Clinical cases in occupational medicine

Workshop E-10

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Conflict of Interest Disclosure

I have no conflict of interest in regard to this presentation

Learning Objectives

At the conclusion of this activity, participants will be able to:

- Recognize and manage some Occupational Illnesses
- Learn how to interpret workplace exposures and their impact on the patient's health

Case # 1

A 44 year old female presents with severe urticaria/angioedema, SOB, chest tightness and frequent cough for the past 3 – 4 years

Atopic dermatitis?

PMH:

- Eczema since childhood
- Allergies – multiple since the age of 12
- Smoking – no

RX:

- Reactine 20mg bid
- Ranitidine 150mg q BID
- Hydroxyzine 50mg q d
- Symbicort 200/6 BID
- Xolair 300mg s/c q 2 weeks
- Sertraline 100mg q d
- Prednisone for urticaire flare up
- Diphenhydramine prn
- EpiPen

Prof. Hx:

Past 11 years as a secretary for a potato processing plant. Her enclosed office was in the area of wash basins and application of food preservatives.

MSDS

Irritant and corrosive chemicals

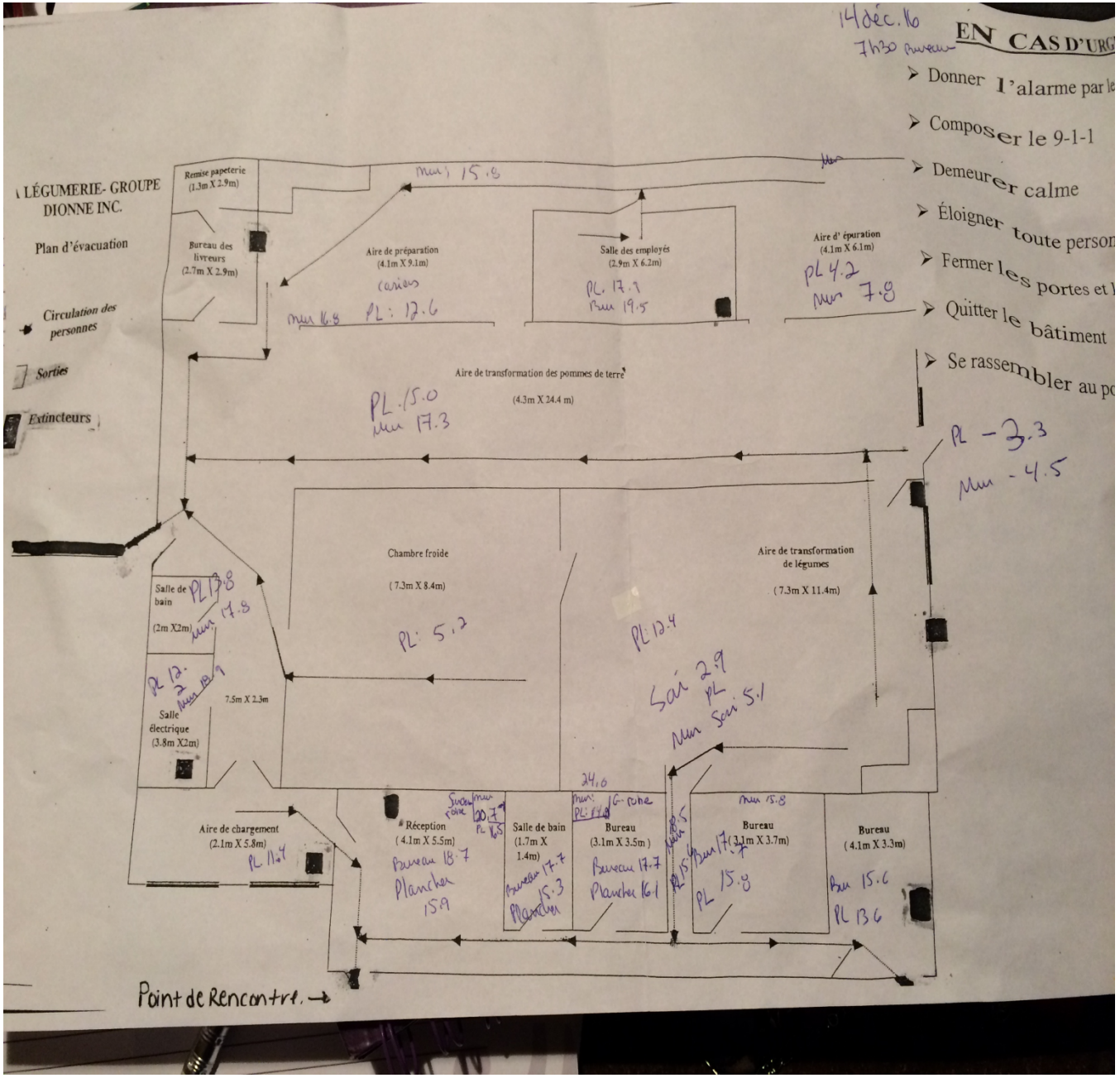
Meta bisulfites – $S_2O_5^{-2}$ (Sulfites – SO_3^{-2})

Sulfite sources

Table 1 Sulphite-containing foods and drugs.

Foods				Cosmetics	Drugs
Apricots	Cider	Lemon juice	Shrimp (uncooked)	Hair colours and bleaches Hair sprays	Anti-haemorrhoidal cream
Avocados	Corn sweeteners	Maraschino cherries	Some fruit drinks	Skin fading/lighteners, false tan lotions	Hydrocortisone cream
Baked products	Dried fruits	Mushrooms	Vegetable wrapped in cellophane	Anti-ageing creams and moisturisers	Trimovate
Beer	Food starches	Potatoes	Vinegar	Facial cleansers Body washes/cleansers	Trimodine
Beet sugar	Fresh fruits	Raisins	Vitamin K3 metabisulphite	Around-eye creams	Lidocaine
Canned seafood	Gelatine	Salads (especially in restaurants)	Wine	Perfumes, blush	Antibiotics
Canned soups	Grapes (grape juice)	Sausage meats	Food preservatives	Bronzers/highlighters	Various anaesthetics

- Patients can develop sensitivities to seemingly anything
- Very challenging to determine the specific culprit for a reaction from the patient


14 déc. 16
7h30 Aveu
EN CAS D'URG
Donner l'alarme par le
Composer le 9-1-1
Demeurer calme
Éloigner toute perso
Fermer les portes et
Quitter le bâtiment
Se rassembler au p
LÉGUMERIE- GROUPE DIONNE INC.
Plan d'évacuation
Circulation des personnes
Sorties
Extincteurs
Remise papeterie (1.3m X 2.9m)
Bureau des livreurs (2.7m X 2.9m)
Aire de préparation (4.1m X 9.1m)
Salle des employés (2.9m X 6.2m)
Aire d' épuration (4.1m X 6.1m)
Aire de transformation des pommes de terre (4.3m X 24.4 m)
Chambre froide (7.3m X 8.4m)
Aire de transformation de légumes (7.3m X 11.4m)
Salle de bain (2m X2m)
Salle électrique (3.8m X2m)
7.5m X 2.3m
Aire de chargement (2.1m X 5.8m)
Réception (4.1m X 5.5m)
Salle de bain (1.7m X 1.4m)
Bureau (3.1m X 3.5m)
Bureau (3.1m X 3.7m)
Bureau (4.1m X 3.3m)
Point de Rencontre

BT

Normal except IgE - 26500

SPT

SPT sulfite 0.01 mg/cc and 0.1 mg/cc negative, **1 mg/cc +6mm**

Case # 1

Still symptomatic after 2 years off work

Anxio-depressive adjustment disorder

Skin exacerbation upon exposure to sulfites (even if she only smells coffee or chips…)

Stopped Omalizumab (Xolair)

Started on Dupilumab (Dupixent)

CBT Clinic

- **Dx**

➢ Urticaria – accepted by CNESST

➢ Occupational asthma – accepted by CNESST

➢ Adjustment disorder – accepted by CNESST

➢ Atopic dermatitis

What is the role of sulfites in her case?

Can she be treated with EpiPen?

YES!

- Some injectable solutions, such as epinephrine, do contain sulfites as preservatives, but the amount injected has not been shown to precipitate asthma or anaphylactoid responses.

- Allergic reaction to epinephrine is EXCEEDINGLY RARE
- Hikaru Kohase and Masahiro Umino. **Allergic reaction to epinephrine preparation in 2% lidocaine: two case reports.** *Anesth Prog*. 2004; 51(4): 134–137
  - 1 patients with palpitation/unease, 1 with zygomatic edema after dental procedure
  - Positive skin test and positive drug induced lymphocyte stimulation test
- Skin testing is difficult due to the vasoconstrictor property of epinephrine

- Bottom line: Patient should use EPIPEN if clinically indicated

Respiratory Manifestation

- The most common reaction to sulfites seen in asthmatics is bronchoconstriction
- 4-8% of asthmatic patients develop sensitivity to sulfites
- Those who have a higher degree of airway hyperreactivity may be at greater risk
  - In adults with severe asthma, rates of sulfite sensitivity are as high as 35–65%
- Sulfites can lead to structural and functional changes in the airway smooth muscle cells
- Bronchospasm may be induced by sulfites by the stimulation of the afferent limb of the cholinergic reflex

Asthma:

Documented association with sulfites

Is there a link between sulfite and Urticaria?

Although there are case reports, absence of large RCT

What is the link between sulfite and atopic dermatitis?

There is no evidence of direct link

Conclusion

- Sulfite-sensitive individuals may experience a range of symptoms,
  - dermatitis, urticaria, angio-oedema, abdominal pain, diarrhea, bronchoconstriction and anaphylaxis
- Unrecognized regular exposure to the sulphite additives may contribute to the chronic asthma symptoms experienced by some sensitive individuals
- Skin reactions may result not only from topical exposure but also following ingestion and parenteral exposure to sulphites, while topical exposure may result in respiratory symptoms in some individuals
- Occupational exposures to the sulfites have been reported
- No uniformly accepted standard protocols for challenging sulphite-sensitive individuals

Case 2

- *A 35 year old female presents with a progressively worsening intermittent cough since about 2 months. Sometimes she will loose her voice for a day or two. Lately her voice seems to be affected for longer then before and her breathing is difficult.*

Case 2

- PMHx: - N/C
- Meds: - None
- All: - None known

2 - min - Occupational History

What do you do ? Does accounting for a company making plastics for the past 8 years.

How do you do it ? She works in the office with few other employees

Are you concerned about any exposures or health hazards on and/or off the job ?

- she is quite concern because on many occasions it smells very strong in her office.

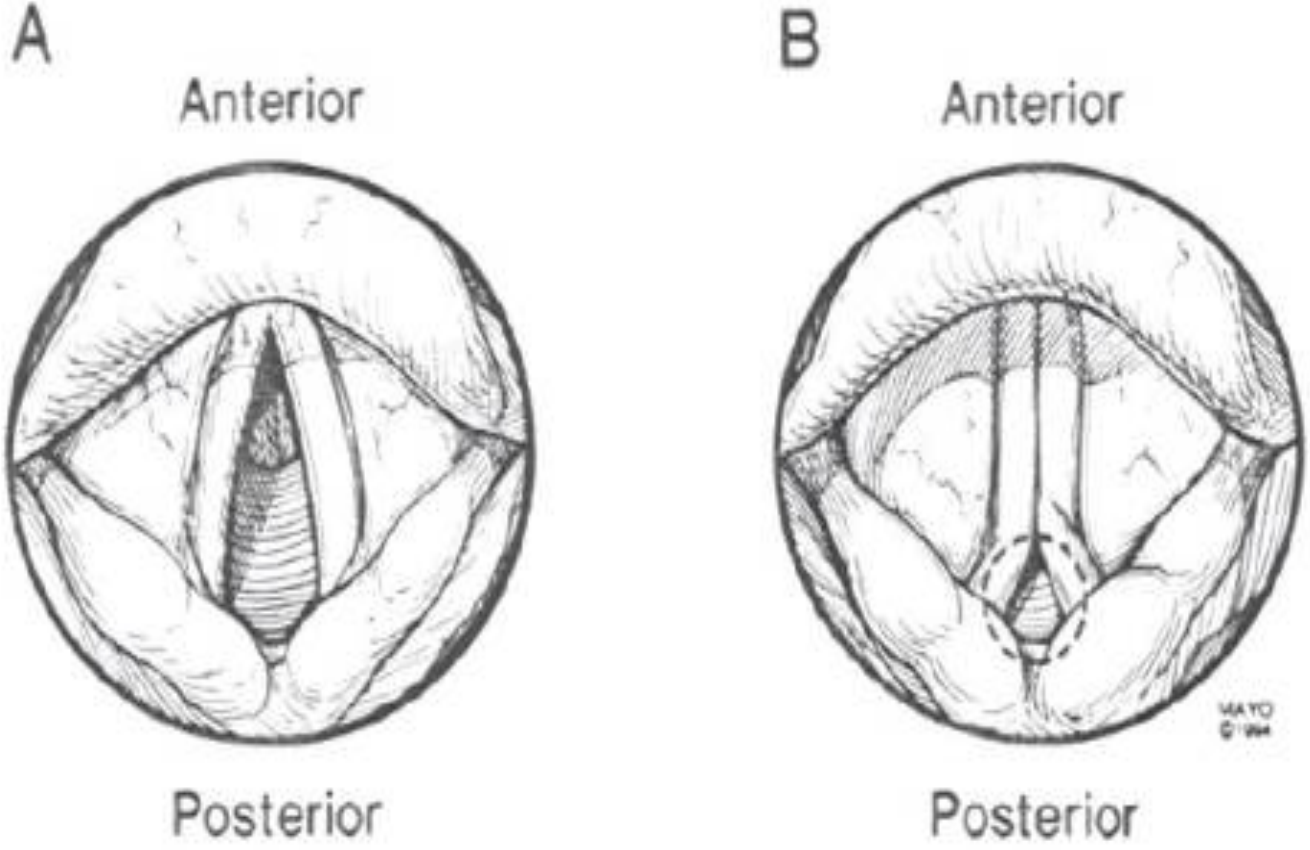
Co-workers or other exposed ?

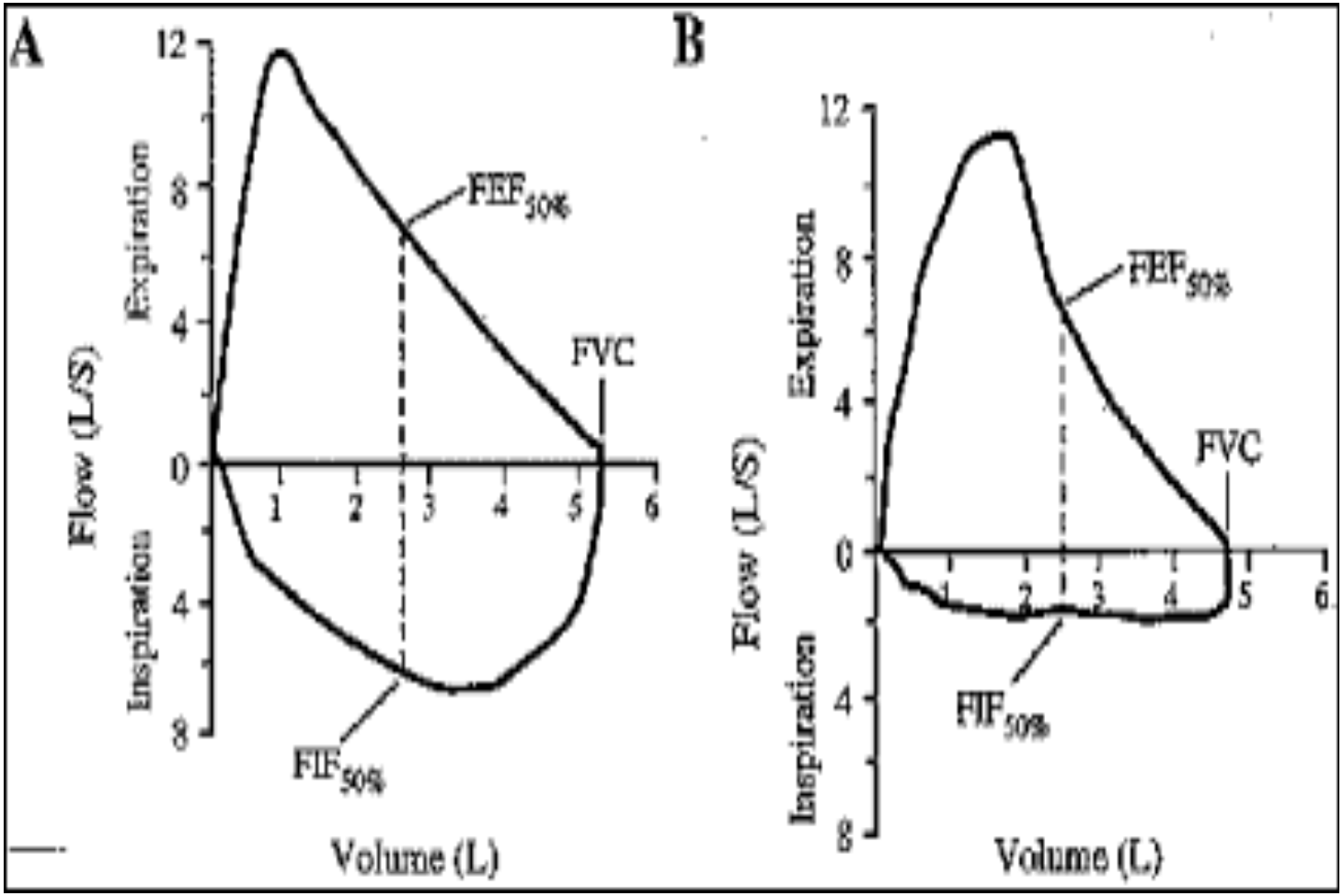
- no one seems to be sick but everyone complains about a strong smell

Safeguards and satisfaction? likes the job

- Chest X-ray - normal
- SPT: - Neg
- PFT: - N
  - Methacholine - PC [– 20] 3.5 mg/ml
- Spec. Challenge at work: - Neg

- <u>Laryngoscopy post exposure:</u>
  - Vocal cords adduction - *“kinking of the vocal cords”*


A
Anterior
Posterior
B
Anterior
Posterior


A
B
Flow (L/S)
Expiration
Inspiration
12
8
4
0
4
8
1
2
3
4
5
6
FEF50%
FVC
FIF50%
Volume (L)

- Diagnosis:
    - Vocal cords dysfunction – Irritable Larynx syndrome
- Follow-up:
    - Eliminate exposure - change the job

Case # 3

- *A 39 year old male patient noticed SOB towards the end of the week. He feels much better after a weekend and on Mondays. For the past year he also noticed an occasional nasal congestion and sneezing. He didn't notice any chest tightness, wheezing or a frequent cough.*

2 - min - Occupational History

What do you do ? Working in a bakery for the past 15 years

How do you do it ? Operating mixers and ovens

Are you concerned about any exposures or health hazards on and/or off the job ?

- not really

Co-workers or other exposed ?

- no one seems to be sick

Safeguards and satisfaction? likes the job

- **PMHx:**
  - No history of asthma, (none in his family)
  - N/C
  - Allergies – None known
  - Smoking – never
- **O/E:**
  - Normal

- **Chest X-ray** - normal

- **Skin PrickTests (SPT):**
  - **Wheat flour - ++**
  - **Oat flour - +++**
  - **Rye flour - +++**
  - **Soya flour - +++**
  - **Barley flour - ++**
  - **Corn flour - ++**

- **Flow rates** - N

INSTITUT THORACIQUE DE MONTRÉAL
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MONTREAL CHEST INSTITUTE
CARDIO-RESPIRATORY PHYSIOLOGY

ÉPREUVES DE ROUTINE
ROUTINE TEST

Last Name:		First Name:	
Identification:		Sex:	male
Age:	39 Years	Physician:	DR. ROHAN
Height:	168 cm	Resp.Therapist:	M-T AMBAYEC RRT
Weight:	103 kg	Medication:	NONE RESP
Diagnosis:	ASTHMA	Smoker:	NEVER

	Pred	Pre	%Pred
Date		28/10/2008	
FEV 1	3.60	3.03	84.1
FVC	4.32	4.09	94.6
FEV1%F	82.72	74.08	89.6
MMEF	4.28	2.16	50.4
PEF	8.79	7.22	82.2
FEF 50	4.81	2.69	55.9
FIF 50		3.22	
TLC	6.34	6.24	98.4
VC	4.51	4.43	98.3
ITGV	2.99	2.49	83.3
ERV	1.35	0.68	50.4
RV	1.83	1.81	99.0
IC		3.75	
TLCOSB	31.63	32.66	103.2
VA	6.19	5.64	91.1
PIMAX	113.09	- 75	
PeMax	148.05	+ 140	

PFT DONE IN AM.MIP= -75 cm H20, MEP=140 cm H20.SPO2 R/A=98 %. HR=72 .

INSTITUT THORACIQUE DE MONTREAL
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RESPIRATORY PHYSIOLOGY

BRONCHOPROVOCATION (METHACHOLINE)

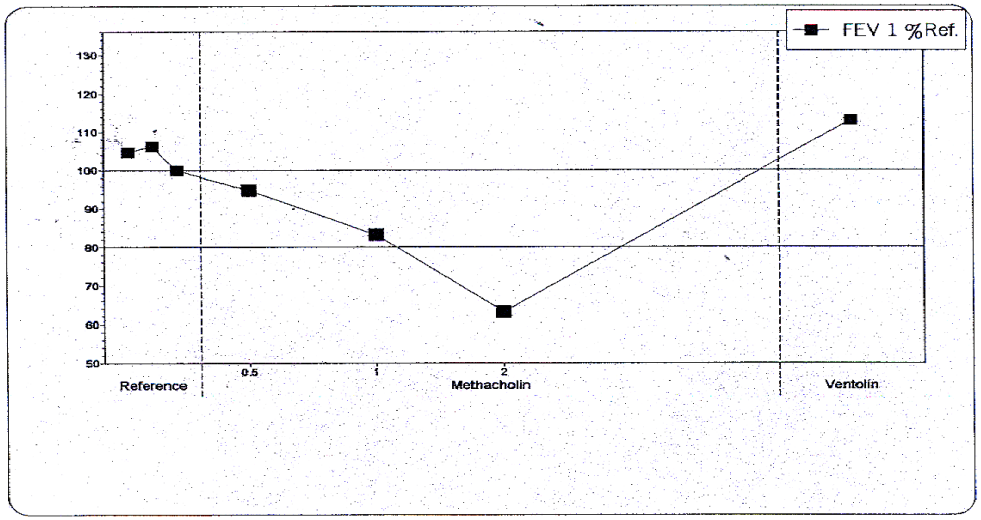
Last Name:		First Name:	
Identification:		Sex:	male
Age:	39 Years	Physician:	DR. ROHAN
Height:	168 cm	Resp.Therapist:	M-TERESA AMBAYEC RRT
Weight:	103 kg	Medication:	NONE RESP
Diagnosis:	ASTHMA	Smoker:	NEVER

Date 28/10/2008

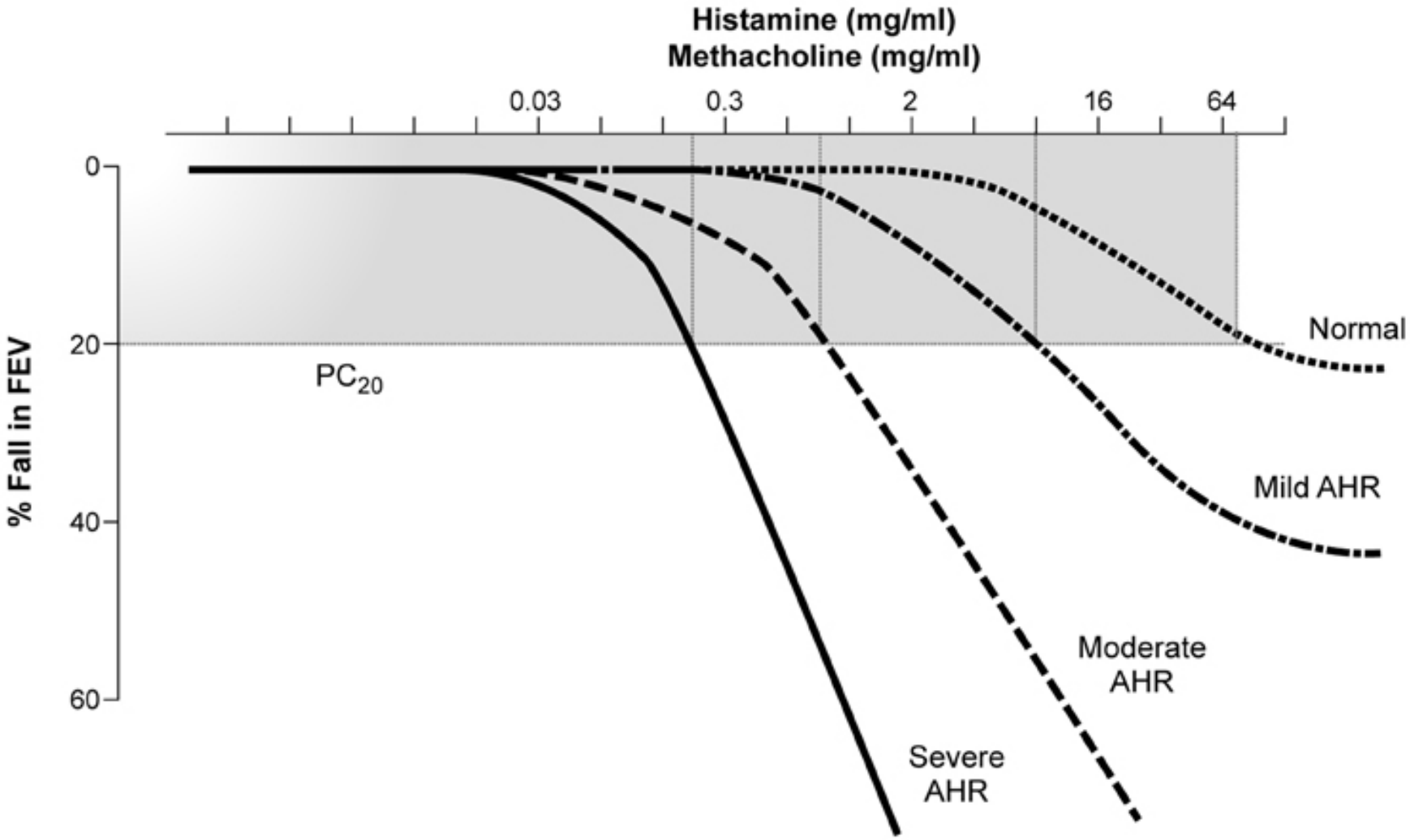
	Pred	Act1	Act2	Act3	Act4	Act5	Act6	Act7
Step		R1	R2	R3	P4	P5	P6	D7
Conc				0.9 %	0.5 mg/ml	1 mg/ml	2 mg/ml	2 Puffs
FEV 1	3.60	3.03	3.07	2.89	2.74	2.41	1.83	3.27

	Pred	Act8	Act9	Act10	Act11	Act12	Act13	Act14
Step								
Conc								
FEV 1	3.60							

PC[-20] FEV 1: 1.11 mg/ml Conc.



Measuring Airway Responsiveness

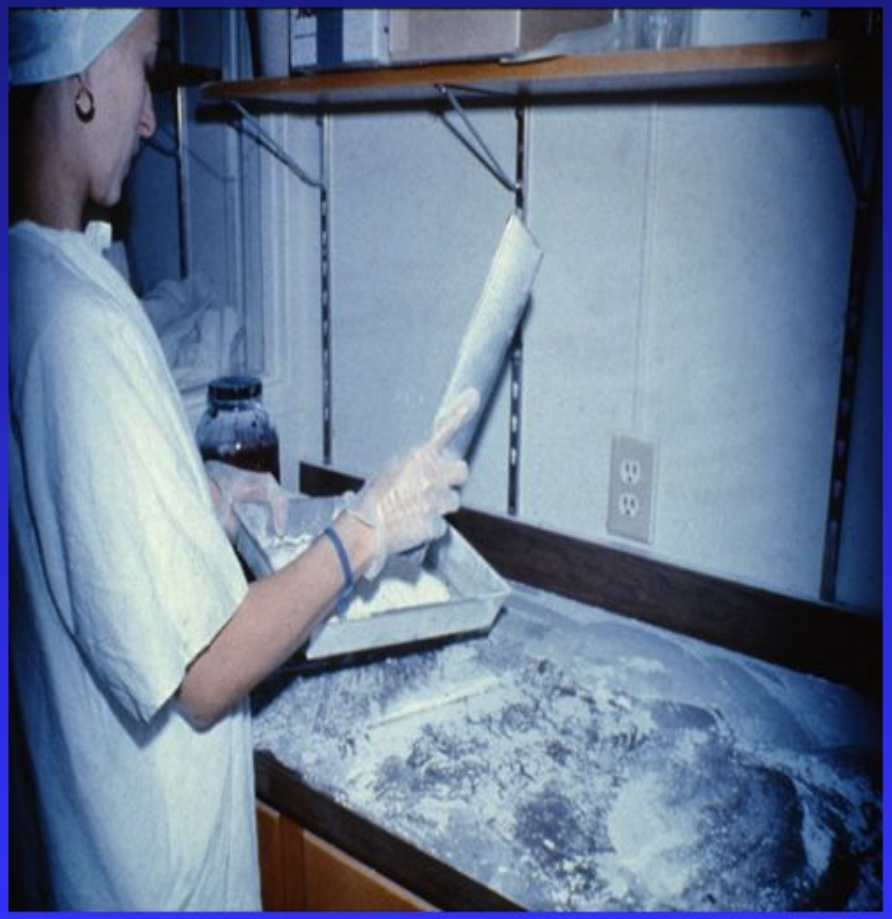



Vitalograph
PEAK FLOW
800
700
650
600
550
500
450
400
350
300
250
200
150
100
50
L/Min
Conforms to NAEP Standards

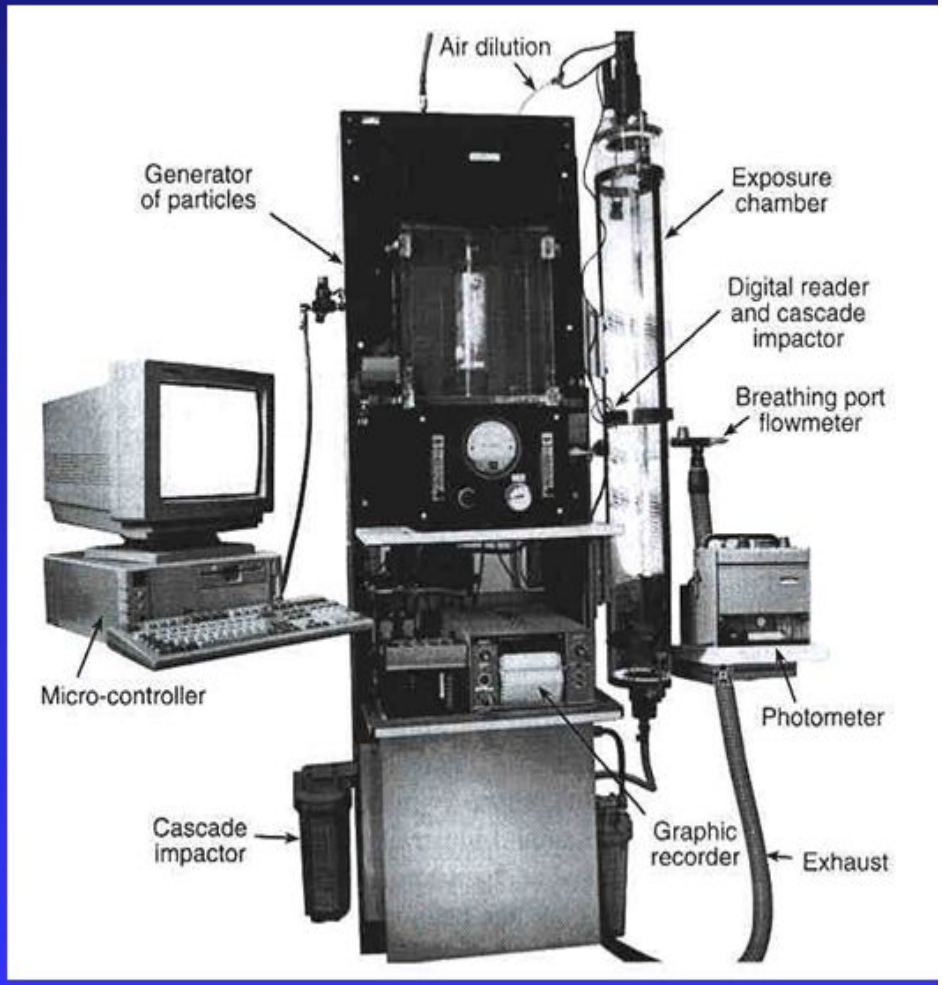
Case # 3

PEFR (ml)	**FEV1** (L)
Weekends: 480 ml	3.80
Mondays: 470 ml	3.20
Thursdays & Fridays: **400** ml	**2.80**

Tests de provocation bronchique spécifiques en laboratoire



Réaliste



Générateur de particules ou d'aérosols

Management

- **Asthma treatment**
- **Removal from the exposure vs exposure reduction**
- **Respiratory protection devices (RPD)**

Diagnosis of OA

Occupational cause suspected

- **Adult onset asthma – 16%**
- **History of asthma onset or aggravation after a job change**
- **No good response to therapy**
- ***Chronology of Symptoms* at work and/or at night and improved on weekends and holidays**

Marijuana

- Sensitization IgE mediated by:
  - Inhalation
  - Touching
  - GI
  - Smoking
- Symptoms:
  - From mild skin reactions to anaphylaxis
  - Asthma
  - Cross-reactivity with food: tomato, peach, hazelnut…
- Allergy skin tests non standardized

Case #4

A 50 year old female elementary school teacher presents for the second time in the last two months to the emergency with a flu like syndrome, cough, fever, SOB. She was put on three different antibiotic regimens without any improvement in her symptoms. She was put on prednisone and she has progressively improved.

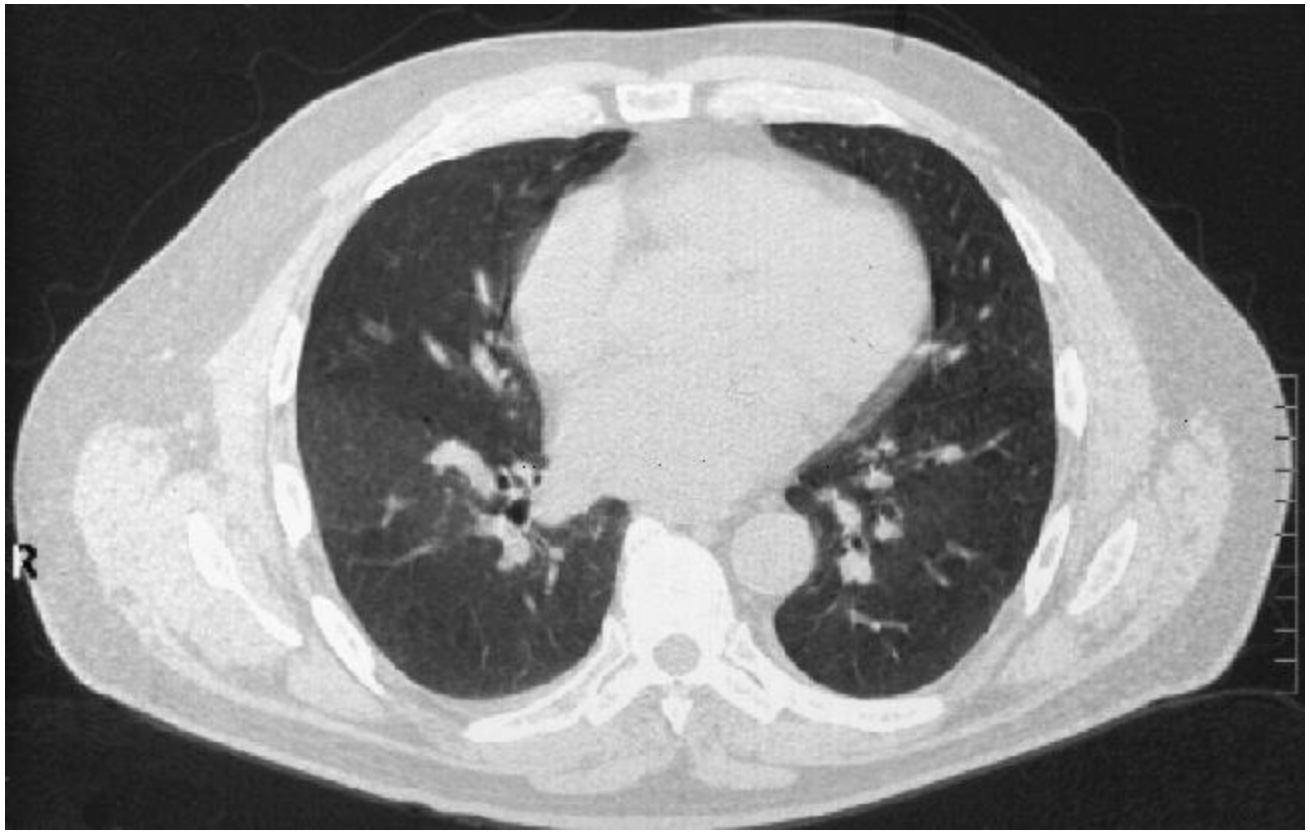
Case # 4

- PMH: Hypothyroidism
- MEDS: Synthroid; HRT
- ALLERGIES: Seasonal to trees and grass
- SMOKING: No

- PH/EX: some skin redness

- **<u>CHEST X-RAY:</u>** *Bilateral alveolar infiltrates*

- **<u>CT SCAN:</u>** *Diffused bilateral basal infiltrates with atelactasis*


R

- BT: CBC – ↑Neutrophils ↓Lymphocytes

  ASPERGILLUS fumigatus PPTNS - Neg

PFTs: FEV1 - 1.54 (2.51) 65%

FVC - 1.91 (2.91) 61%

FEV1/FVC – 93%

DLCO – 14.23 (19.21) 74%

Exerecise study: N

Case # 4

- <u>BT:</u> CBC – ↑Neutrophils ↓Lymphocytes

  ASPERGILLUS fumigatus PPTNS - Neg

- <u>BAL- TBB, TTB:</u> Not done

  Lymphocytes accumulation

  Non-caseating granulomas

ENVIRONMENTAL REPORT:

ENV. REPORT CONCLUSIONS

- Intense Musty Odor
- Contaminated areas visible
- Variety of species – amplification
- Allergenic, Pathogenic and Mycotoxins producing fungi
- Inadequate ventilation in many classes :
  - ↑ CO2 → ↑ Humidity
    - » ↑ MVOC
    - » ↑ Spores and particles
    - » ↑ (1-3)-β-D-Glucans

Environmental Report

- Species:

  Alternaria sp.

  Aspergillus sp.

  Penicillium sp.

  Stachybotrys

  Cladosporium sp.

What to look for in an Environmental report

- **For pathogenic, allergenic and toxigenic species**
- **For a predominance of few species (CFU)**
  - ***Amplification effect***
- **Compare outdoors and indoors sampling**
- **Is there an evidence of water infiltration and/or high humidity**
- **What season the report was done**
- **There are no norms**

- **DIAGNOSIS:**

  Hypersensitivity Pneumonitis

  caused by exposure to molds

- **Treatment:**
  - **Avoidance of the Antigen**
  - **Respiratory protection**
  - **Corticosteroids**

- **Long-term outcome depends on:**
  - **Duration of the disease**
  - **Recurrences**
  - **Persistence of exposure**
  - **Intrinsic host factors**

Key points

- Diverse clinical presentation
- Hp can be caused by repeated inhalation of organic antigens by sensitized subjects including molds
- To avoid a possible chronic or progressive form – antigen avoidance

References

Joseph Ladou, and Robert Harrison

Current Diagnosis & Treatment Occupational & Environmental Medicine

5th Edition – 2014, McGraw Hill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