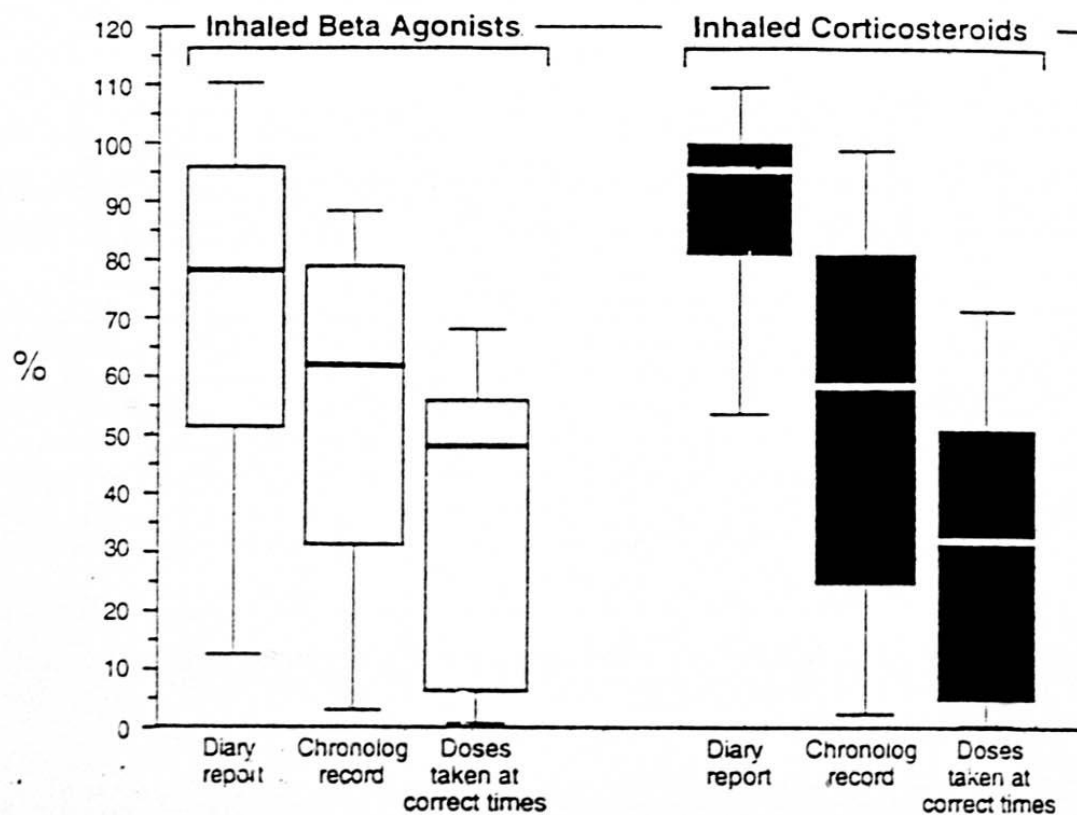
Summary

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

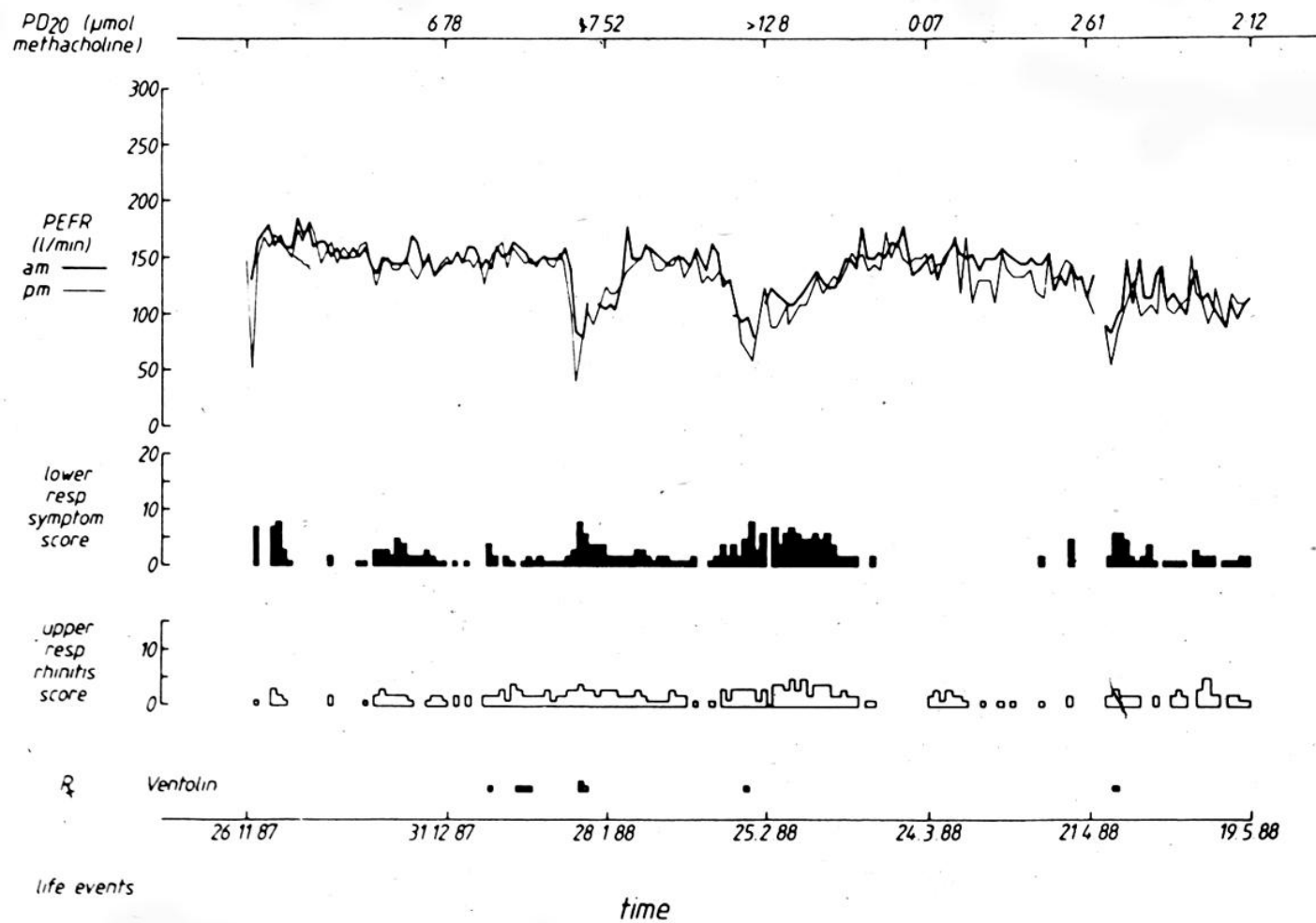
**Any
questions?**

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