



**HKU  
Med**

School of Clinical Medicine  
Department of Medicine  
香港大學內科學系

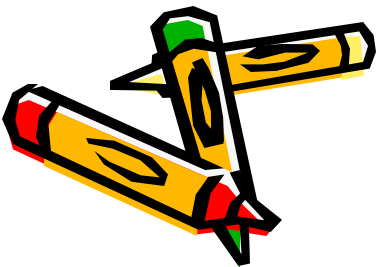
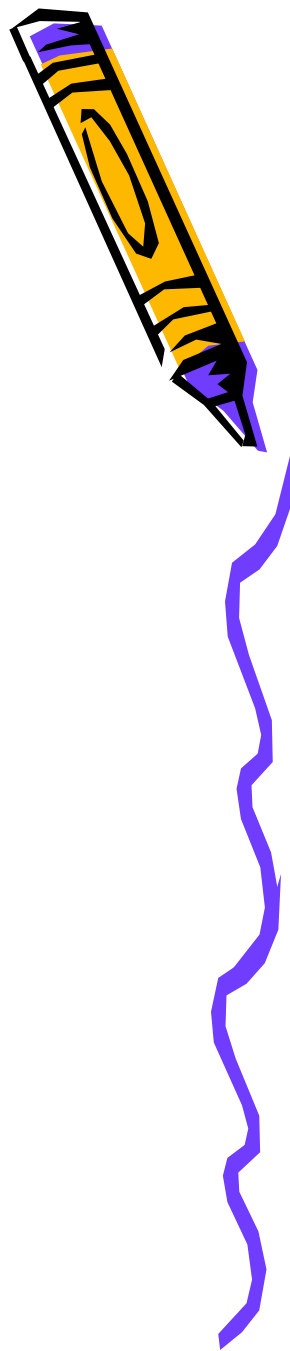


# Common respiratory diseases and diagnostics

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

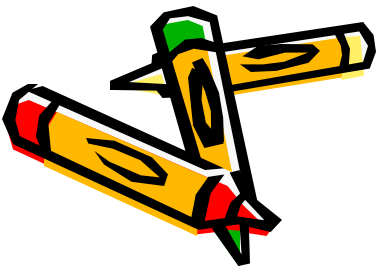
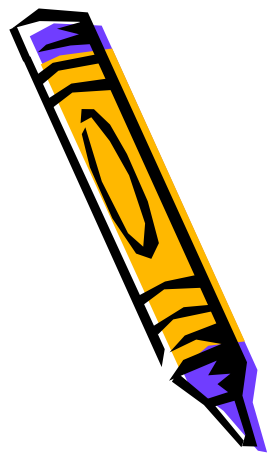
# Outline

- Respiratory tract infections
- Obstructive airway diseases
- Lung cancer



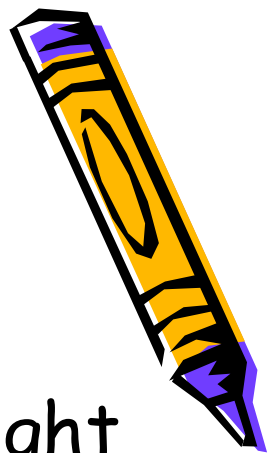
# Case 1: Hx

- 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



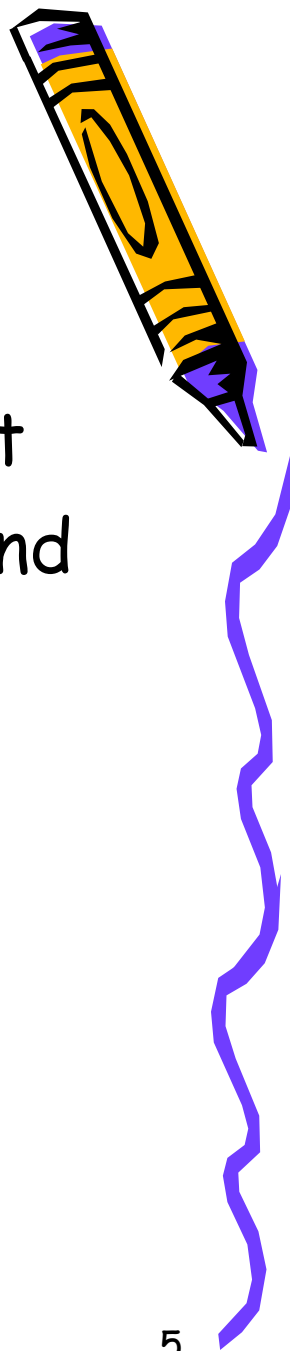
# Case 1: Hx

- 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
- SpO2 92% (RA)



# Case 1: Ix

Collect Date : 03/04/07  
Collect Time : 22:00  
Request No. : H0931412      Ref. Range      Units

## 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	pg
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

## 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

## RBC MORPHOLOGY

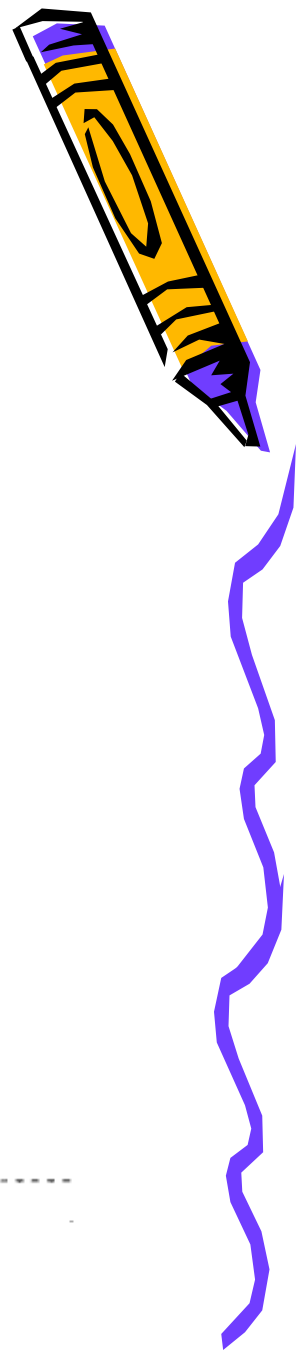
Anisocytosis      --

## 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

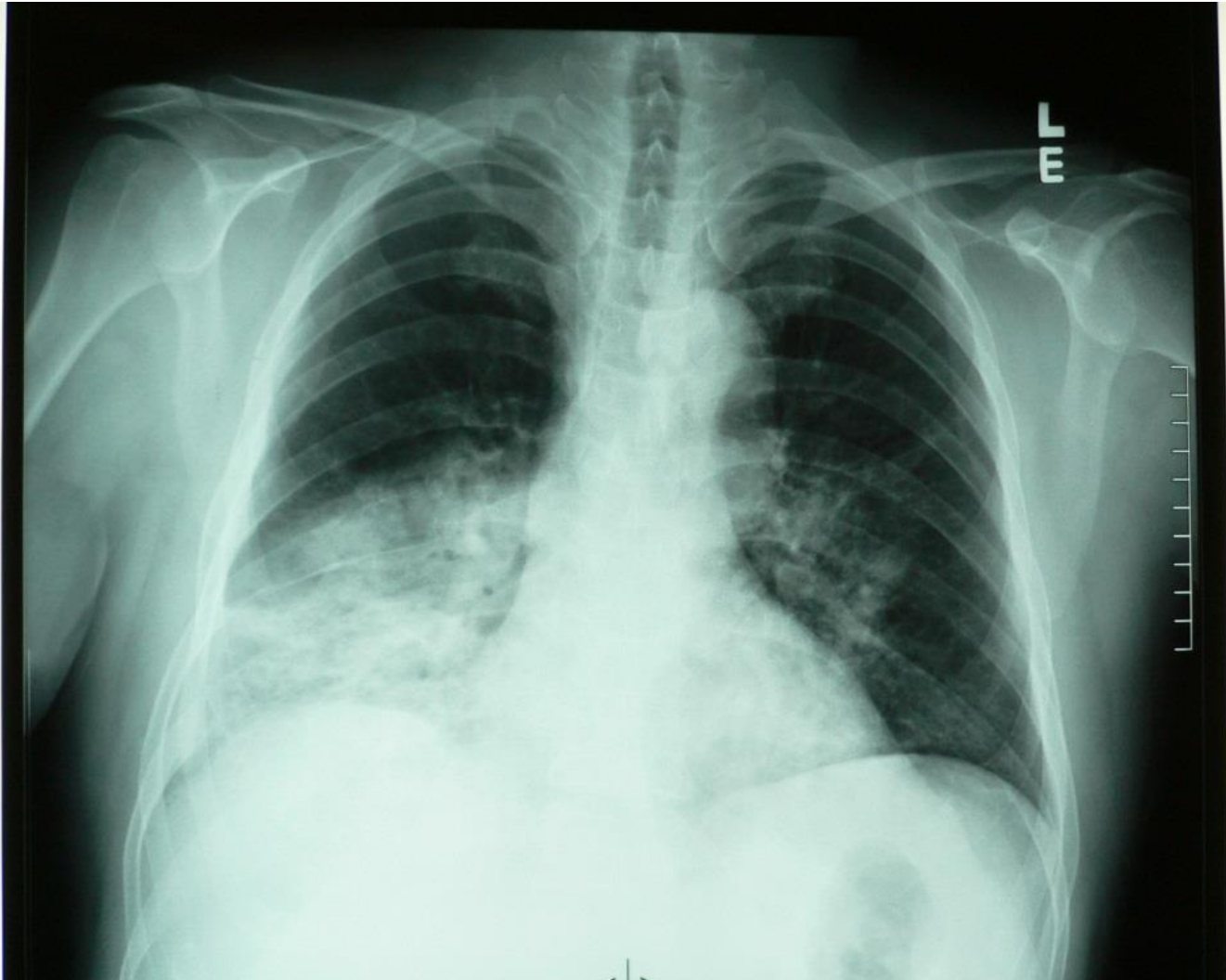
---

## Viral Antigen Detection (Immunofluorescence)

RSV	--	Negative
Adenovirus	--	Negative
Influenza A	--	Positive
Influenza B	--	Negative
Paraflu	--	Negative
Resp. Viruses	Negative	Positive

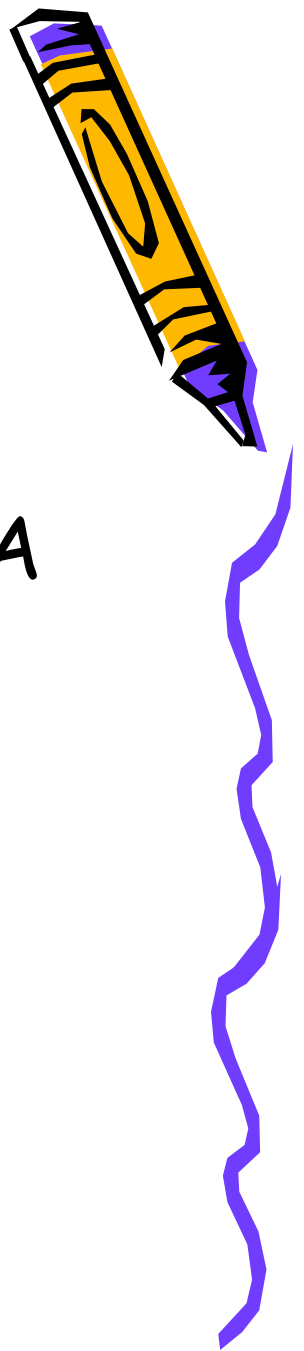


# Case 1: Ix

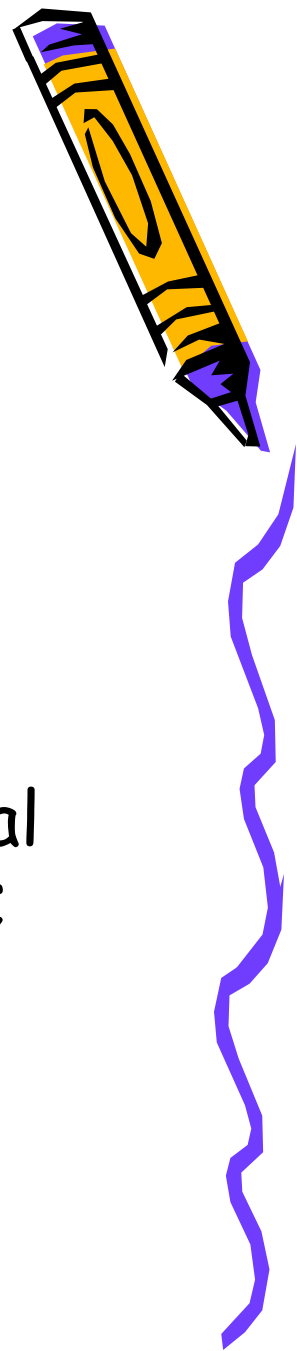


# Case 1: Tx

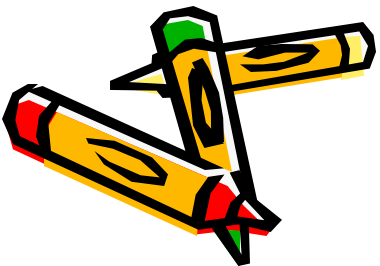
- Diagnosis: Community-acquired pneumonia, complicating influenza A URTI
- Treatment
  - O<sub>2</sub> 2 L/min
  - Augmentin iv and doxycycline po
  - Tamiflu po



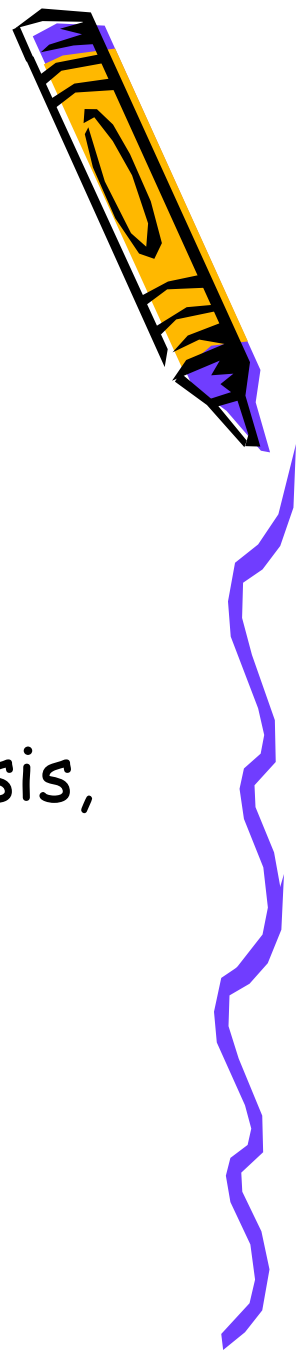
# Respiratory tract infections (RTI)



- 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)

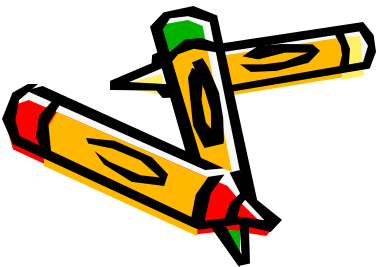
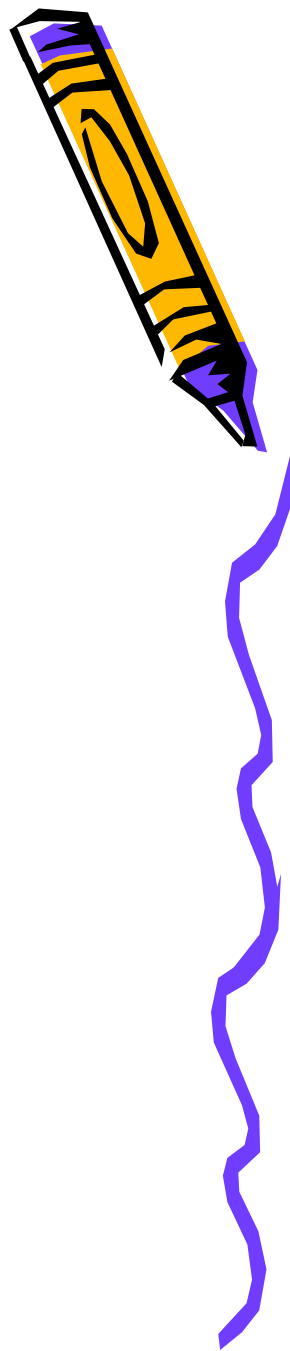


- Lower RTI
  - Bronchitis, pneumonia
  - Mostly **bacterial**
  - Symptoms: cough, sputum, haemoptysis, shortness of breath, pleuritic chest pain; fever, chills, poor appetite



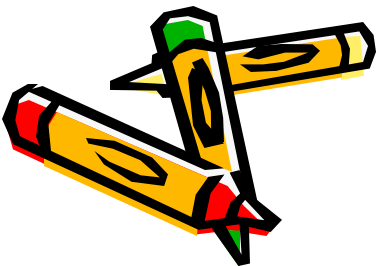
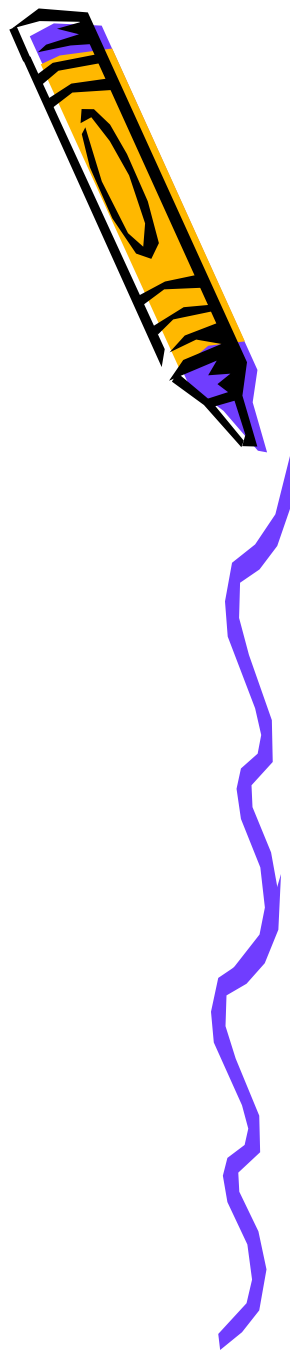
# Upper vs lower RTI

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



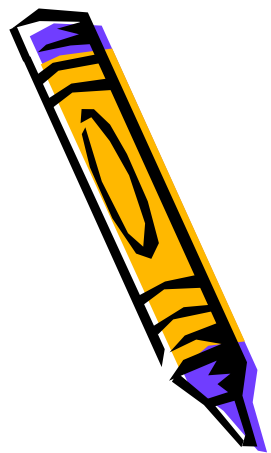
# Treatment

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



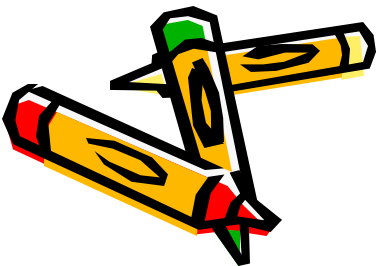
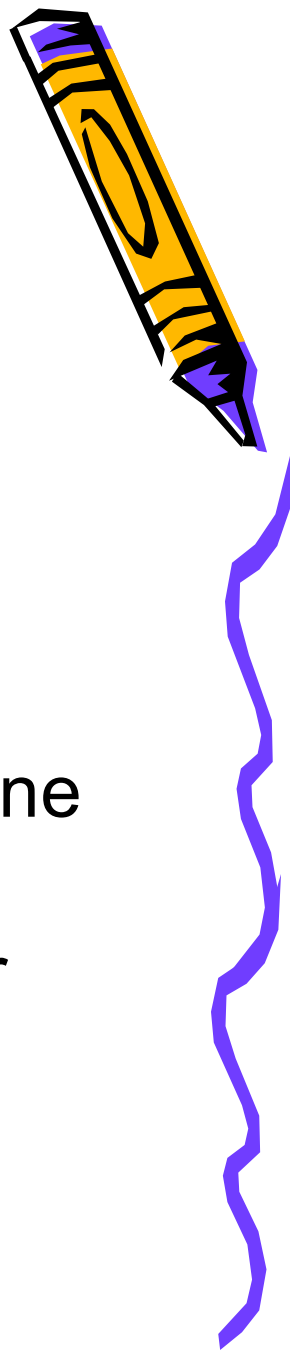
## Case 2: Hx

- 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



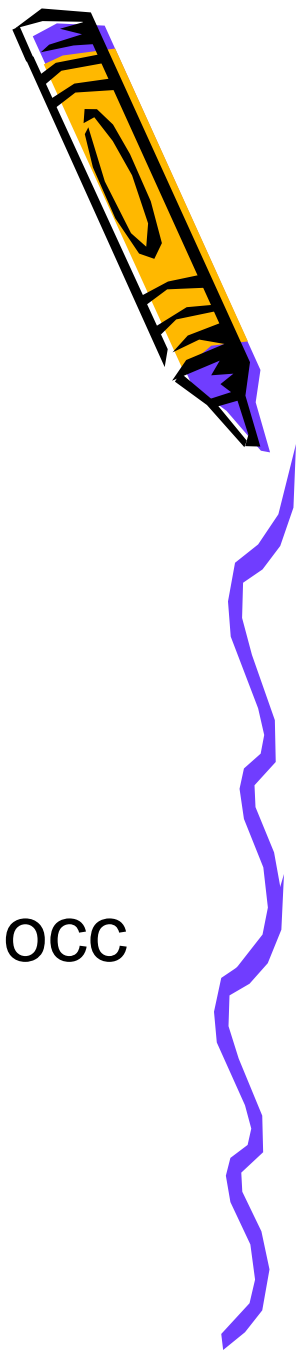
## Case 2: Hx

- 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

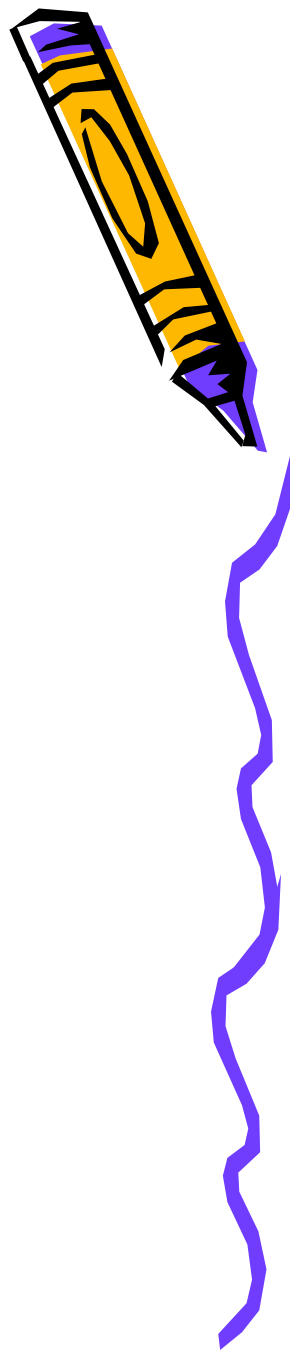
- Marked SOB, audible wheeze
- Using accessory muscles of respiration
- Respiratory rate - 32/min
- Pulse rate - 102/min
- BP 137/80
- Chest - diffuse expiratory wheeze, occ crackles
- SpO<sub>2</sub> - 96% on 24% oxygen
- PEFR 80 L/min





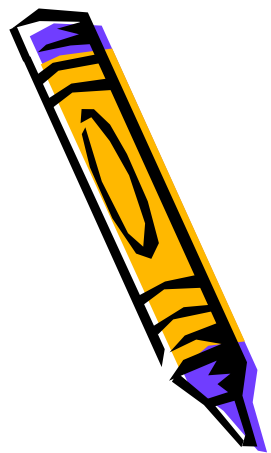
## Case 2: Tx

- 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

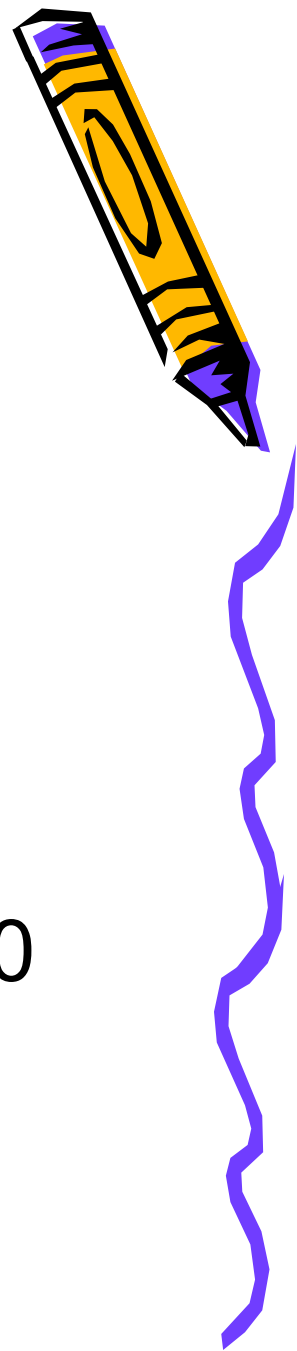


## Case 3: P/E

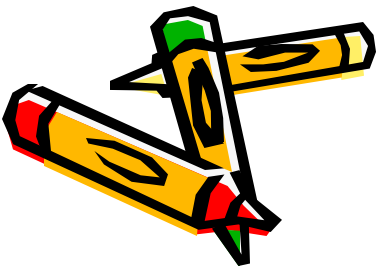
- Physical examination - no clubbing, no lymphadenopathy
- Heavy cigarette staining of fingers
- Use of accessory muscles
- Chest - hyperinflated, decreased breath sounds and rhonchi
- PEFR 80 L/min



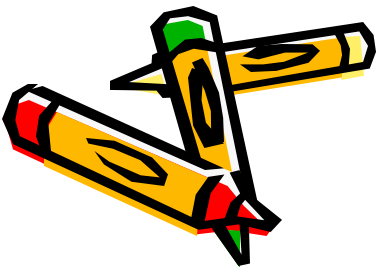
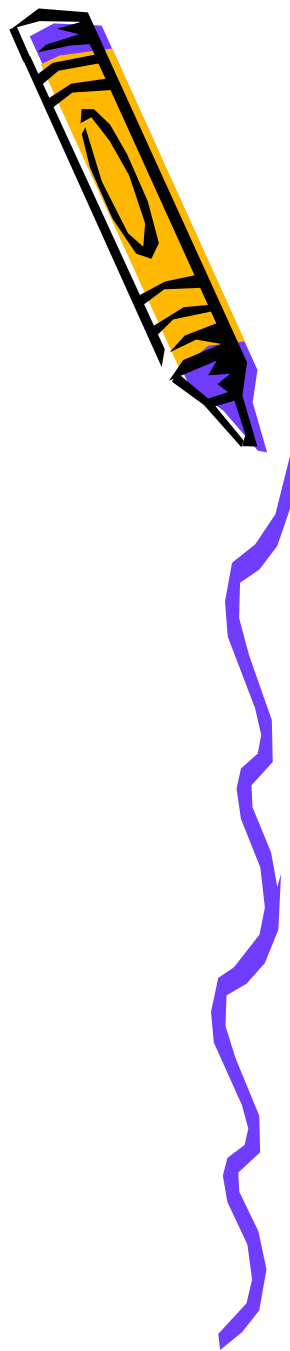
# Case 3: Ix



- $\text{SaO}_2$  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

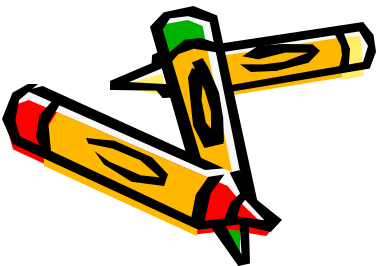
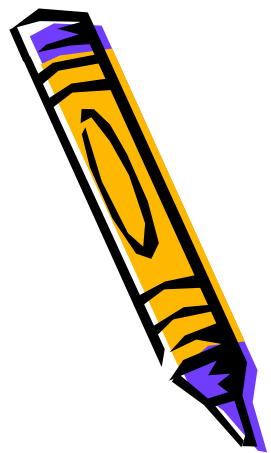


# Case 3: Ix



## Case 3: Tx

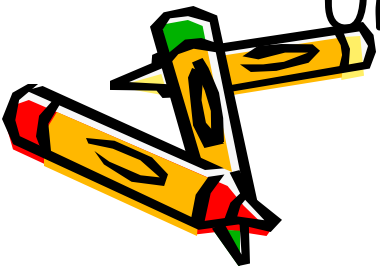
- Dx: Chronic obstructive pulmonary disease (COPD) with acute exacerbation
- O<sub>2</sub>
- Salbutamol + Ipratropium bromide inhaled
- Oral steroid
- Augmentin



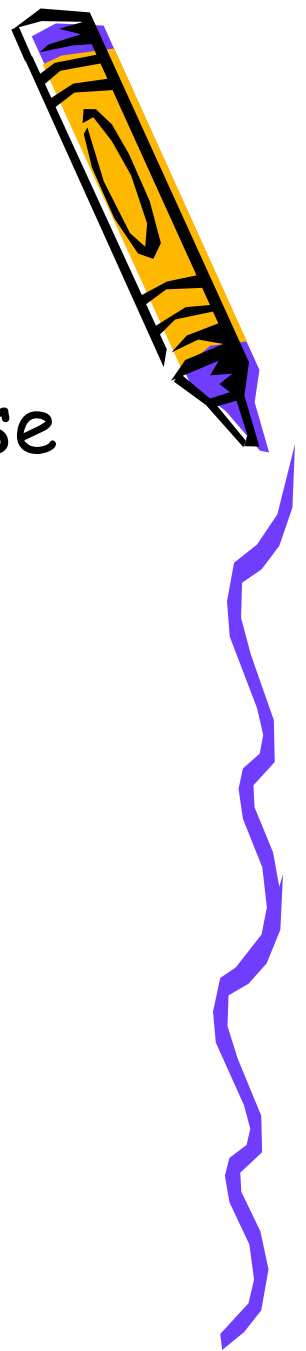
# Obstructive airway diseases



- 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

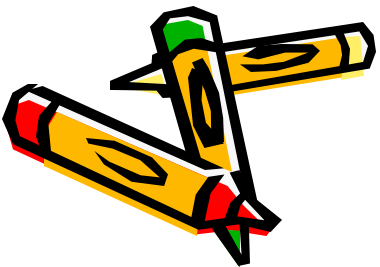
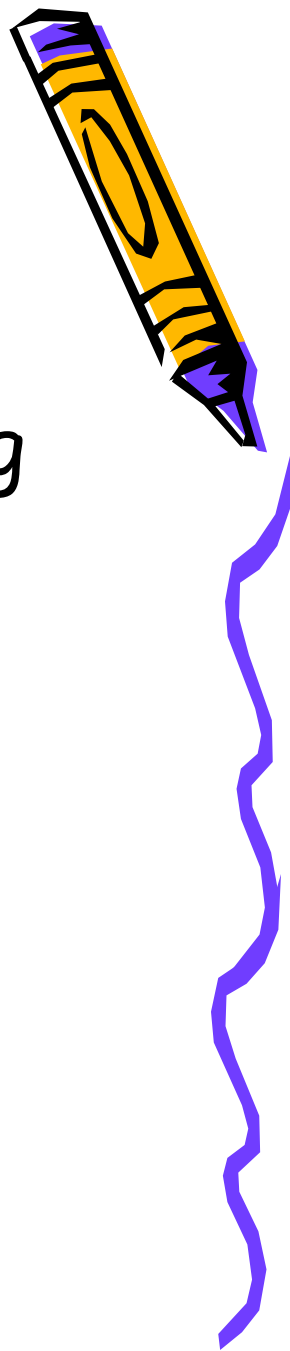


- Chronic obstructive pulmonary disease (COPD)
  - Emphysema, chronic bronchitis
  - Cause: **smoking**, air pollution
  - Symptoms: cough, sputum, shortness of breath, wheeze, ↓ exercise tolerance
  - Usually middle age/elderly
  - **Progressive worsening**; infective exacerbations

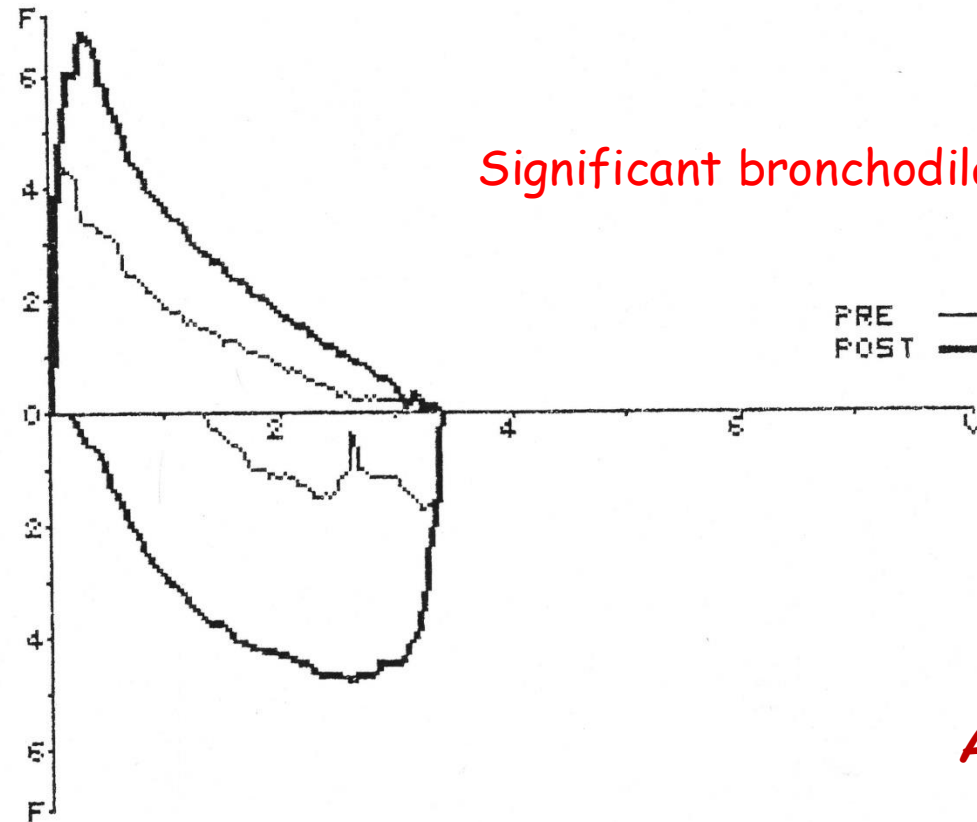


# Asthma vs COPD

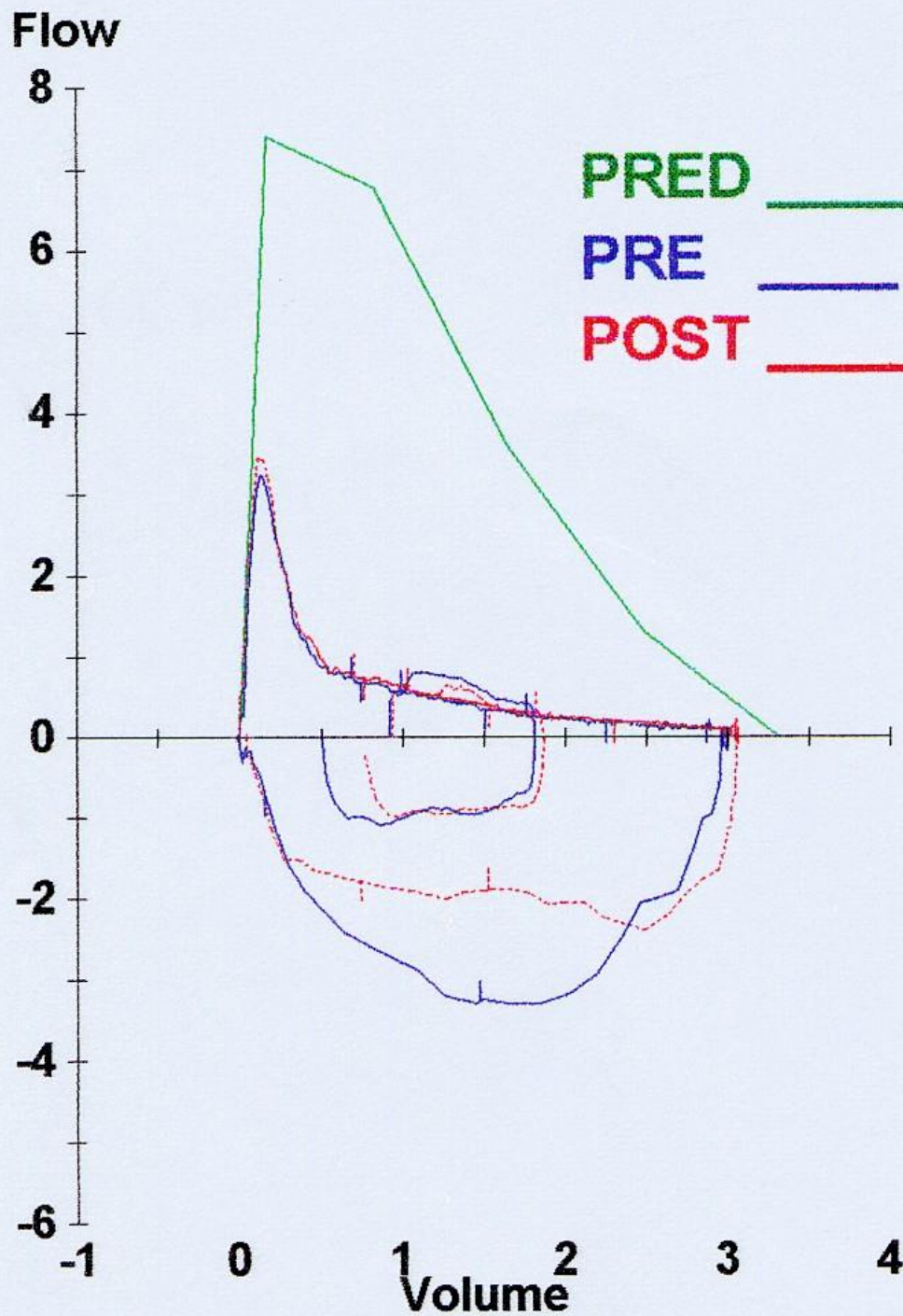
- Background: atopy/allergy, smoking
- Age: early vs late onset
- Clinical course: episodic vs progressive
- Lung function test



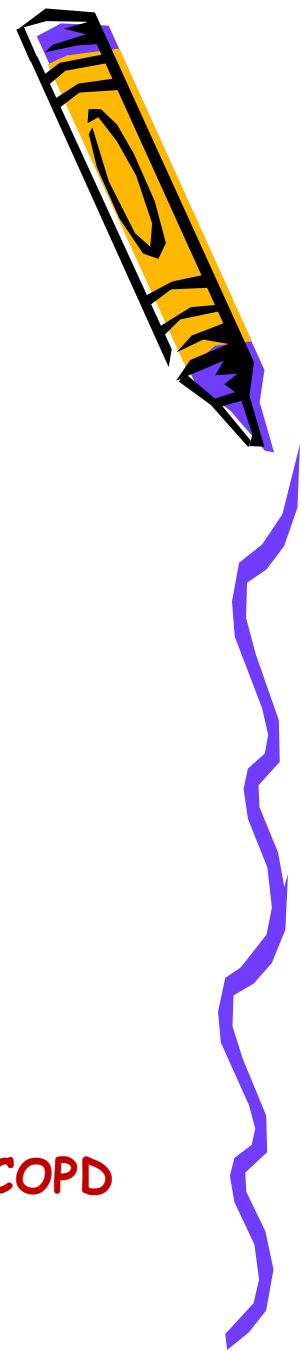
A.T.S. BEST.	PRED	PRE MEAS	%	POST MEAS	%	CHANGE %
FVC	3.10	3.37	109	3.38	109	0
FEV <sub>1</sub>	2.77	2.02	73	2.53	91	25
FEV <sub>1</sub> /FVC%	89	60	-29	75	-14	15
PEF	421	255	61	392	93	54
FEF <sub>25-75%</sub>	3.92	0.96	24	2.04	52	113
FEF 50%	4.33	1.15	27	2.21	51	92
FEF 75%	2.05	0.38	18	1.04	51	174
FIF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



Asthma

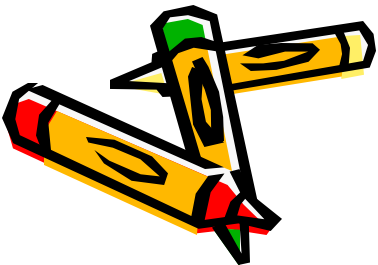
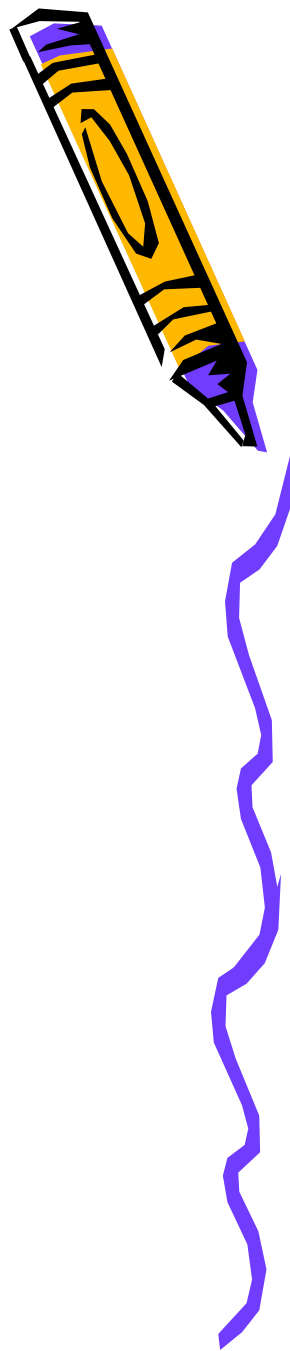


COPD



# Treatment

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

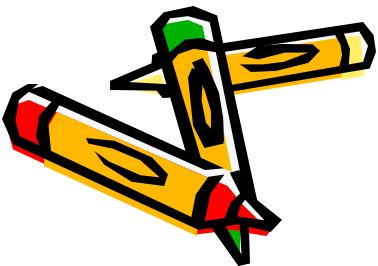




## Case 4: Hx

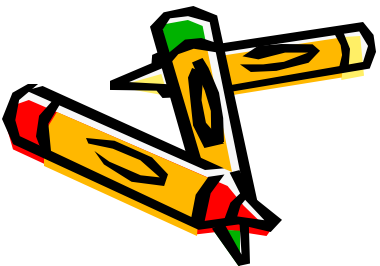
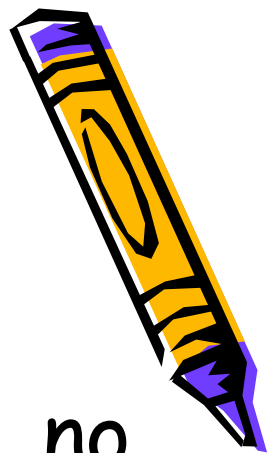


- Construction site worker
- Chronic smoker, 2 packs of cigarette per day for the last 40 years
- Presented with cough and blood-stained sputum production for the past 3 weeks
- Exertional dyspnea for the last few years without significant worsening in recent days
- Subjective weight loss over past one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

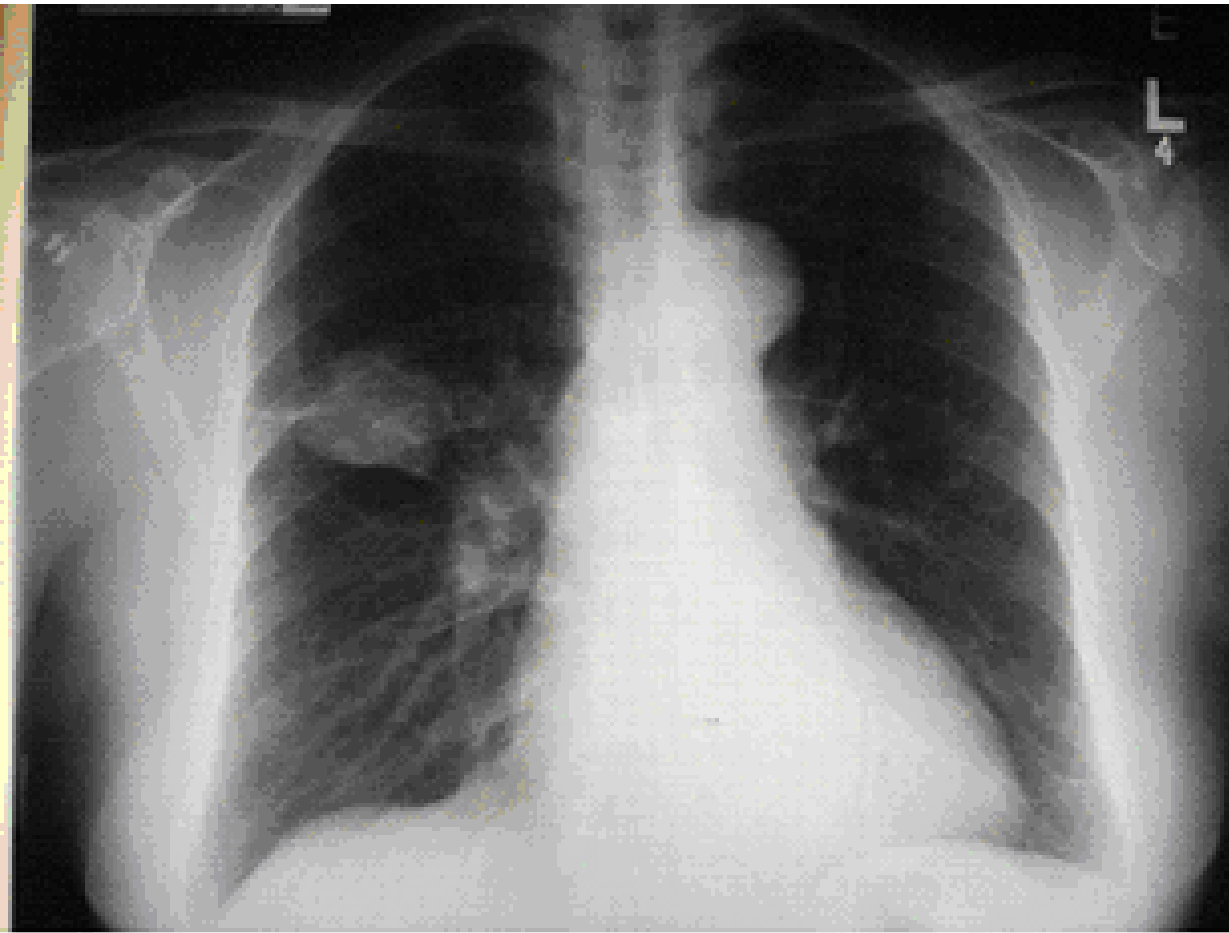


## Case 4: P/E

- 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



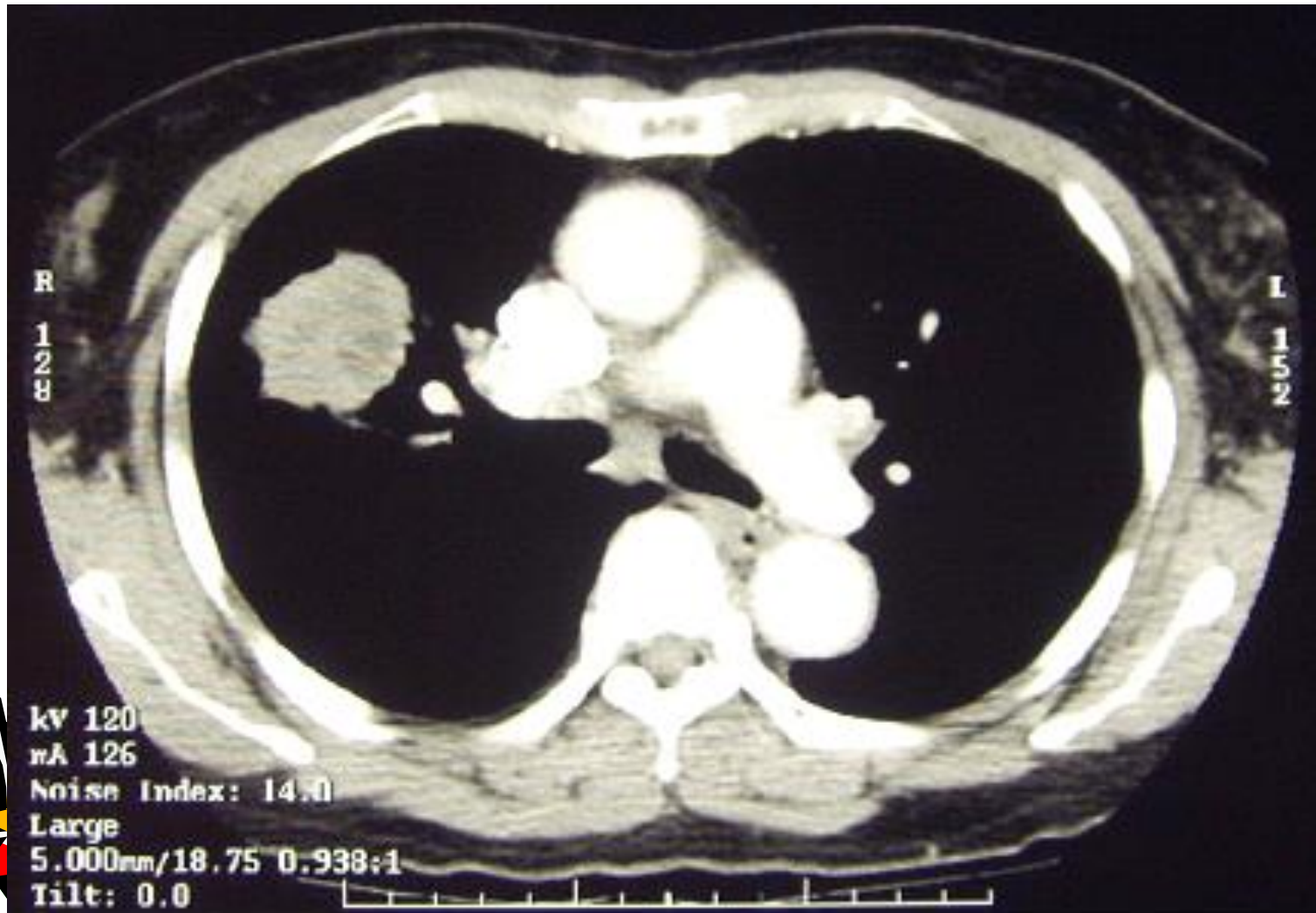
# Case 4: Ix



• WBC	9.4 x 10 <sup>9</sup>		(4.40 – 10.10 x 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 x 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)



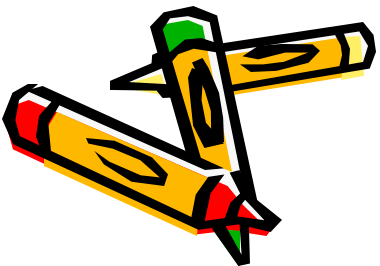
# Case 4: Ix



# Lung cancer



- Most important cause: smoking
- Increasing trend of neversmoking lung cancer
- Non-small cell (NSCLC) vs small cell lung cancer (SCLC)
- Staging: **T**umour, **N**ode, **M**etastasis
- Early-stage: resectable; Late-stage: metastatic or unresectable



# HK Cancer Registry 2021: incidence



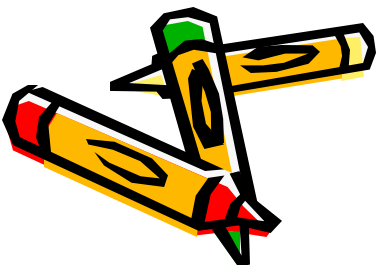
Male 男性					Female 女性				
Rank 排名	Site 部位	No. 發病數字	Rel. freq. 百分比	Crude rate* 粗發病率*	Rank 排名	Site 部位	No. 發病數字	Rel. freq. 百分比	Crude rate* 粗發病率*
1	Lung 肺	3,493	18.4%	103.3	1	Breast 乳腺	5,565	28.5%	138.1
2	Colorectum 大腸	3,427	18.1%	101.3	2	Lung 肺	2,485	12.7%	61.7
3	Prostate 前列腺	3,038	16.0%	89.8	3	Colorectum 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



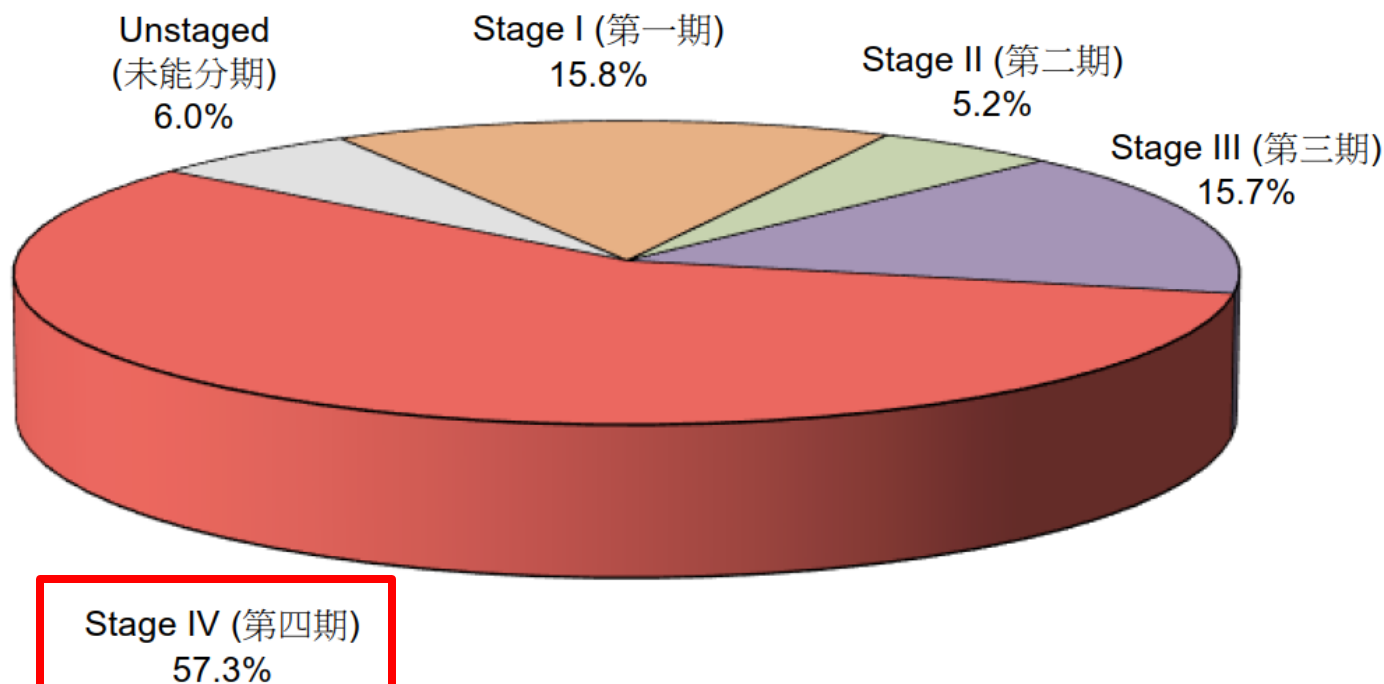
Male 男性					Female 女性				
Rank 排名	Site 部位	No. 死亡數字	Rel. freq. 百分比	Crude rate* 粗死亡率*	Rank 排名	Site 部位	No. 死亡數字	Rel. freq. 百分比	Crude rate* 粗死亡率*
1	Lung 肺	2,622	30.0%	77.5	1	Lung 肺	1,415	22.3%	35.1
2	Colorectum 大腸	1,323	15.1%	39.1	2	Colorectum 大腸	975	15.3%	24.2
3	Liver 肝	1,041	11.9%	30.8	3	Breast 乳腺	791	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



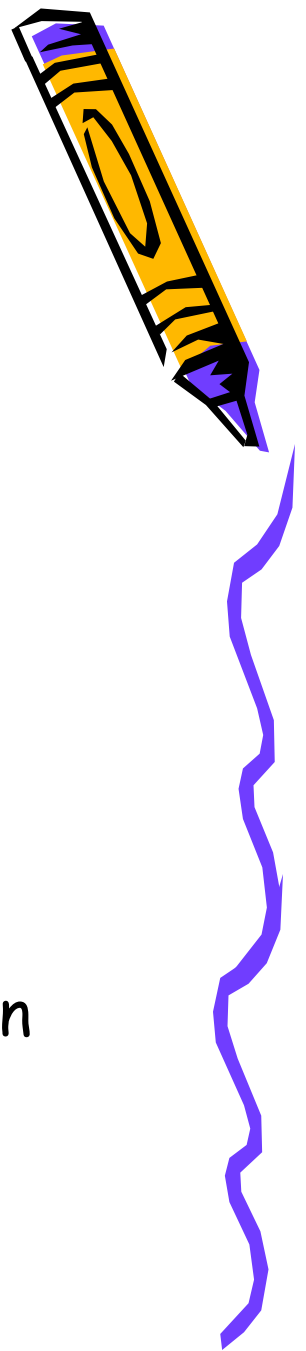
Staged according to the 8<sup>th</sup> edition of the AJCC system  
按 AJCC 癌症分期手冊第八版分類

# Lung cancer

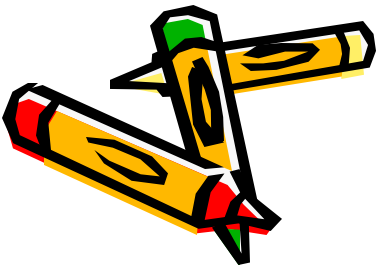
- Symptoms/signs:
  - **Thoracic:** cough, sputum, haemoptysis, shortness of breath, wheeze, chest pain
  - **Extrathoracic:** related to metastatic sites e.g. neck lumps (lymph nodes), bone pain, limb weakness
  - **Paraneoplastic:** endocrine, neurological
  - **Constitutional:** weight loss



# Investigations



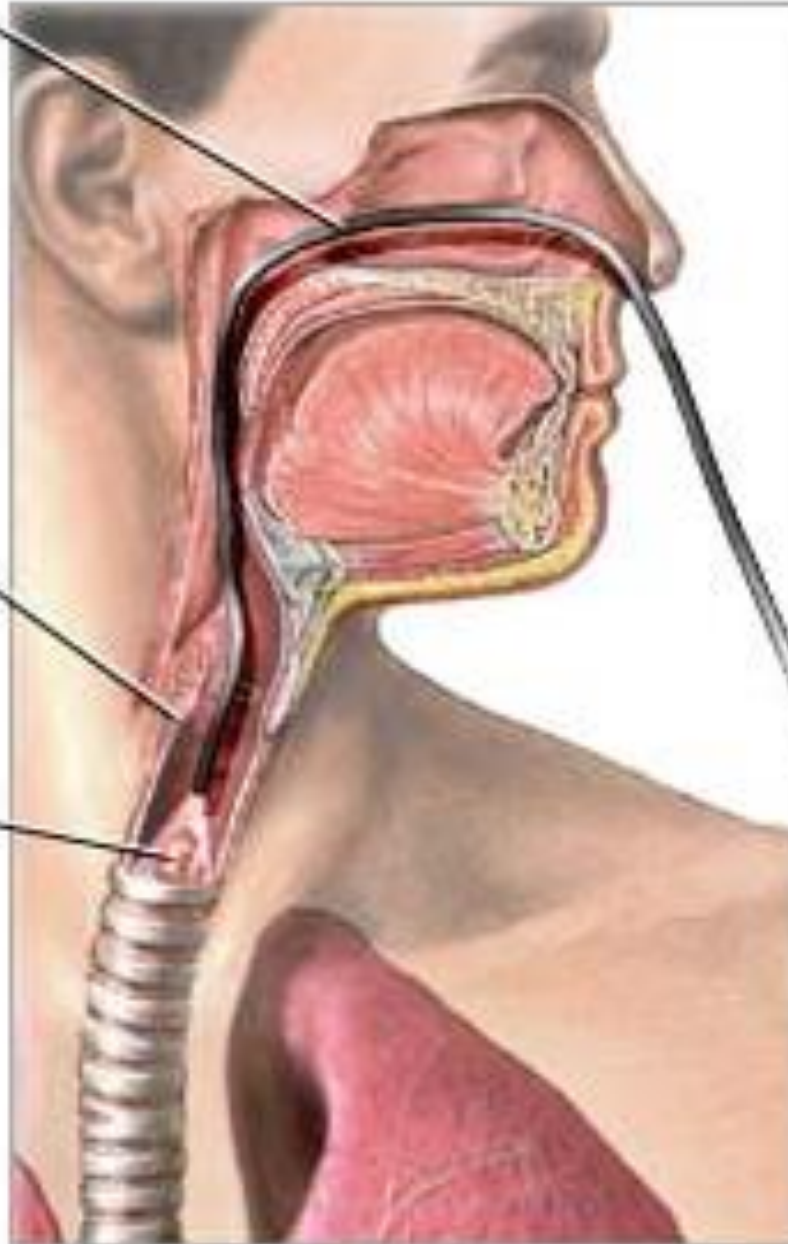
- **Pathological diagnosis**
  - Sputum cytology
  - Biopsy of tumour sites
    - Lung: bronchoscopy, CT-guided biopsy
    - Neck lymph node: needle or excisional biopsy
    - Bone, liver, subcutaneous lumps
  - Molecular tests: e.g. EGFR mutation
- **Staging**
  - Computed tomography (CT) thorax/abdomen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

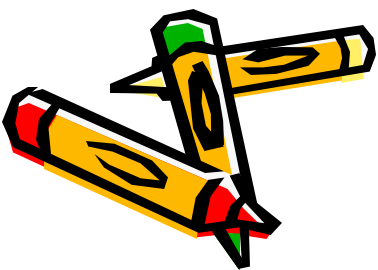
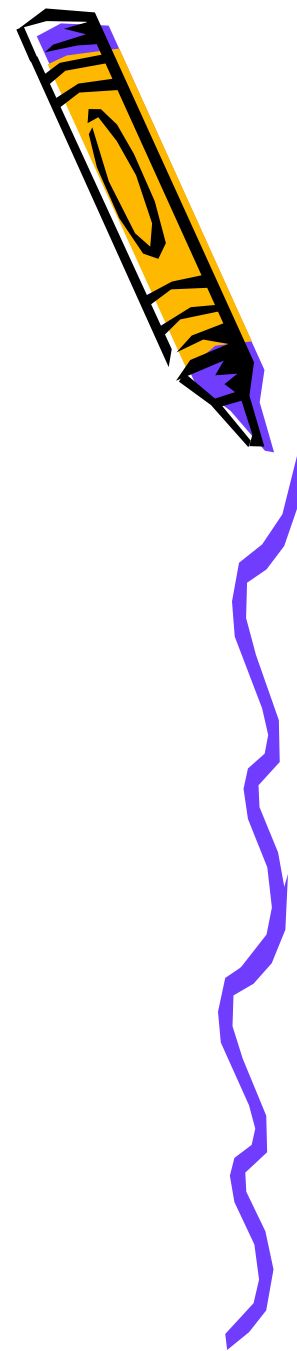
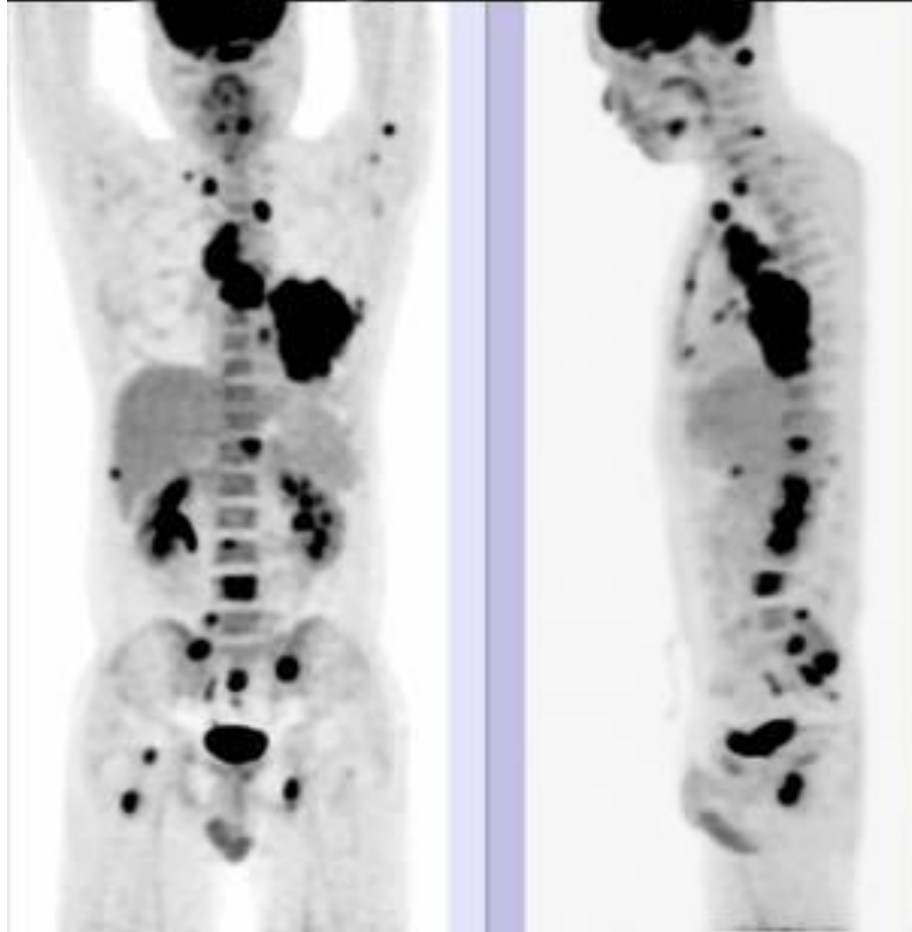
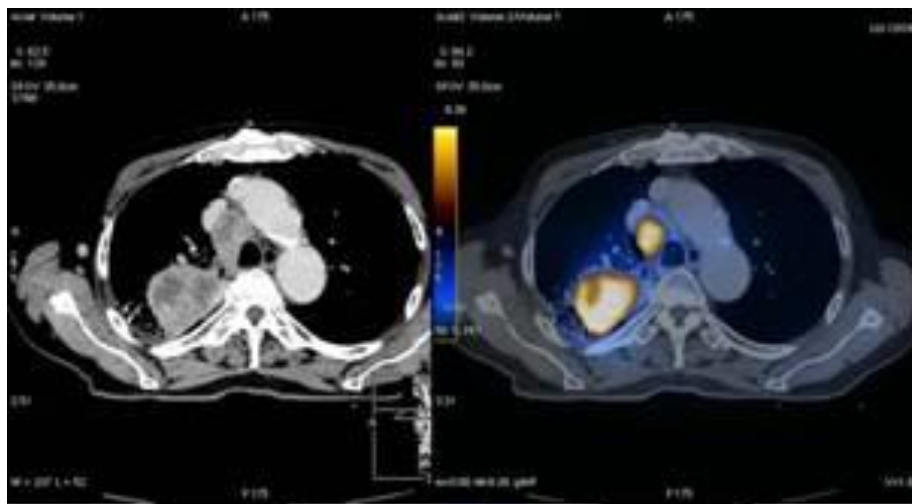


Bronchoscope

Trachea

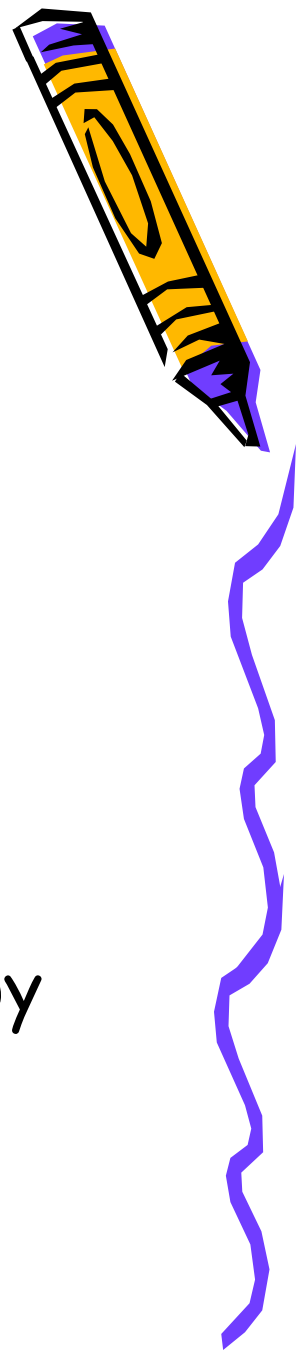
Unusual  
tissue  
sampled  
for biopsy





# 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

