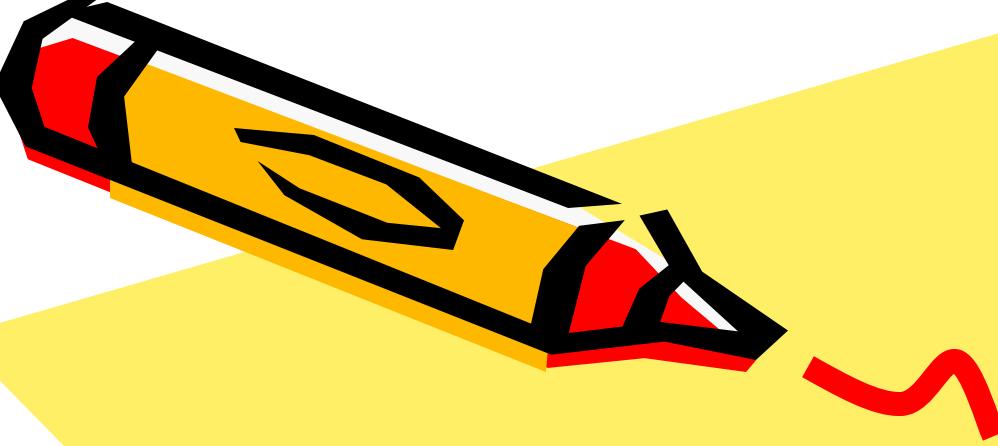




HKU  
Med

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Department of Medicine  
香港大學內科學系



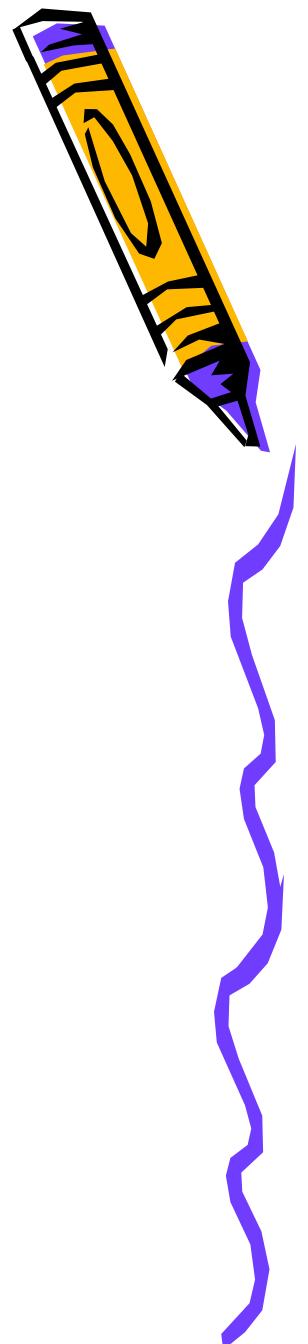
# Common respiratory diseases and diagnostics

Prof. James C.M. Ho  
Associate Professor, Respiratory Medicine  
Department of Medicine, School of Clinical Medicine  
The University of Hong Kong



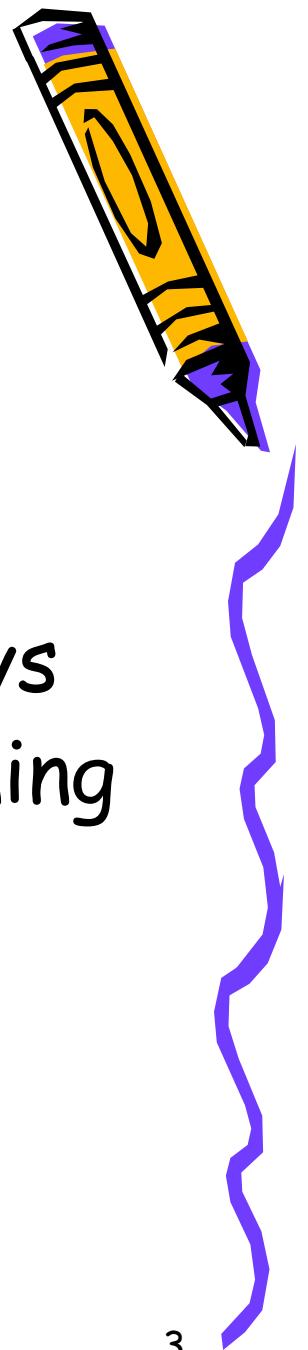
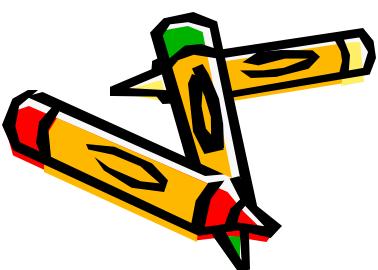
# Outline

- Respiratory tract infections
- Obstructive airway diseases
- Lung cancer

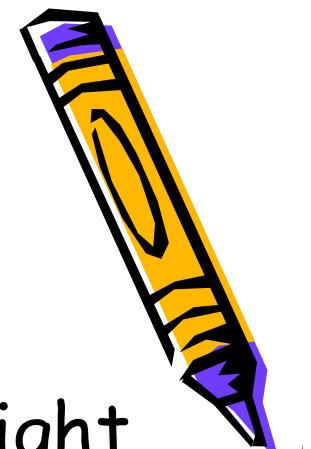


# Case 1: Hx

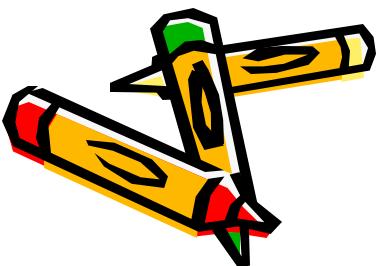
- M/35, chronic smoker
- Good past health
- Complained of high fever for 3 days
- URTI symptoms (soar throat, running nose) 10 days ago
- Increasing cough and greenish sputum over the past 5 days



# Case 1: Hx

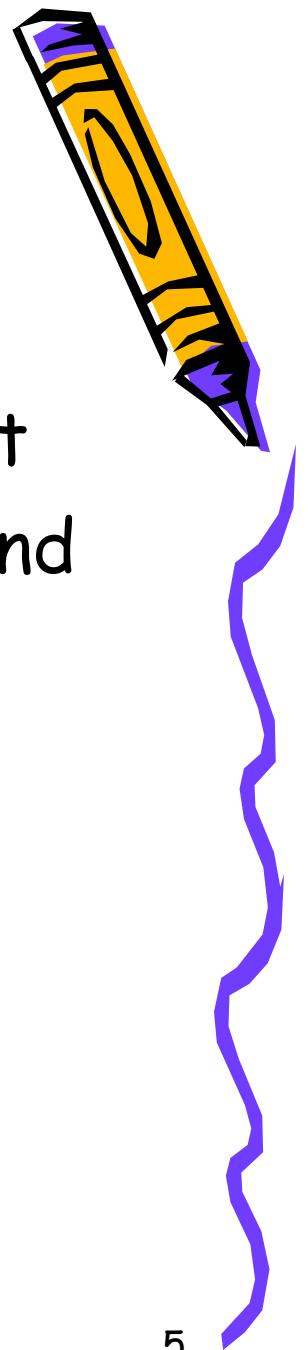
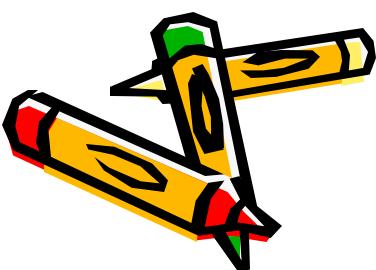


- Progressive shortness of breath with right pleuritic chest pain for 3 days
- High swinging fever with chills and rigor for 3 days
- Seen by GP, given oral antibiotics and paracetamol
- Admitted through A&E for worsening of general condition

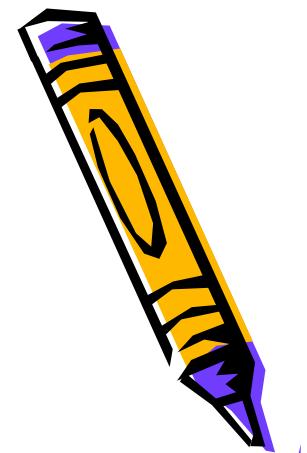


# Case 1: P/E

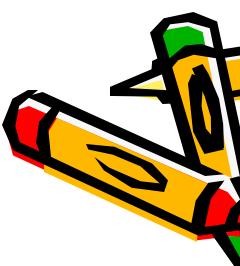
- in respiratory distress, mentally alert
- Chest: dullness, bronchial breath sound and coarse inspiratory crackles over right lower chest
- BP 120/50 mmHg
- SpO<sub>2</sub> 92% (RA)

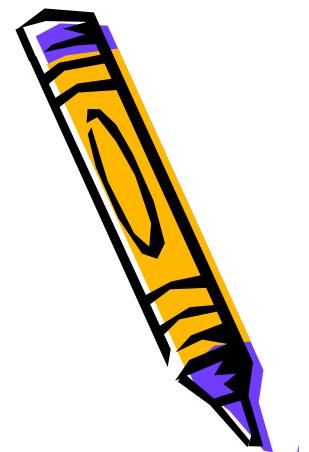


# Case 1: IX



Collect Date :	03/04/07					
Collect Time :	22:00					
Request No. :	H0931412	Ref. Range	Units			
<hr/>						
CBC						
WBC	12.00	H 4.40 - 10.10	10 <sup>9</sup> /L			
RBC	5.43	4.00 - 5.50	10 <sup>12</sup> /L			
HGB	15.4	12.4 - 16.8	g/dL			
HCT	0.458	0.36 - 0.49				
MCV	84.3	82.0 - 96.9	fL			
MCH	28.3	27.5 - 33.4	pq			
MCHC	33.5	33.0 - 36.0	g/dL			
RDW	14.5	H 11.7 - 14.0	%			
PLT	289	170 - 380	10 <sup>9</sup> /L			
<hr/>						
WBC DIFFERENTIAL						
DC Type	MACHINE					
#Neutrophil	9.00	H 2.2 - 6.7	10 <sup>9</sup> /L			
#Lymphocyte	1.80	1.2 - 3.4	10 <sup>9</sup> /L			
#Monocyte	1.20	H 0.2 - 0.7	10 <sup>9</sup> /L			
#Eosinophil	0.00	0.0 - 0.5	10 <sup>9</sup> /L			
#Basophil	0.10	0.0 - 0.1	10 <sup>9</sup> /L			
Film Review	N					
<hr/>						
RBC MORPHOLOGY						
Anisocytosis	--					
<hr/>						
PLT MORPHOLOGY						
PLT. Count Est.	--					





# Case 1: IX

- LRFT normal
- Sputum C/ST: *streptococcus pneumoniae* (S to penicillin G)
- Urinary legionella Ag -ve

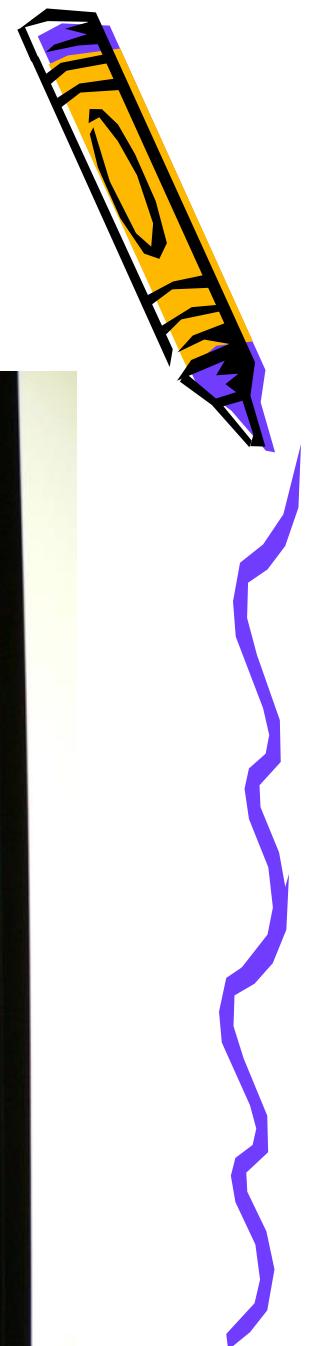
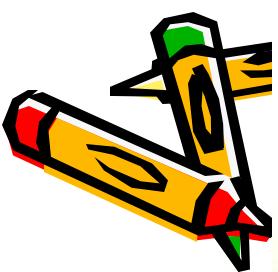
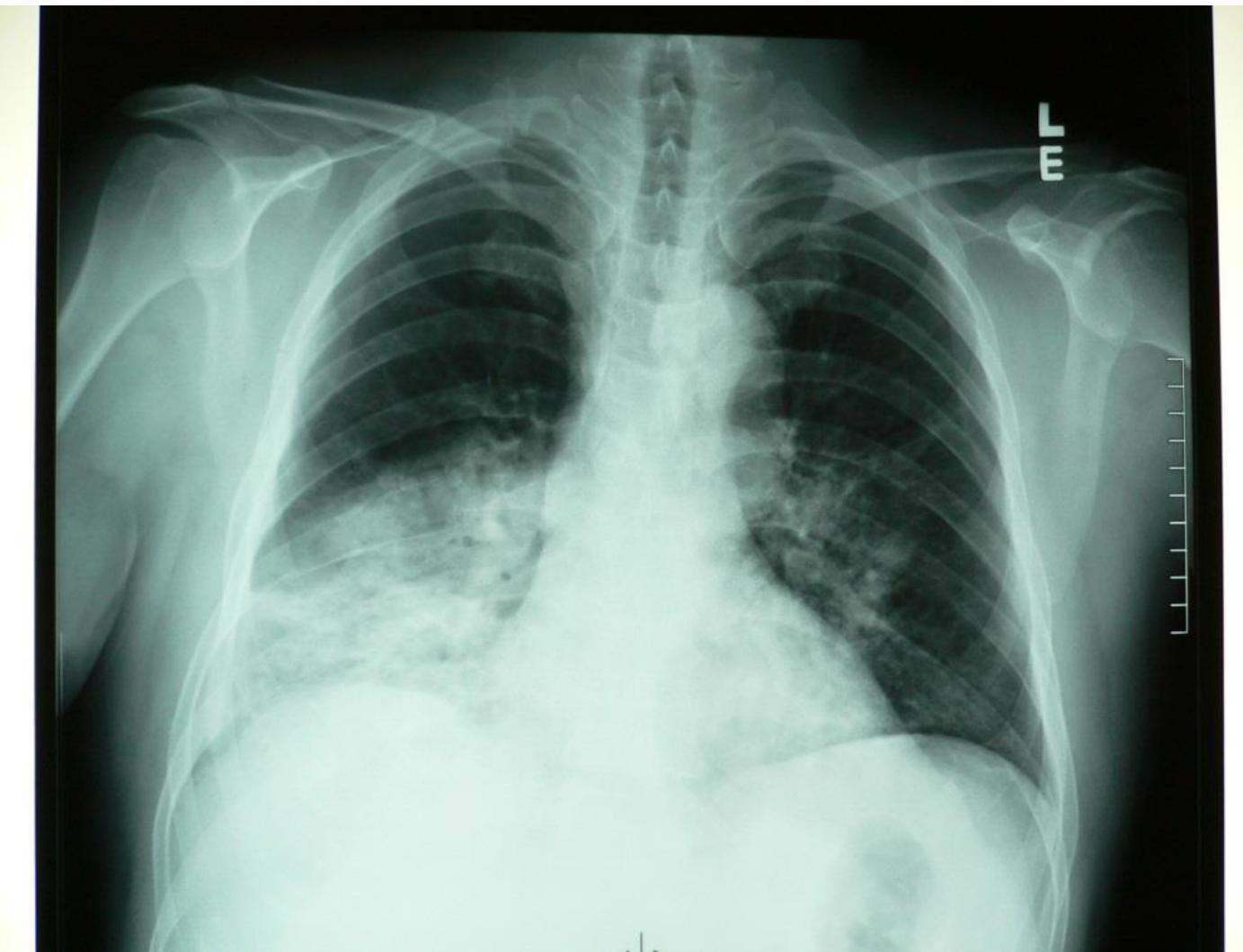
Specimen:- Nasopharyngeal Aspirate

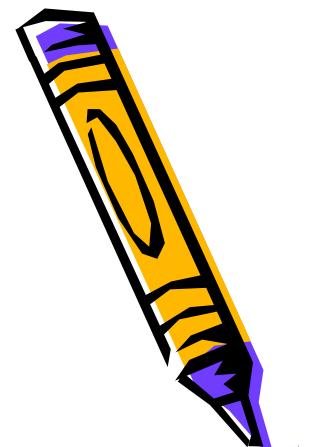
Arrive Date :	10/06/06	04/04/07
Request No. :	M2123545	M2105835
Specimen :	Nasoph Asp	Nasoph Asp

Viral Antigen Detection (Immunofluorescence)		
RSV	--	Negative
Adenovirus	--	Negative
Influenza A	--	Positive
Influenza B	--	Negative
Paraflu	--	Negative
Resp. Viruses	Negative	Positive



# Case 1: Ix





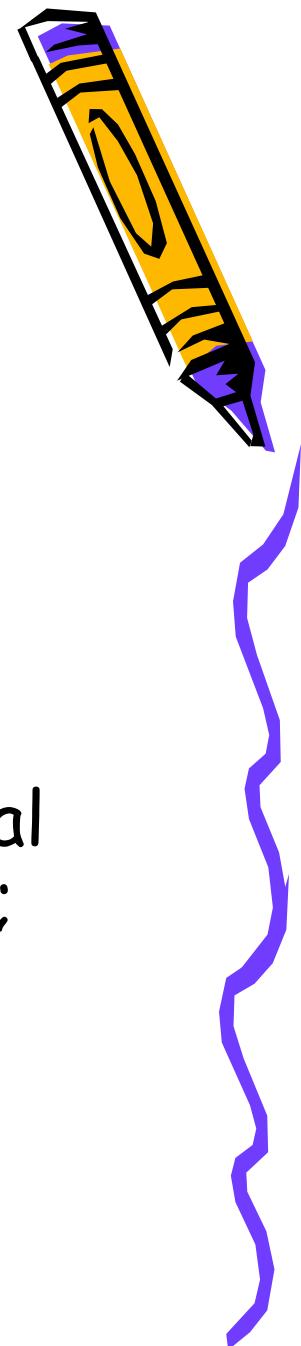
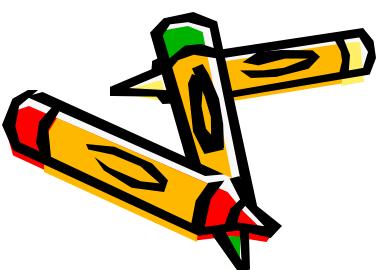
# Case 1: Tx

- Diagnosis: Community-acquired pneumonia, complicating influenza A URTI
- Treatment
  - O2 2 L/min
  - Augmentin iv and doxycycline po
  - Tamiflu po



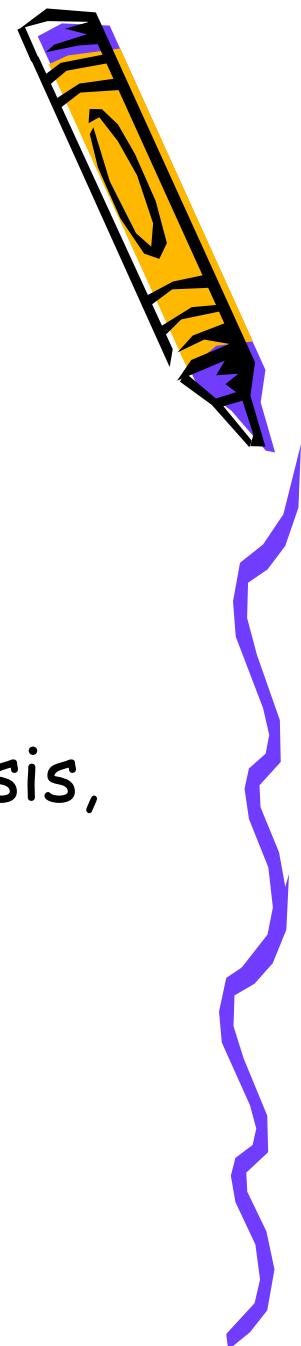
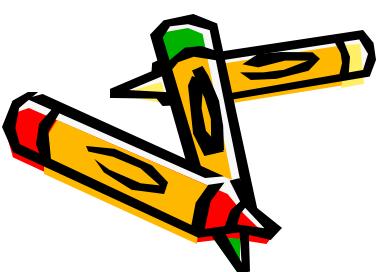
# Respiratory tract infections (RTI)

- Upper RTI
  - Common cold, flu-like illness, pharyngitis, laryngitis
  - Mostly **viral**
  - Symptoms: runny nose, sneezing, nasal blockage, soar throat, cough, sputum; fever, chills, myalgia
  - Usually acute onset and self-limiting



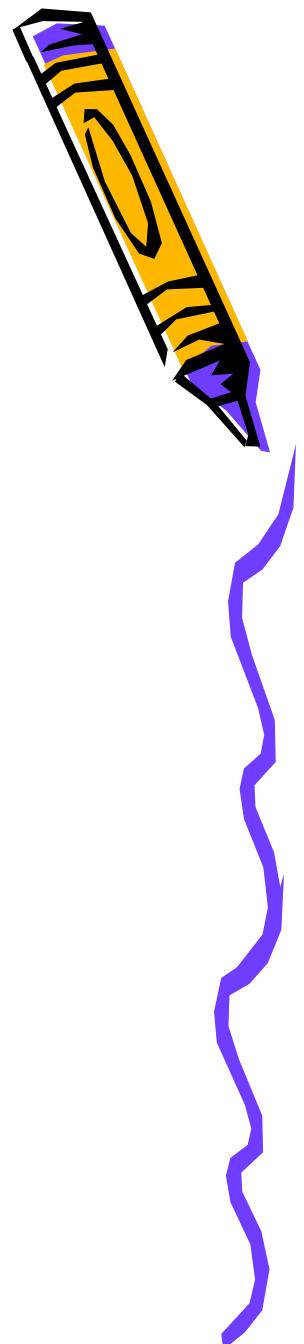
# Respiratory tract infections (RTI)

- Lower RTI
  - Bronchitis, pneumonia
  - Mostly **bacterial**
  - Symptoms: cough, sputum, haemoptysis, shortness of breath, pleuritic chest pain; fever, chills, poor appetite



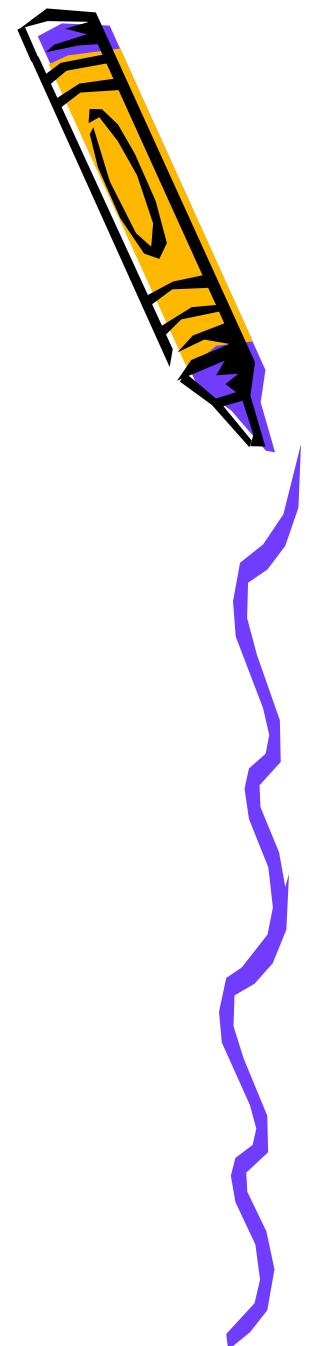
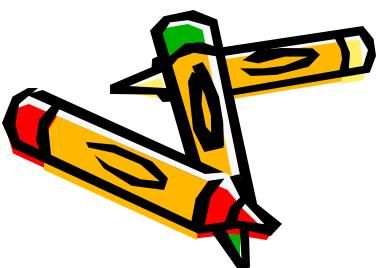
# Upper vs lower RTI

- Symptoms/signs
- Investigations:
  - Nasopharyngeal aspirate/swab for respiratory panel (RT-PCR or rapid antigen test for influenza)
  - Chest Xray
  - Sputum culture (for bacteria)



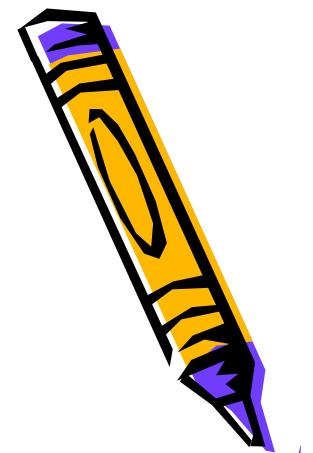
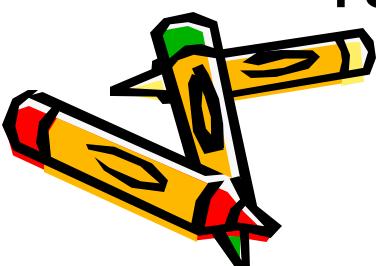
# Treatment

- Supportive treatment
  - IV fluids, oxygen supplement
- Chest physiotherapy
- Specific treatment
  - Antiviral for influenza
  - Antibiotics (e.g. penicillin, macrolide, doxycycline) for pneumonia



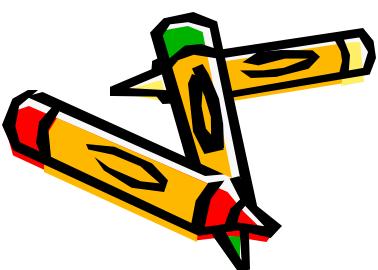
## Case 2: Hx

- F/40, nonsmoking waitress
- Went to A and E at 10 pm
- Chief complaint: Sudden onset of wheeze, chest tightness, and shortness of breath at 6pm
- Has cough and some mucoid sputum, had low grade fever, mild myalgia, and runny nose in past two days



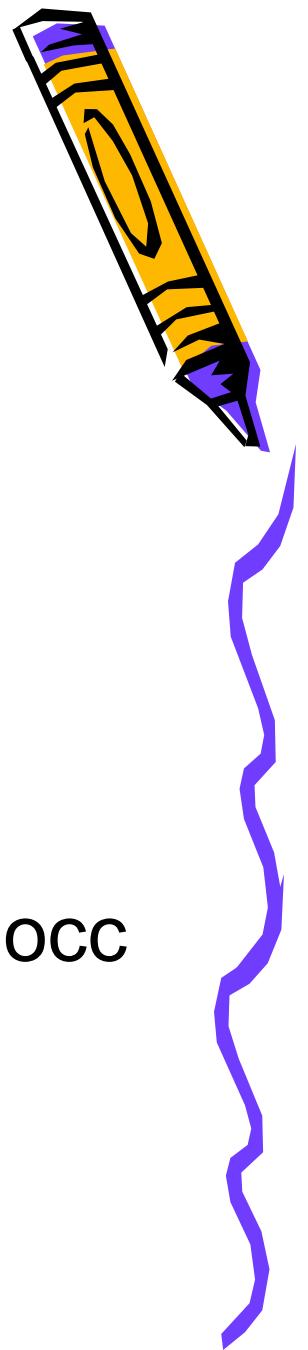
## Case 2: Hx

- Known asthmatic for 10 years
- Rhinitis - same period
- Multiple drug allergy- aspirin, panadol, ponstan, NSAID, penicillin, erythromycin, levofloxacin, some Chinese herbal medicine with urticaria and angioedema
- Hospitalization about once or twice a year during the past 5 years



## Case 2: P/E

- Marked SOB, audible wheeze
  - Using accessory muscles of respiration
  - Respiratory rate - 32/min
  - Pulse rate - 102/min
  - BP 137/80
  - Chest - diffuse expiratory wheeze, occ crackles
  - SpO<sub>2</sub> - 96% on 24% oxygen
- PEFR 80 L/min

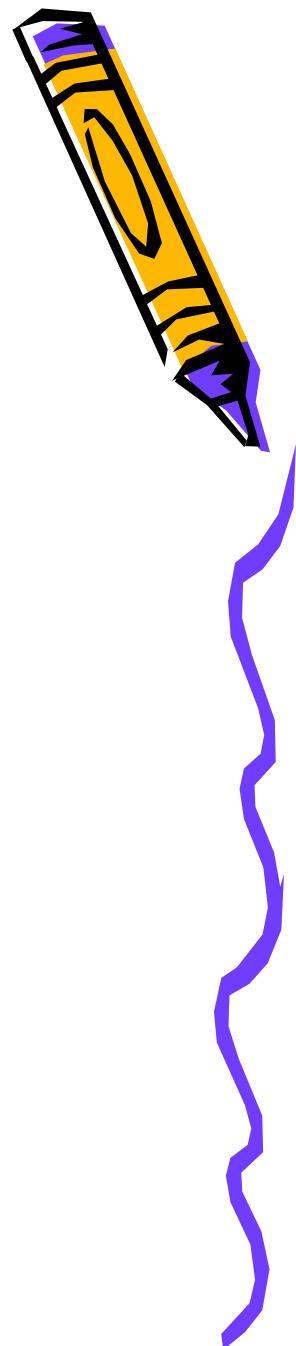
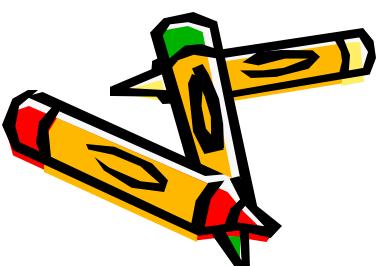




MBBS WCS JCM Ho

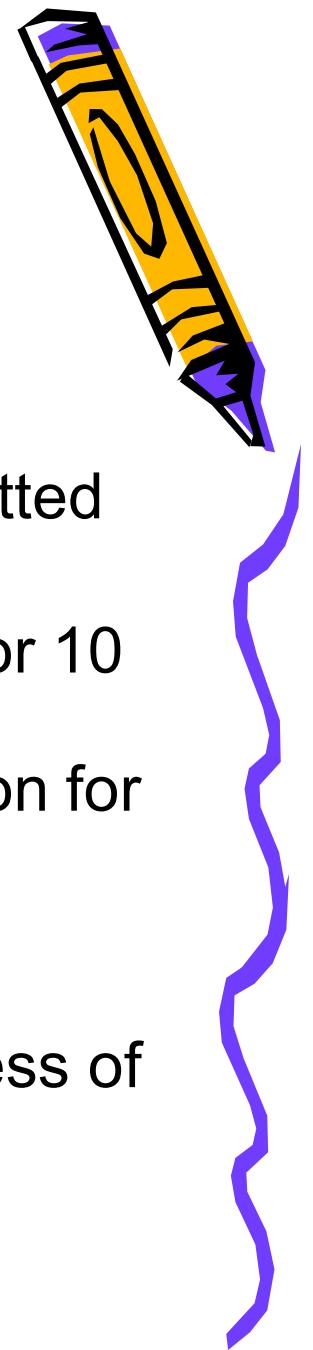
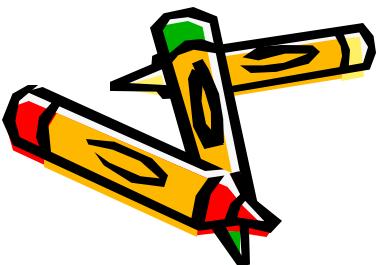
## Case 2: Tx

- Dx: acute asthmatic attack
- Salbutamol and Ipratropium bromide by spacer
- Oxygen
- PEF post- bronchodilator - 160 L/min
- Admitted and started on oral steroid



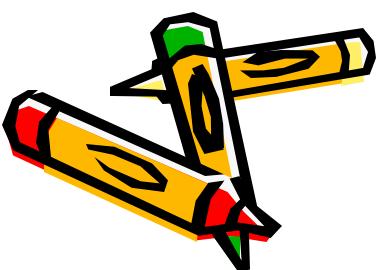
## Case 3: Hx

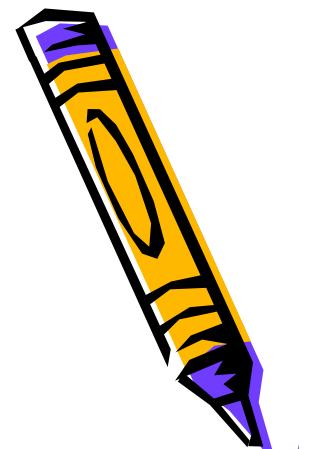
- 65 years old retired businessman
- 45-year of smoking 20 cigarettes /day, quitted
- Social drinker
- History of cough and sputum production for 10 years
- Progressive shortness of breath on exertion for 5 years
- 3-day history of fever, cough, increased shortness of breath with wheezing
- Hospitalization for exacerbation of shortness of breath for 4 times in the past year



## Case 3: P/E

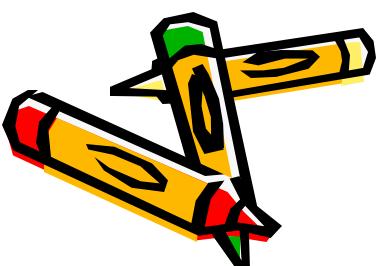
- Physical examination - no clubbing, no lymphadenopathy
- Heavy cigarette staining of fingers
- Use of accessory muscles
- Chest - hyperinflated, decreased breath sounds and rhonchi
- PEFR 80 L/min



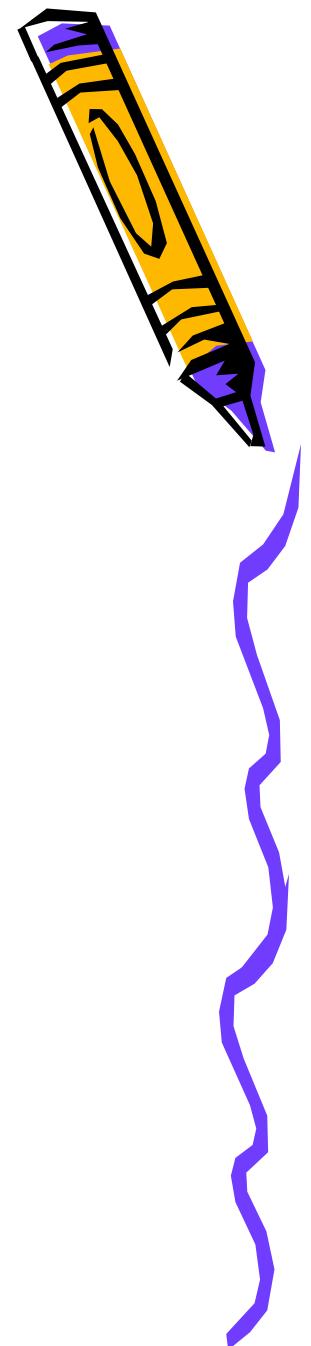
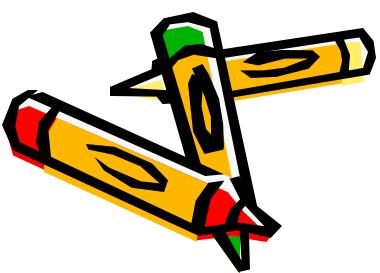


## Case 3: Ix

- $\text{SaO}_2$  on room air 85%
- Haematology screen showed:
  - Hb 18.6 g/dl ↑
  - WBC  $12.2 \times 10^9/\text{L}$
  - Platelet  $220 \times 10^9/\text{L}$
- Blood gases:  $\text{PaO}_2$  8.0 ↓,  $\text{PaCO}_2$  5.0 kPa

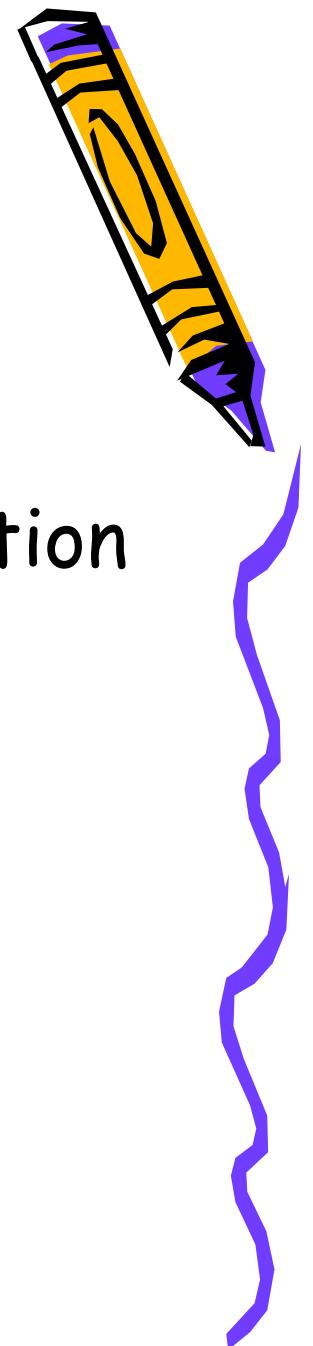
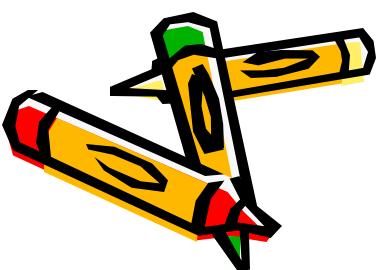


# Case 3: Ix

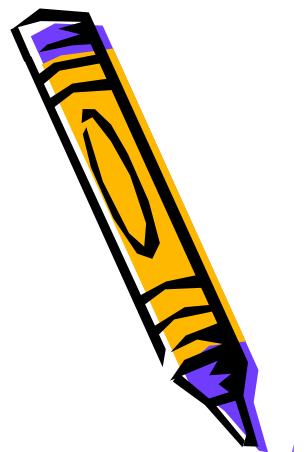


## Case 3: Tx

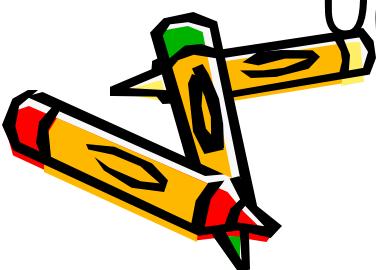
- Dx: Chronic obstructive pulmonary disease (COPD) with acute exacerbation
- O<sub>2</sub>
- Salbutamol + Ipratropium bromide inhaled
- Oral steroid
- Augmentin



# Obstructive airway diseases

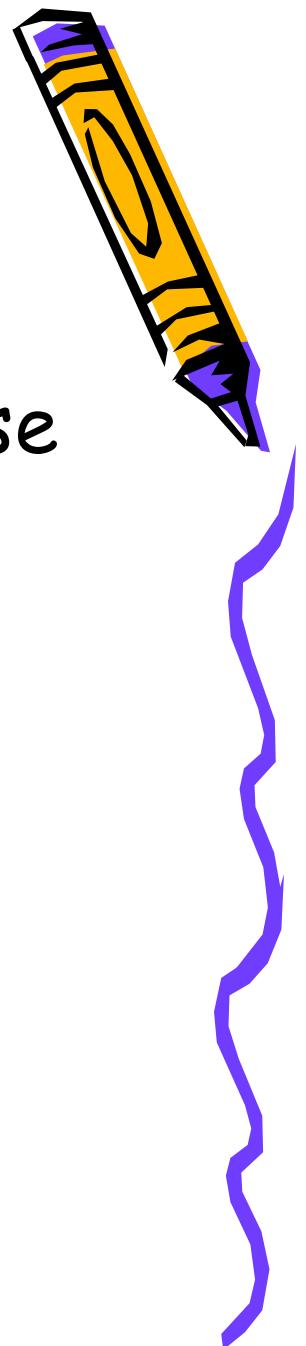
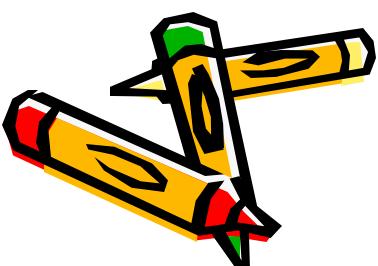


- Asthma
  - A heterogeneous disease, usually characterized by chronic airway inflammation, leading to variable airflow limitation/bronchospasm
  - Symptoms: cough, whitish/mucoid sputum, shortness of breath, wheeze; **episodic**
  - Variable with common environmental triggers: e.g. weather change, cold air, URTI, air pollution, drugs



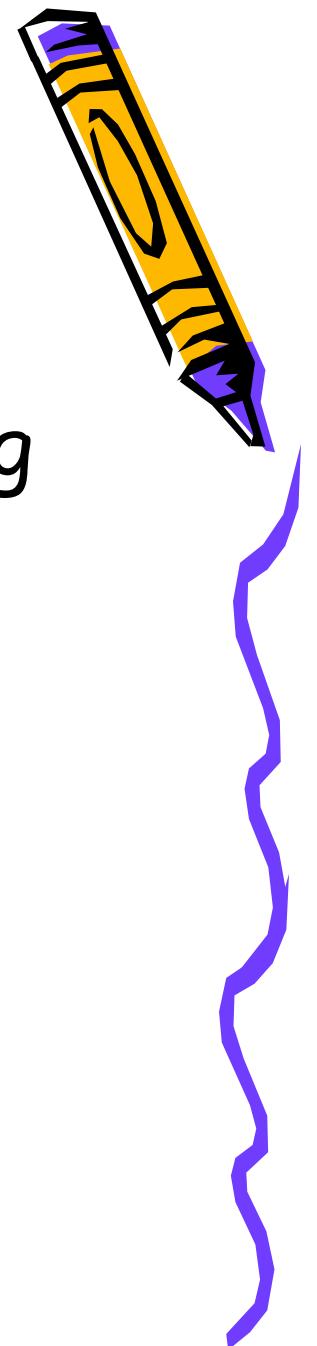
# Obstructive airway diseases

- Chronic obstructive pulmonary disease (COPD)
  - Emphysema, chronic bronchitis
  - Cause: **smoking**, air pollution
  - Symptoms: cough, sputum, shortness of breath, wheeze, ↓ exercise tolerance
  - Usually middle age/elderly
  - **Progressive worsening**; infective exacerbations

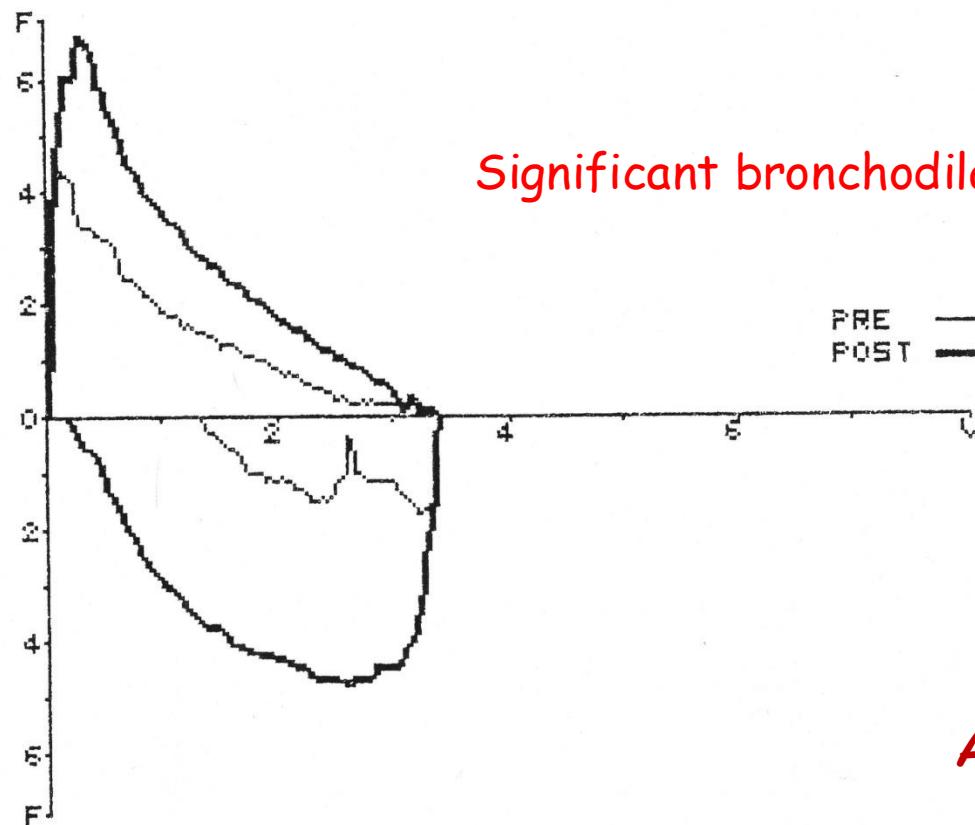


# Asthma vs COPD

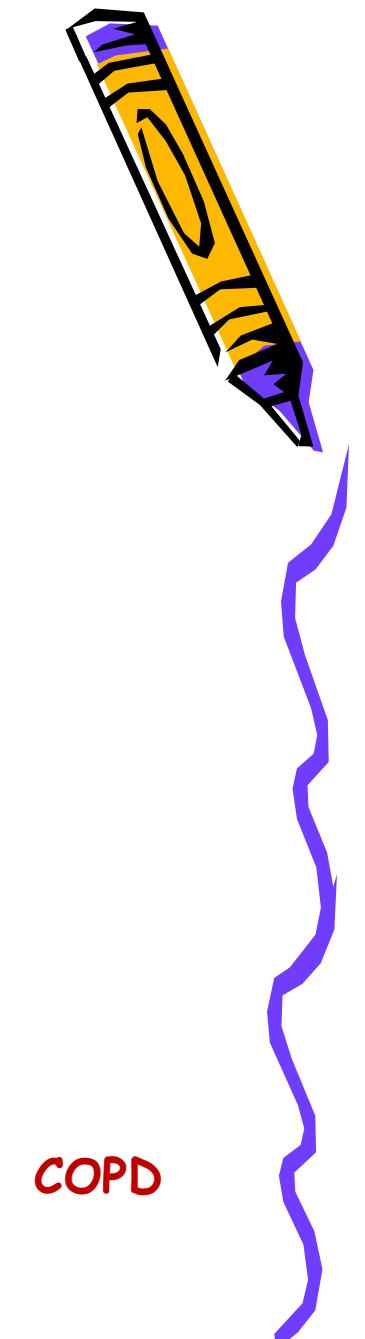
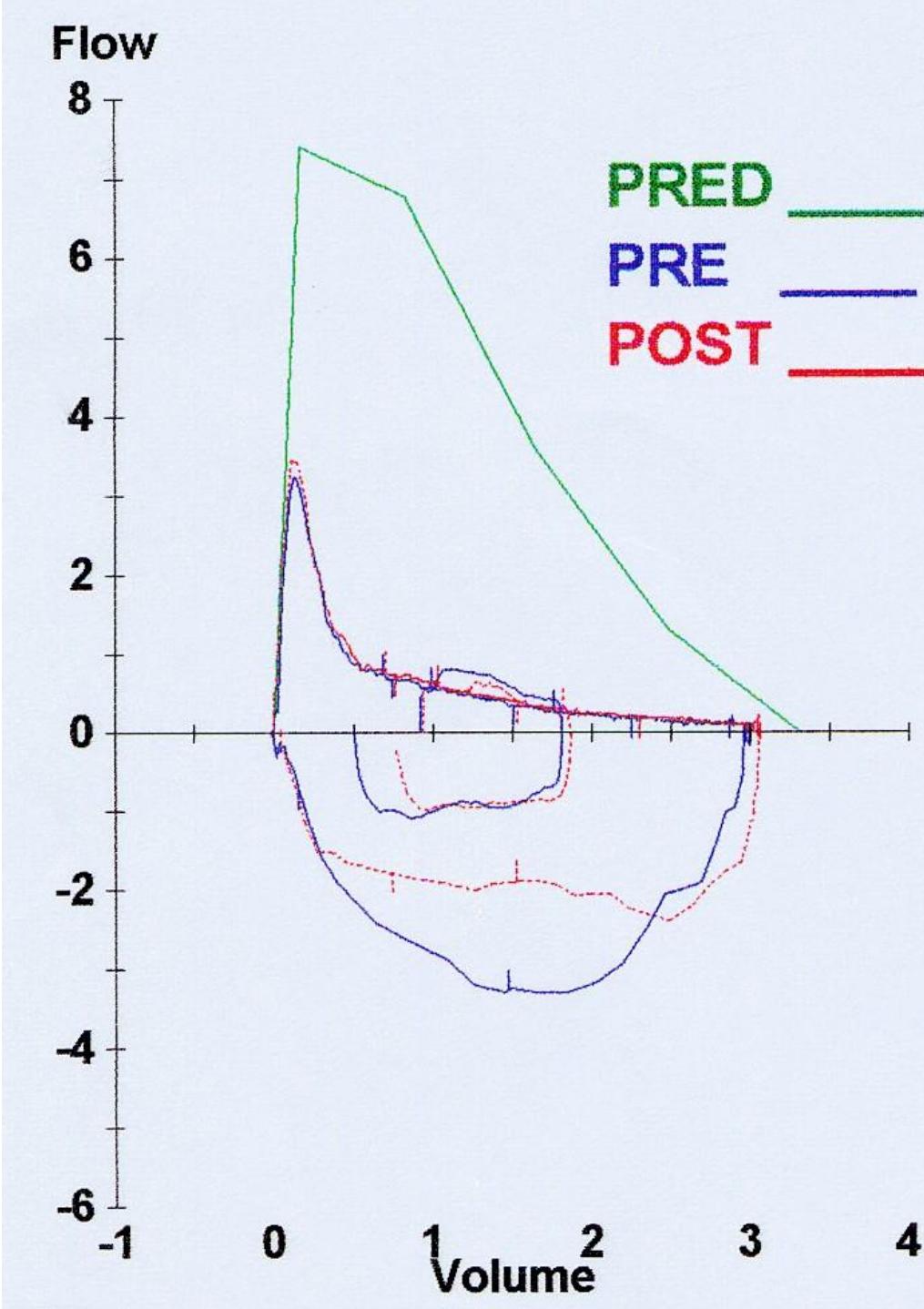
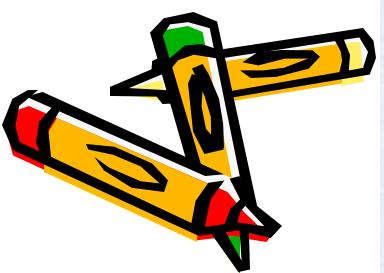
- Background: atopy/allergy, smoking
- Age: early vs late onset
- Clinical course: episodic vs progressive
- Lung function test



A.T.S. BEST.	PRE	POST	CHANGE					
			PRED	MEAS	%	MEAS	%	%
FVC	3.10	3.37	109	3.38	109	0		
FEV <sub>1</sub>	2.77	2.02	73	2.53	91	25		
FEV <sub>1</sub> /FVC%	89	60	-29	75	-14	15		
PEF	421	255	61	392	93	54		
FEF25-75%	3.92	0.96	24	2.04	52	113		
FEF 50%	4.33	1.15	27	2.21	51	92		
FEF 75%	2.05	0.38	18	1.04	51	174		
FIF 50%	3.82	1.47	38	4.12	108	180		

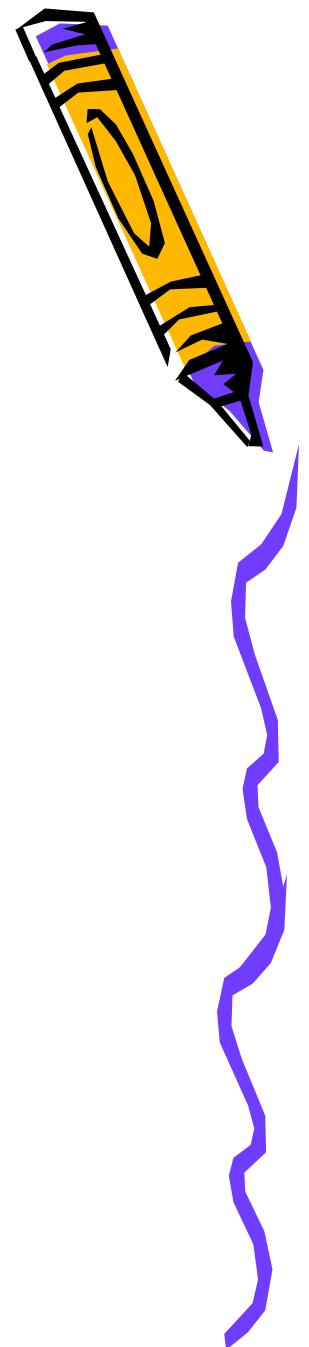
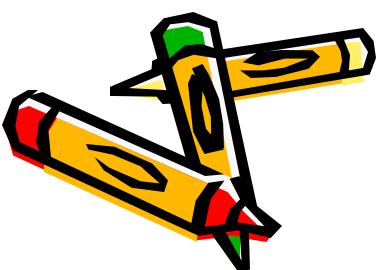


Asthma



# Treatment

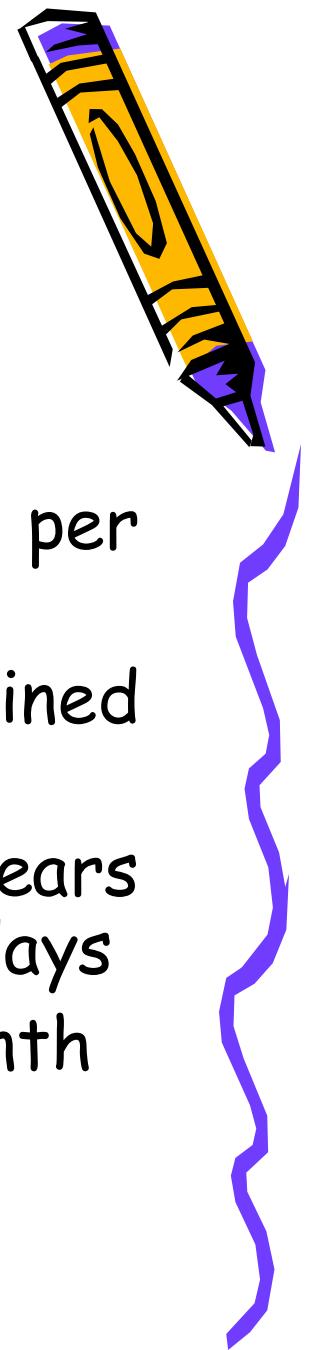
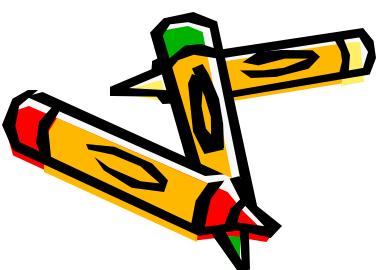
- Mostly via inhalers
- Commonly used drugs
  - Inhaled corticosteroid
  - Long-acting bronchodilators
  - Short-acting bronchodilators





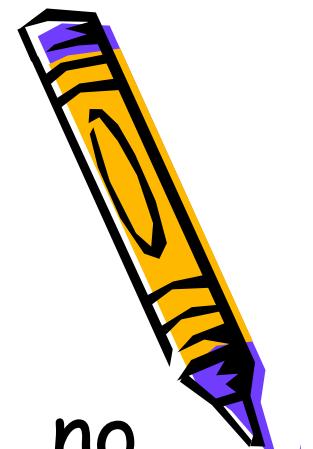
# Case 4: Hx

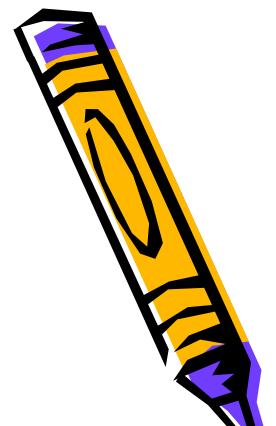
- Construction site worker
- Chronic smoker, 2 packs of cigarette per day for the last 40 years
- Presented with cough and blood-stained sputum production for the past 3 weeks
- Exertional dyspnea for the last few years without significant worsening in recent days
- Subjective weight loss over past one month



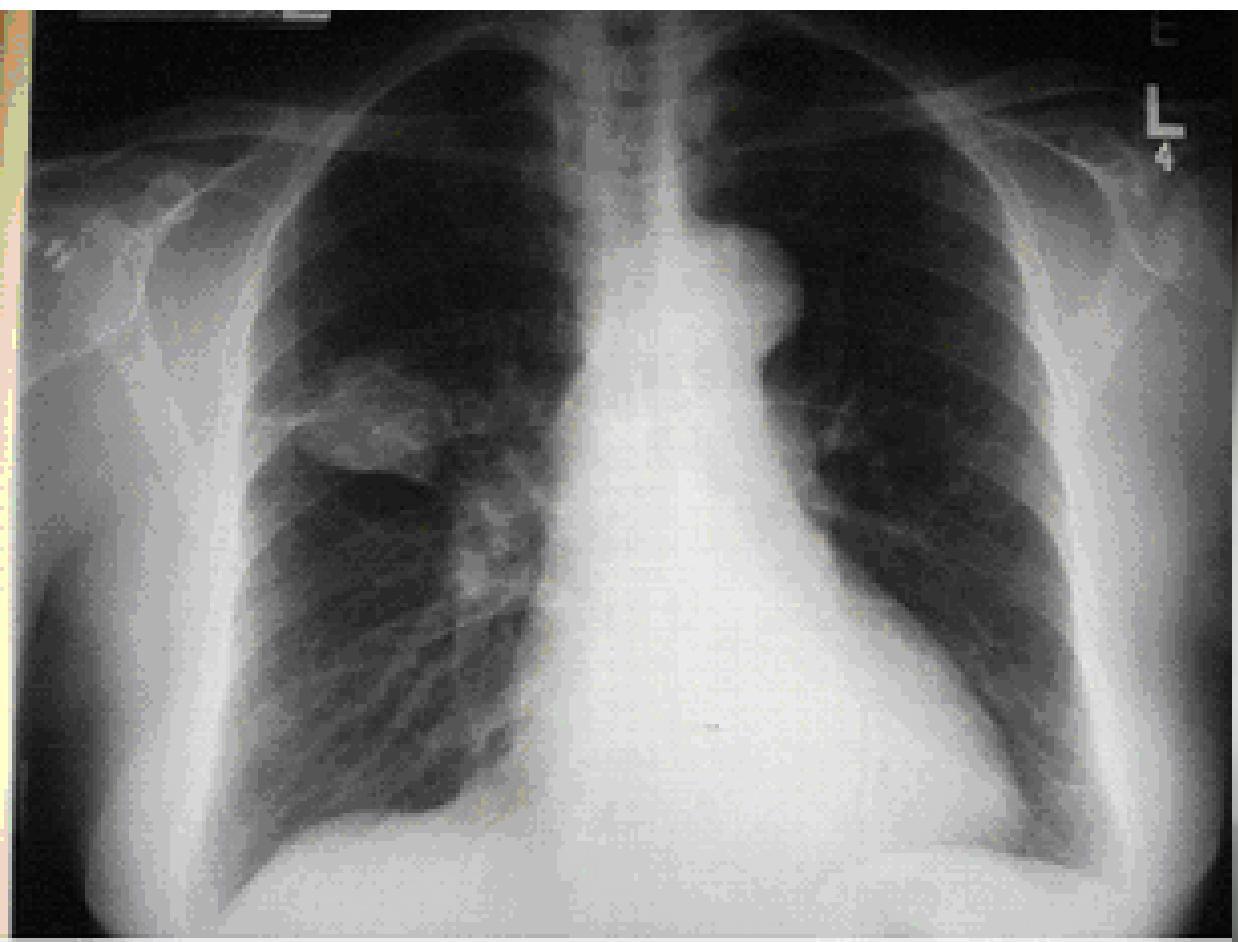
## Case 4: P/E

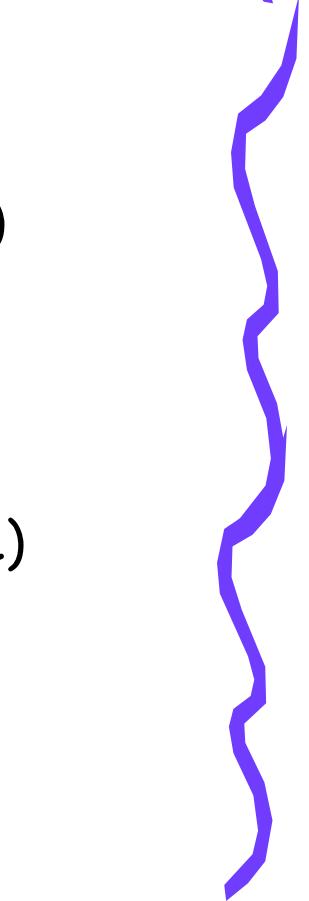
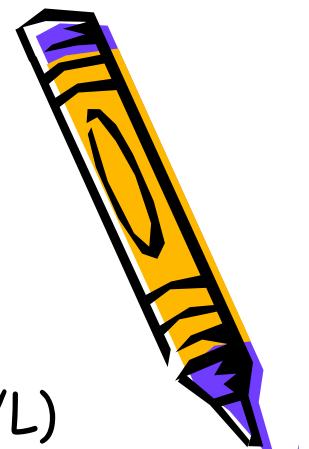
- Looked emaciated and pale, no clubbing
- A 2 cm firm lymph node was found in the right supraclavicular fossa
- Physical examination of the cardiovascular system, chest and abdomen, and central nervous system was unremarkable





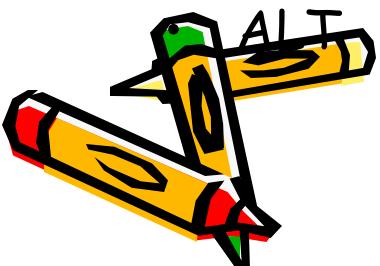
## Case 4: Ix



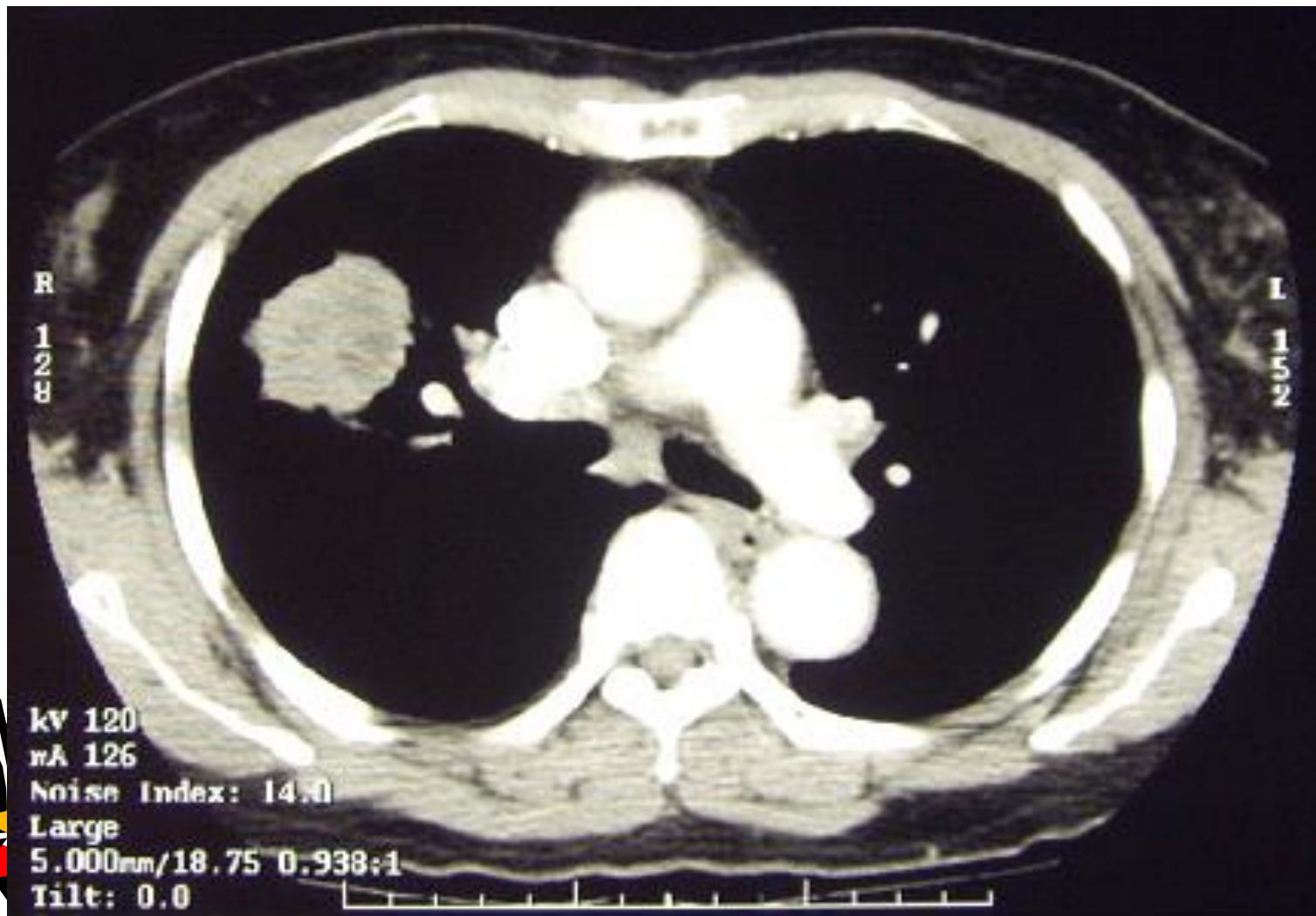


## Case 4: Ix

• WBC	9.4 × 10 <sup>9</sup>	(4.40 – 10.10 × 10 <sup>9</sup> /L)
• Hb	9.1	↓ (11.7 – 14.8 g/dL)
• MCV	85.2	(82.0 – 96.9 fL)
• MCH	28.9	(27.5 – 33.4 pg)
• Plt	186	(170 – 380 × 10 <sup>9</sup> /L)
• Na	124	↓ (136 – 148 mmol/L)
• K	4.5	(3.6 – 5.0 mmol/L)
• Ur	5.6	(2.8 – 6.7 mmol/L))
• Cr	80	(49 – 82 mmol/L)
• Calcium	2.78	↑ (2.11 – 2.55 mmol/L)
• ALP	266	↑ (32 – 93 U/L)
• AST	28	(14 – 30 U/L)
• ALT	13	(7 – 36 U/L)

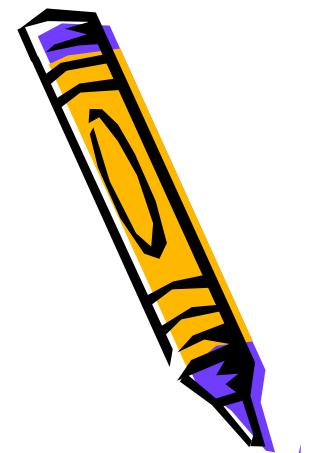


# Case 4: IX



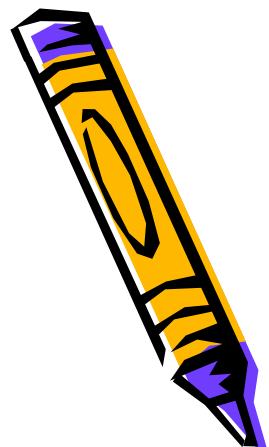
# Lung cancer

- Most important cause: smoking
- Increasing trend of never smoking lung cancer
- Non-small cell (NSCLC) vs small cell lung cancer (SCLC)
- Staging: **Tumour, Node, Metastasis**
- Early-stage: resectable; Late-stage: metastatic or unresectable

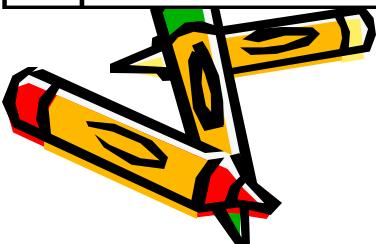


# HK Cancer Registry

## 2021: incidence

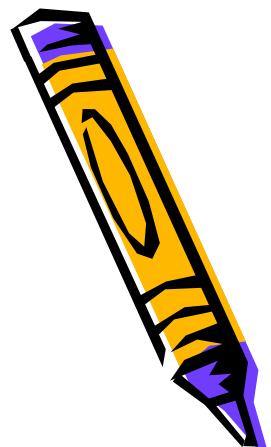


Male 男性					Female 女性				
Rank 排名	Site 部位	No. 發病數字	Rel. freq. 百分比	Crude rate* 粗發病率*	Rank 排名	Site 部位	No. 發病數字	Rel. freq. 百分比	Crude rate* 粗發病率*
1	Lung 肺	3,493	18.4%	103.3	1	Breast 乳腺	5,565	28.5%	138.1
2	Colorectum 大腸	3,427	18.1%	101.3	2	Lung 肺	2,485	12.7%	61.7
3	Prostate 前列腺	3,038	16.0%	89.8	3	Colorectum 大腸	2,472	12.7%	61.3
4	Liver 肝	1,343	7.1%	39.7	4	Corpus uteri 子宮體	1,250	6.4%	31.0
5	Stomach 胃	762	4.0%	22.5	5	Thyroid 甲狀腺	919	4.7%	22.8
6	Non-Hodgkin lymphoma 非霍奇金淋巴瘤	631	3.3%	18.7	6	Ovary & Peritoneum 卵巢及腹膜	654	3.4%	16.2
7	Kidney & other urinary organs except bladder 腎及其他泌尿器官 (膀胱除外)	586	3.1%	17.3	7	Cervix 子宮頸	596	3.1%	14.8
8	Pancreas 胰臟	582	3.1%	17.2	8	Non-melanoma skin 非黑色素瘤皮膚癌	549	2.8%	13.6
9	Nasopharynx 鼻咽	558	2.9%	16.5	9	Stomach 胃	544	2.8%	13.5
10	Non-melanoma skin 非黑色素瘤皮膚癌	545	2.9%	16.1	10	Pancreas 胰臟	534	2.7%	13.2
All sites 所有部位		18,943	100.0%	560.1	All sites 所有部位		19,519	100.0%	484.2

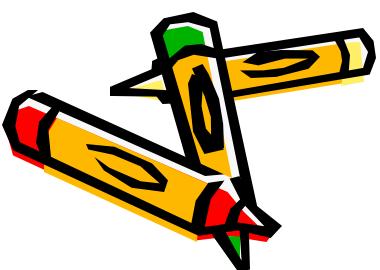


# HK Cancer Registry

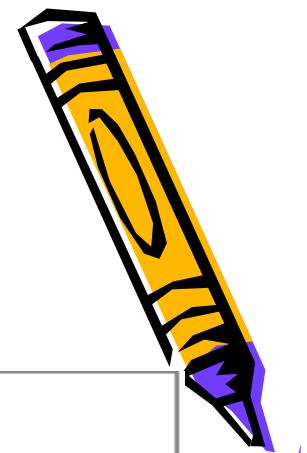
## 2021: mortality



Male 男性					Female 女性				
Rank	Site	No.	Rel. freq.	Crude rate*	Rank	Site	No.	Rel. freq.	Crude rate*
排名	部位	死亡數字	百分比	粗死亡率*	排名	部位	死亡數字	百分比	粗死亡率*
1	Lung 肺	2,622	30.0%	77.5	1	Lung 肺	1,415	22.3%	35.1
2	Colorectum 大腸	1,323	15.1%	39.1	2	Colorectum 大腸	975	15.3%	24.2
3	Liver 肝	1,041	11.9%	30.8	3	Breast 乳腺	791	12.4%	19.6
4	Prostate 前列腺	518	5.9%	15.3	4	Pancreas 胰臟	422	6.6%	10.5
5	Pancreas 胰臟	467	5.3%	13.8	5	Liver 肝	406	6.4%	10.1
6	Stomach 胃	380	4.3%	11.2	6	Stomach 胃	251	4.0%	6.2
7	Non-Hodgkin lymphoma 非霍奇金淋巴瘤	242	2.8%	7.2	7	Ovary & Peritoneum 卵巢及腹膜	236	3.7%	5.9
8	Oesophagus 食道	239	2.7%	7.1	8	Cervix 子宮頸	178	2.8%	4.4
9	Leukaemia 白血病	210	2.4%	6.2	9	Non-Hodgkin lymphoma 非霍奇金淋巴瘤	146	2.3%	3.6
10	Nasopharynx 鼻咽	178	2.0%	5.3	10	Leukaemia 白血病	139	2.2%	3.4
All sites 所有部位		8,754	100.0%	258.8	All sites 所有部位		6,354	100.0%	157.6

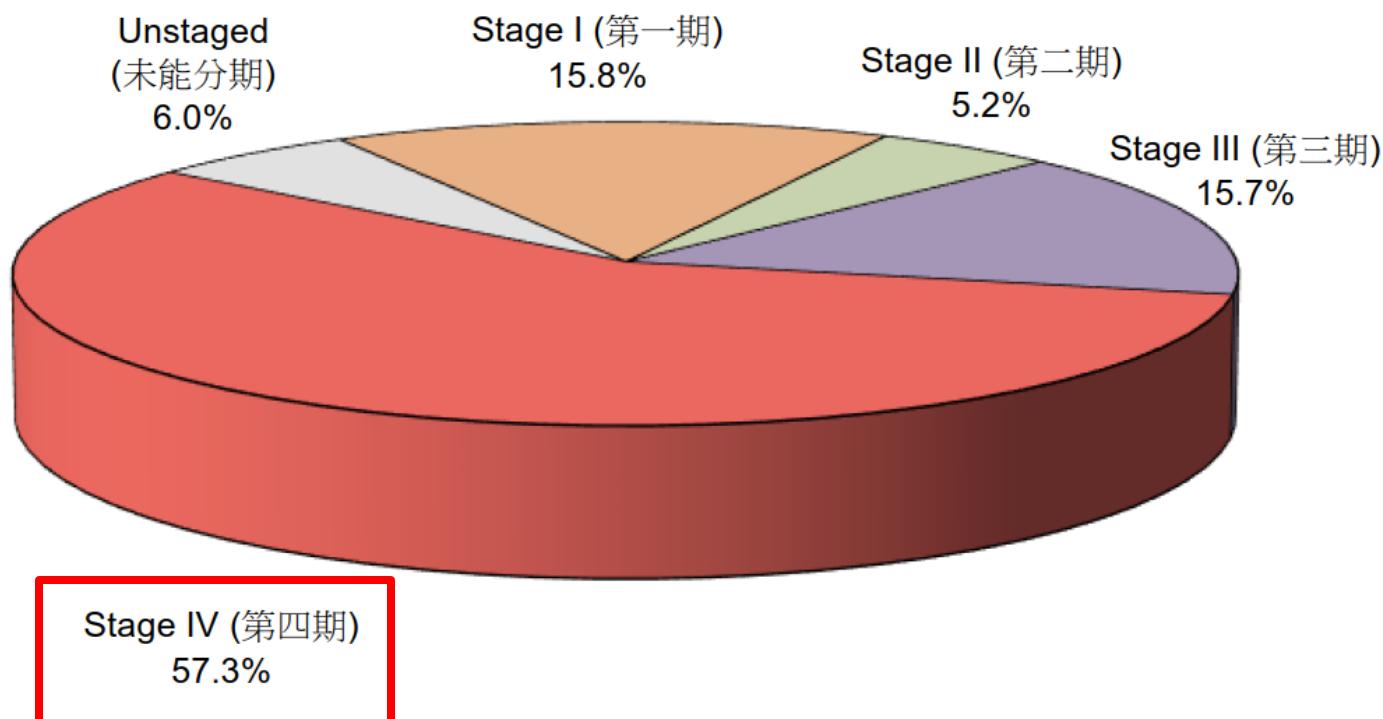


# HK Cancer Registry 2019



Stage Distribution of Lung Cancer in 2019

2019年肺癌期數分佈



Staged according to the 8<sup>th</sup> edition of the AJCC system  
按 AJCC 癌症分期手册第八版分類

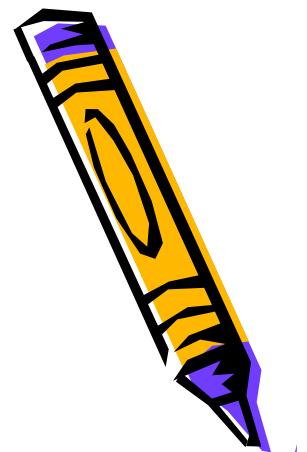


# Lung cancer

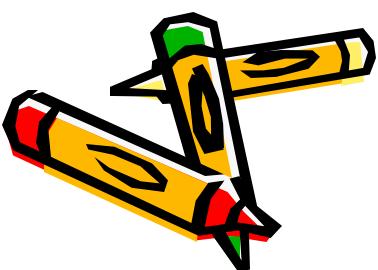
- Symptoms/signs:
  - **Thoracic:** cough, sputum, haemoptysis, shortness of breath, wheeze, chest pain
  - **Extrathoracic:** related to metastatic sites e.g. neck lumps (lymph nodes), bone pain, limb weakness
  - **Paraneoplastic:** endocrine, neurological
  - **Constitutional:** weight loss



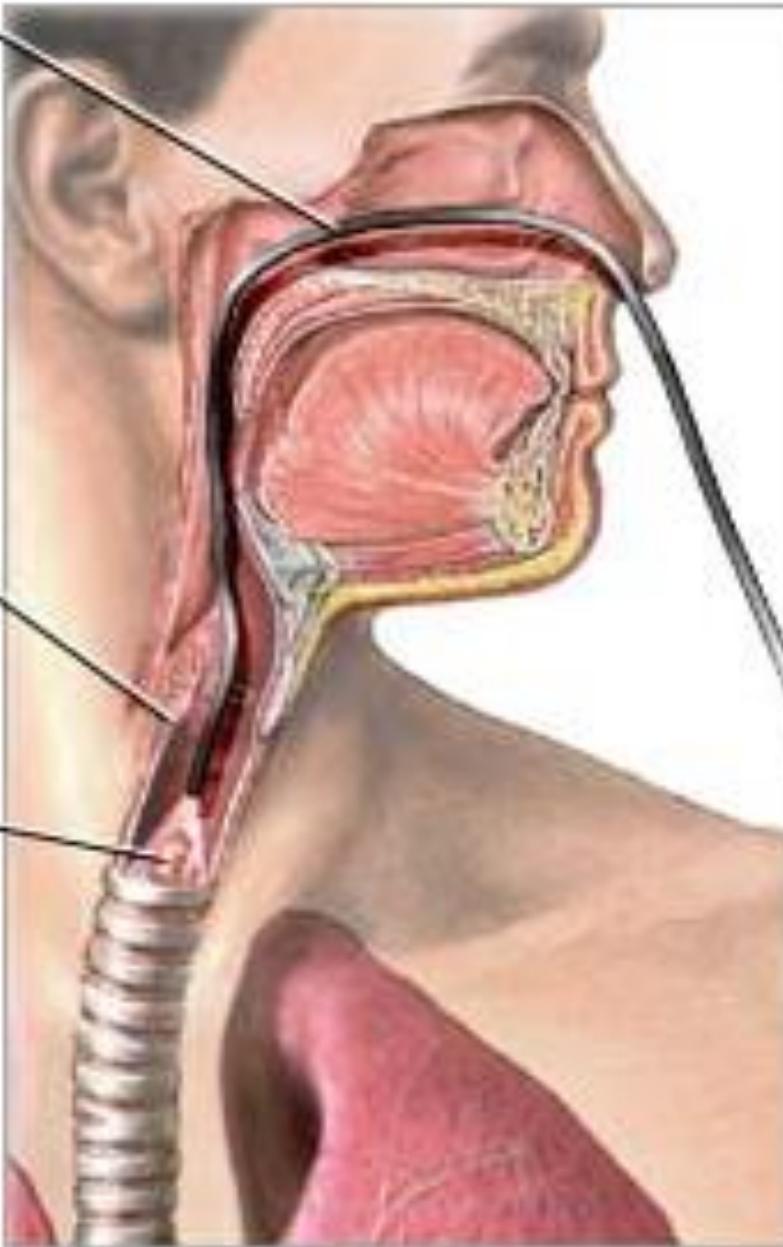
# Investigations



- Pathological diagnosis
  - Sputum cytology
  - Biopsy of tumour sites
    - Lung: bronchoscopy, CT-guided biopsy
    - Neck lymph node: needle or excisional biopsy
    - Bone, liver, subcutaneous lumps
  - Molecular tests: e.g. EGFR mutation
- Staging
  - Computed tomography (CT) thorax/abdomen
  - Positron emission tomography (PET)-CT

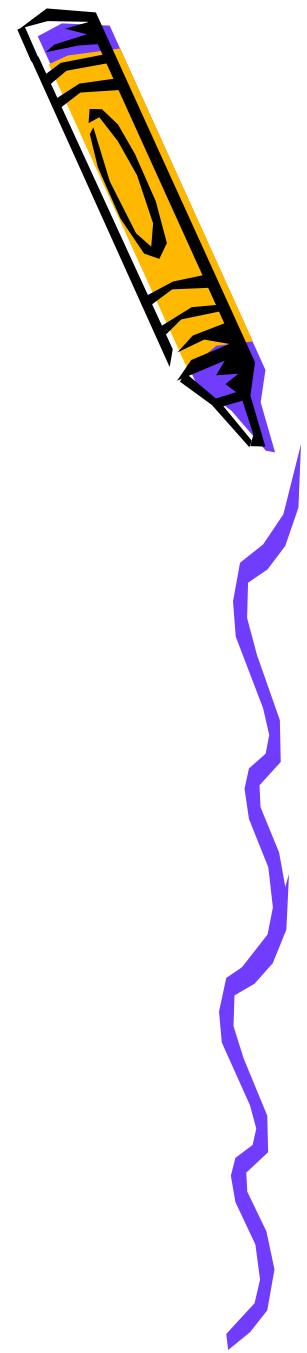
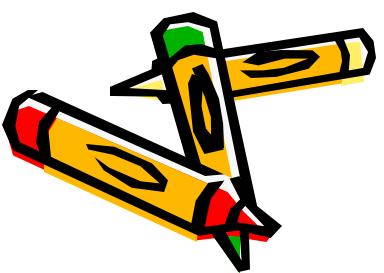
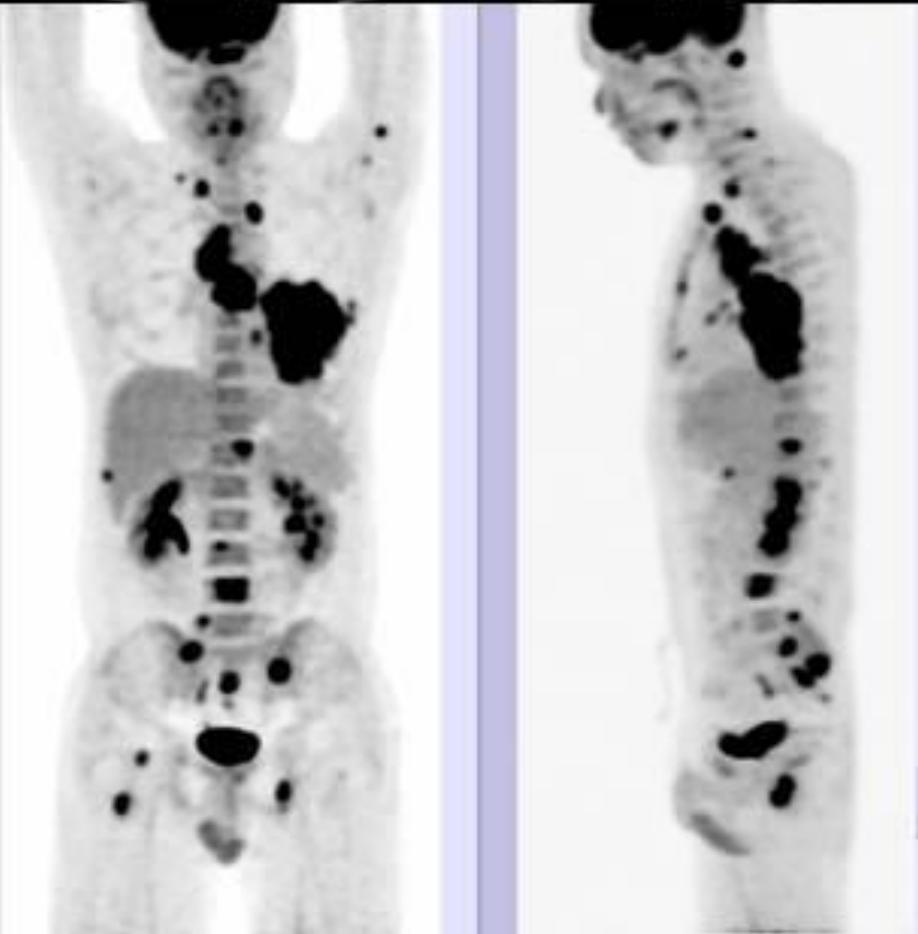
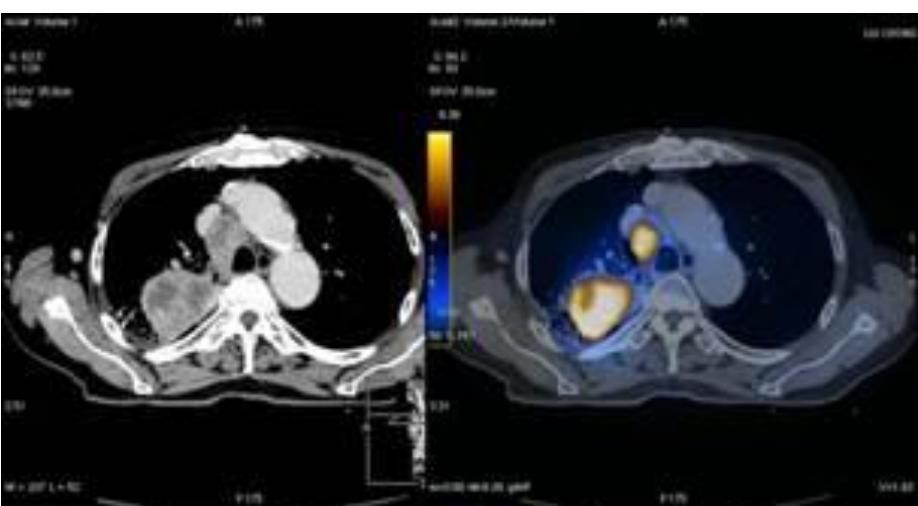


Bronchoscope



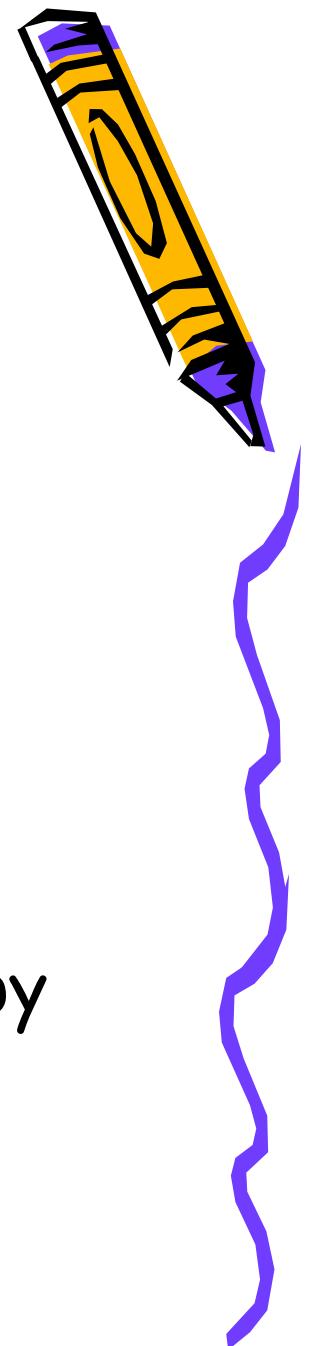
Trachea  
Unusual  
tissue  
sampled  
for biopsy





# Lung cancer: treatment

- Small cell lung cancer
  - Chemotherapy +/- radiotherapy (RT)
- Non-small cell lung cancer
  - Early-stage: surgery +/- adjuvant chemotherapy
  - Locally advanced: Chemo-radiotherapy
  - Metastatic: Chemotherapy, targeted therapy, immunotherapy



# Key topics covered

- Distinguish between URTI and pneumonia: symptoms and simple CXR
- Differences between asthma and COPD: clinical course
- Lung cancer related symptoms and diagnostic workup

