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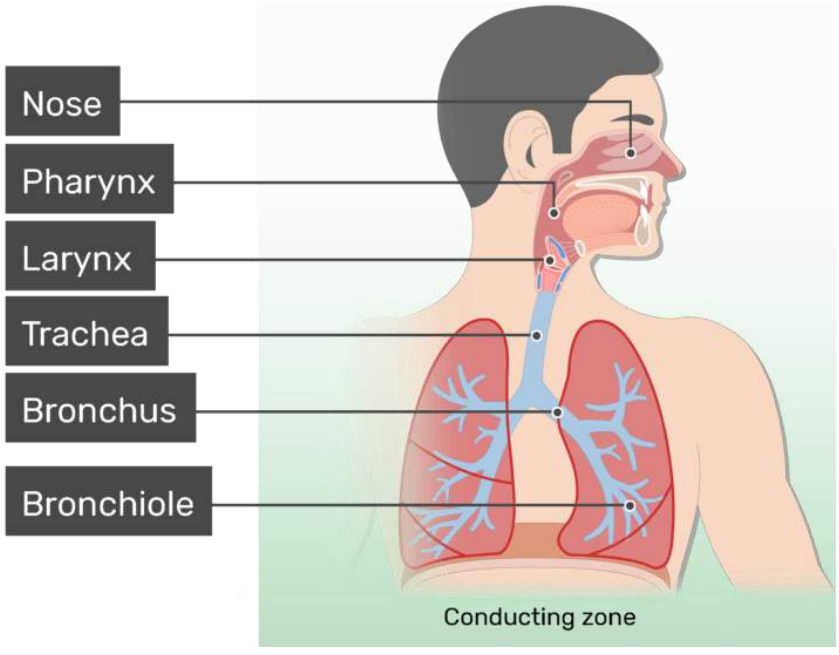
Respiratory disease is responsible for a major burden of morbidity and untimely death, with conditions such as tuberculosis, pandemic influenza and pneumonia the most important in world health terms. The increasing prevalence of allergy, asthma and chronic obstructive pulmonary disease (COPD) contributes to the overall burden of chronic disease in the community. By 2025, the number of cigarette smokers worldwide is anticipated to increase to 1.5 billion, ensuring a growing burden of tobacco-related respiratory conditions.



PRESENTING PROBLEMS IN RESPIRATORY DISEASE

Cough

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Cough is the most frequent symptom of respiratory disease and is caused by stimulation of sensory nerves in the mucosa of the pharynx, larynx, trachea and bronchi.

Origin	**Common causes**	**Clinical features**
Pharynx	Post-nasal drip	History of chronic rhinitis
Larynx	Laryngitis,	Voice or swallowing altered
Trachea	Tracheitis	Raw retrosternal pain
Bronchi	COP Asthma	Dry or productive, worse in Morning Usually dry, worse at night
Lung Parenchyma	Tuberculosis Pneumonia	Productive (often with haemoptysis) Dry initially, productive later
Drug side-effect od drug	ACE inhibitors	Dry cough

Breathlessness

Breathlessness or dyspnoea can be defined as the feeling of an uncomfortable need to breathe

Common causes	**Acute dyspnea**	**Chronic exertional** dyspnea
Cardiovascular	*Acute pulmonary oedema	Chronic heart failure
Respiratory	*Acute severe asthma *Pneumothorax *Pneumonia *Pulmonary embolus.	COPD chronic asthma
Others	Metabolic acidosis (e.g. diabetic	Severe anaemia, obesity

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	ketoacidosis) Psychogenic hyperventilation (anxiety or panic-related)	

Chest pain

Chest pain is a frequent manifestation of both cardiac and respiratory disease . Pleurisy a sharp chest pain aggravated by deep breathing or coughing, is a common feature of pulmonary infection Malignant involvement of the chest wall or ribs can cause gnawing, continuous local pain in the chest wall , Massive pulmonary embolus may cause ischaemic cardiac pain, as well as severe breathlessness.

Haemoptysis

Coughing up blood, irrespective of the amount, is an alarming symptom and patients nearly always seek medical advice. Care should be taken to establish that it is true haemoptysis and not haematemesis, or gum

or nose bleeding. Haemoptysis must always be assumed to have a serious cause until this is excluded:

Causes of haemoptysis

Bronchial disease

• Carcinoma*

• Foreign body

Parenchymal disease

• Tuberculosis*

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Lung vascular disease

• Pulmonary infarction*

Cardiovascular disease

• Acute left ventricular failure*

Blood disorders

• Haemophilia

• Anticoagulants

INVESTIGATION OF RESPIRATORY DISEASE

The 'plain' chest X-ray

This is performed on the majority of patients suspected of having chest disease. A postero-anterior (PA) film provides information on the lung fields, heart**.** Additional information may be obtained from a lateral film, particularly if pathology is suspected behind the heart shadow or deep in the diaphragmatic sulci.

Computed tomography

Computed tomography (CT) provides detailed images of the pulmonary parenchyma, mediastinum, pleura and bony structures . CT pulmonary angiography (CTPA) has become the investigation of choice in the diagnosis of pulmonary thromboembolism.

Ultrasound

Ultrasound is used to assess the pleural space for pleural fluid.

Laryngoscopy

The larynx may be inspected directly with a fibreoptic laryngoscope and this is useful in cases of suspected vocal cord dysfunction.

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Bronchoscopy

The trachea and the first 3–4 generations of bronchi may be inspected using a flexible bronchoscope.

Sputum Analysis

Gram stain is used to differentiate bacteria into two broad groups (gram-positive and gram-negative microorganisms) . When the physician suspects that the patient may have TB, acid-fast bacilli (AFB), stain testing must be performed. TB is a lung infection disease caused by *Mycobacterium tuberculosis* . sputum culture is a laboratory test that looks for germs that cause infection.

Histopathology

Histopathological examination of biopsies of pleura, lymph node or lung often allows a 'tissue diagnosis' to be made. This is particularly important in suspected malignancy

Measurement of airway obstruction (Spirometry)

More accurate measures are obtained by inhaling fully, then exhaling at maximum effort into a spirometer. The forced expired volume in 1 second (FEV1) is the volume exhaled in the first second, and the forced vital capacity (FVC) is the total volume exhaled. FEV1 is disproportionately reduced in airflow obstruction, resulting in FEV1/FVC ratios of less than 70%.

Arterial blood gases and oximetry

PaCO2 4.5–6.0 kPa	34–45 mmHg
PaO2 12–15 kPa	90–113 mmHg

Oxygen saturation > 94%

practical

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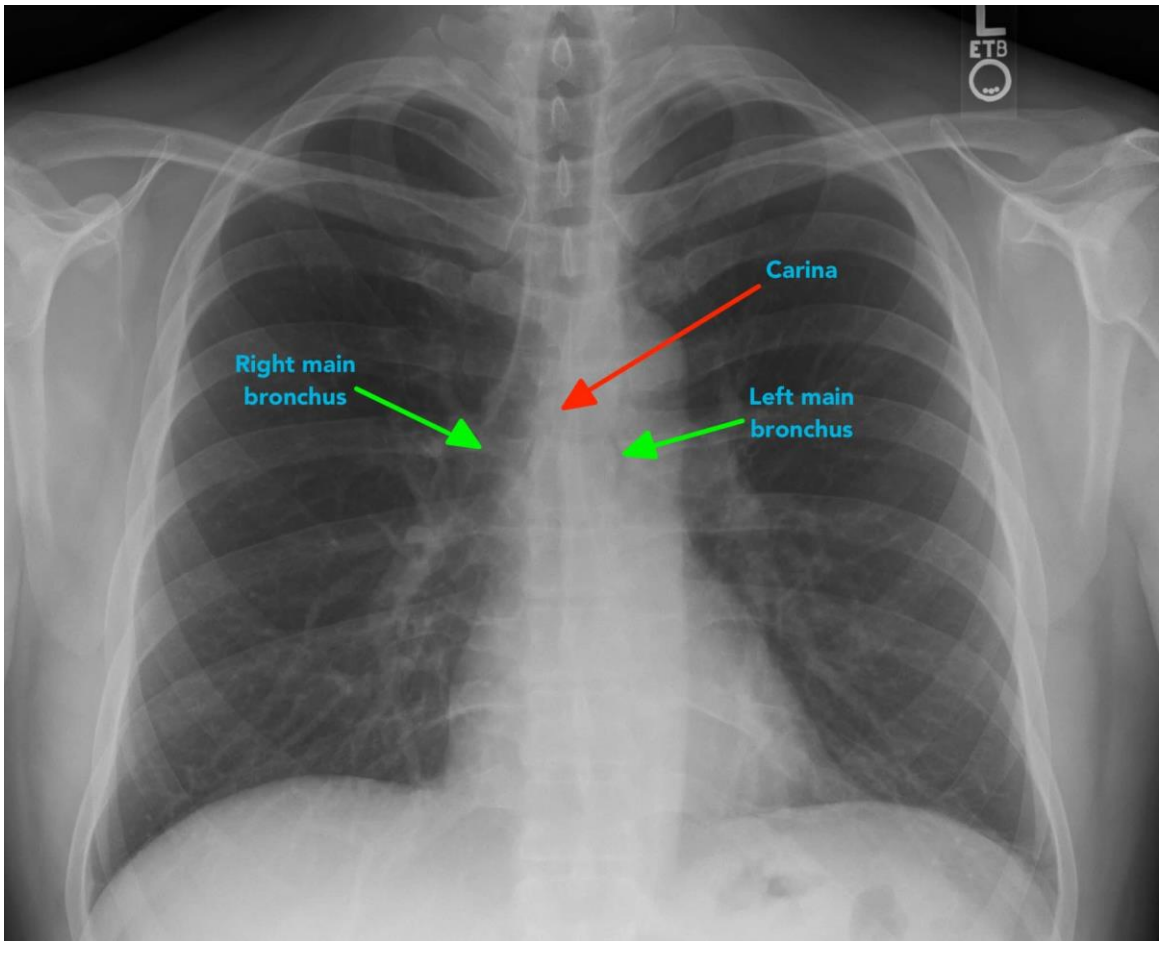

NORMAL CXR

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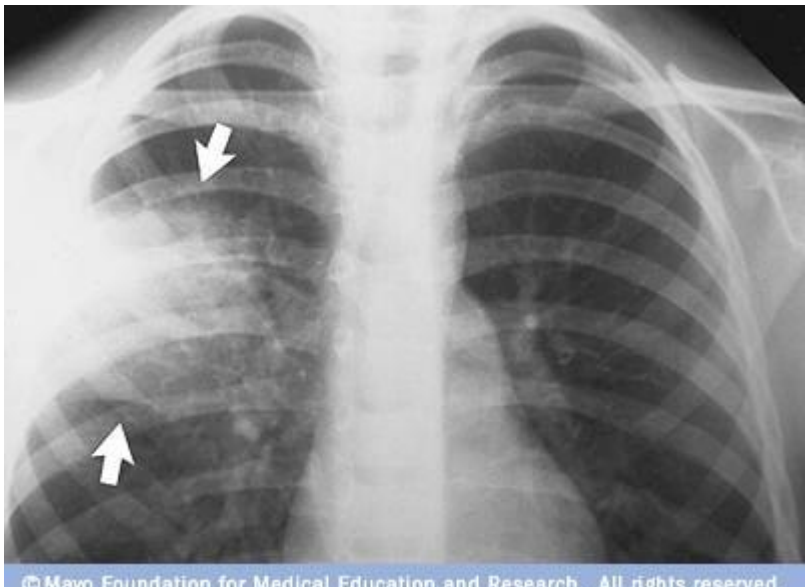

Pneumonia

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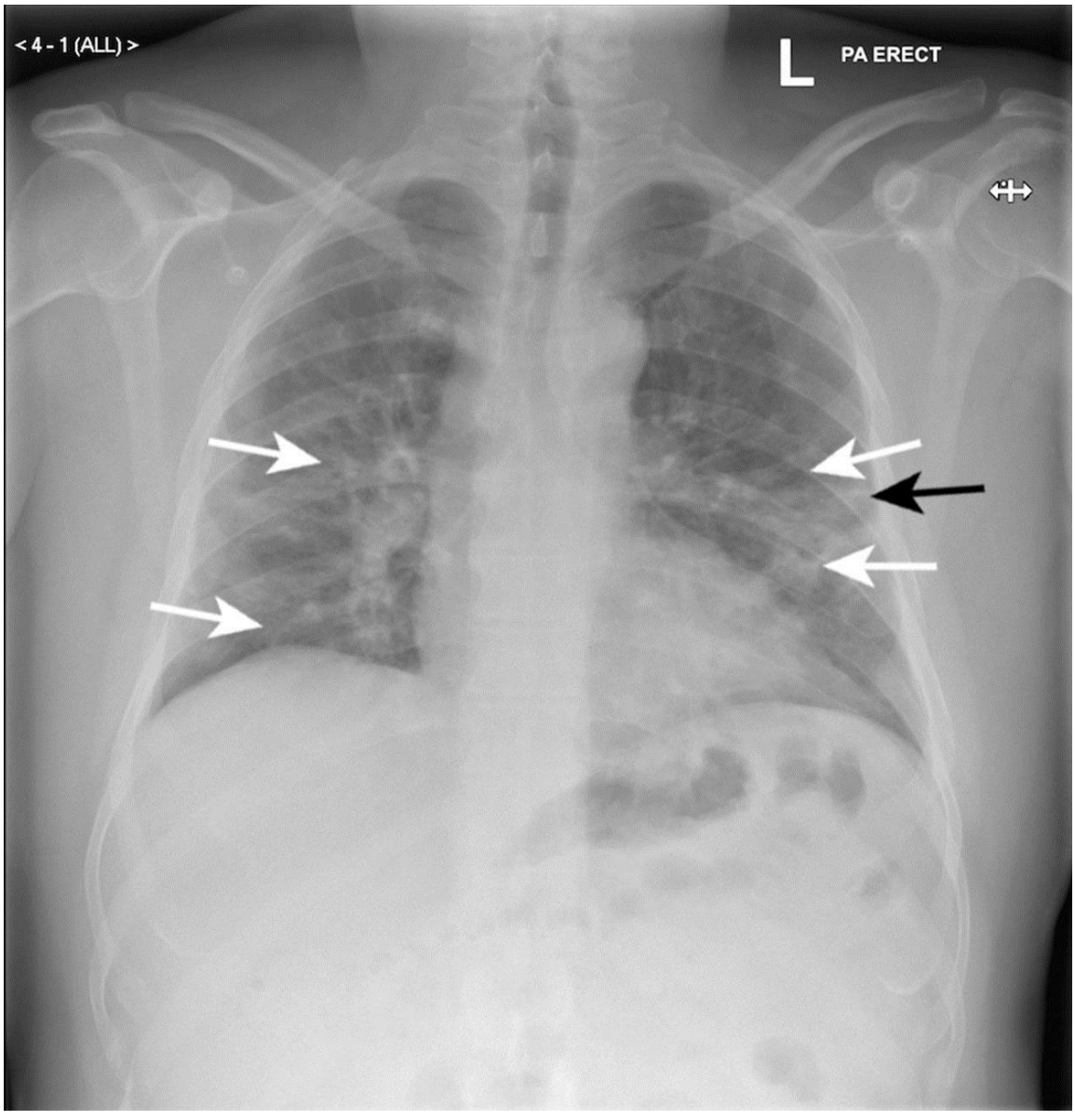

Covid -19

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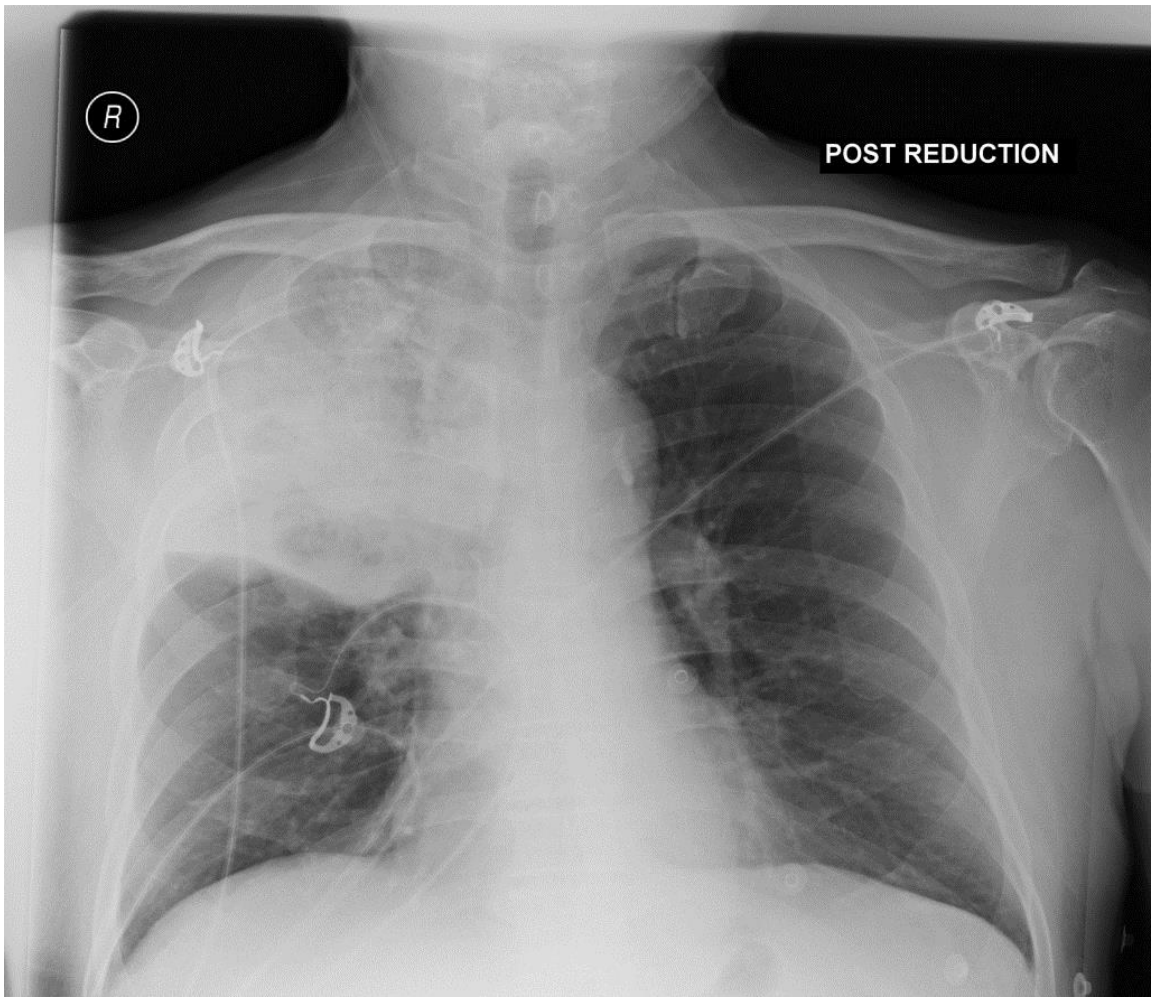

Lung squamous cell carcinoma

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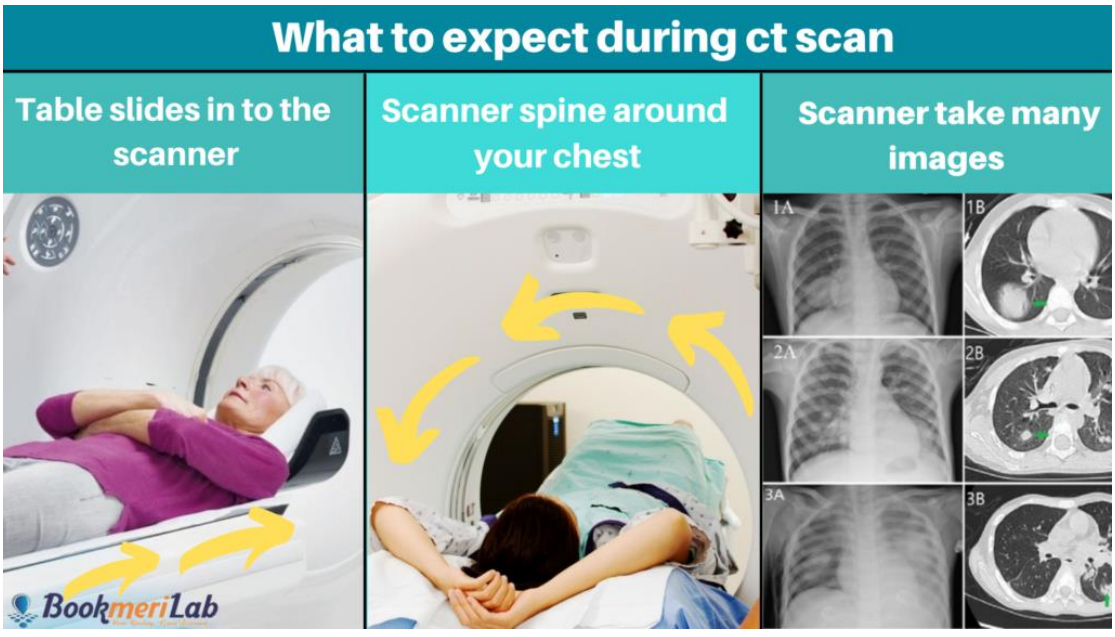

CT SCAN OF THE CHEST

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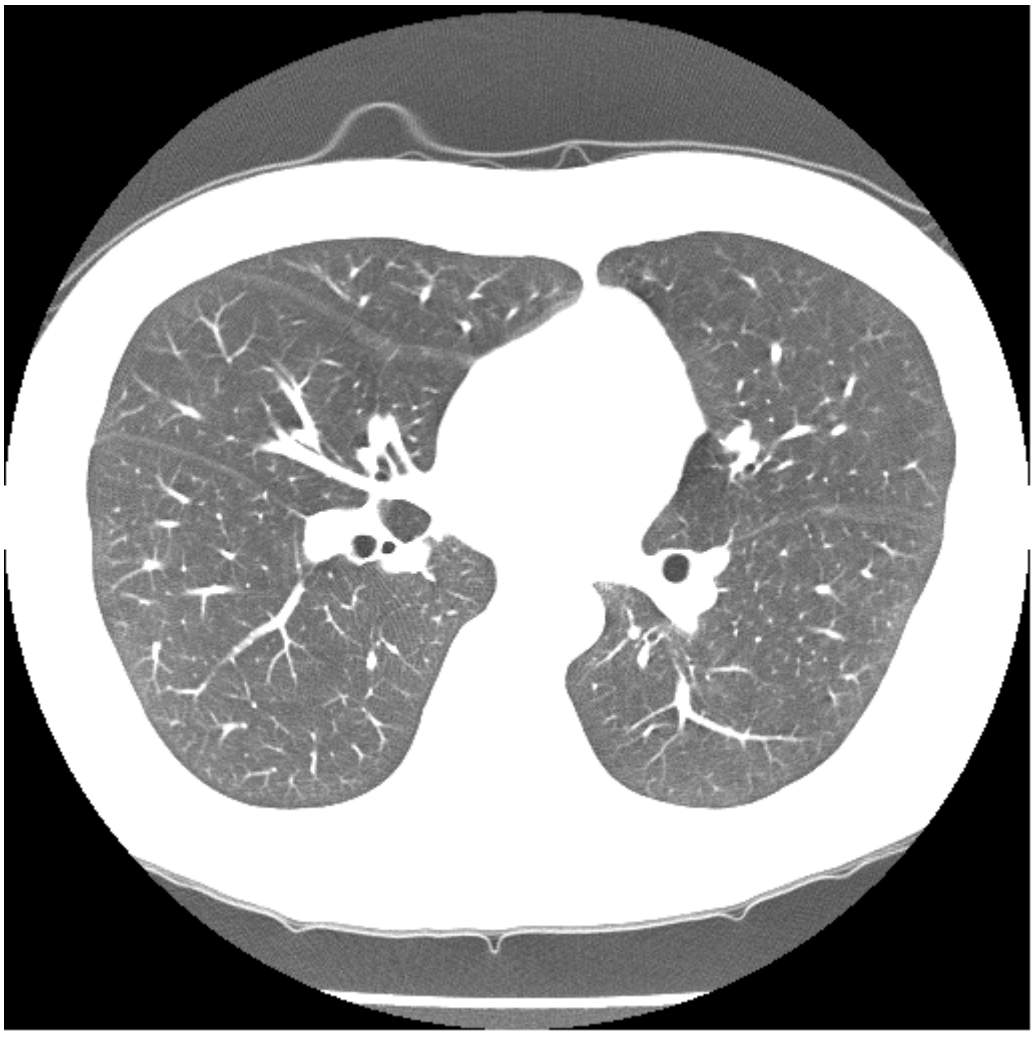

normal lung scan

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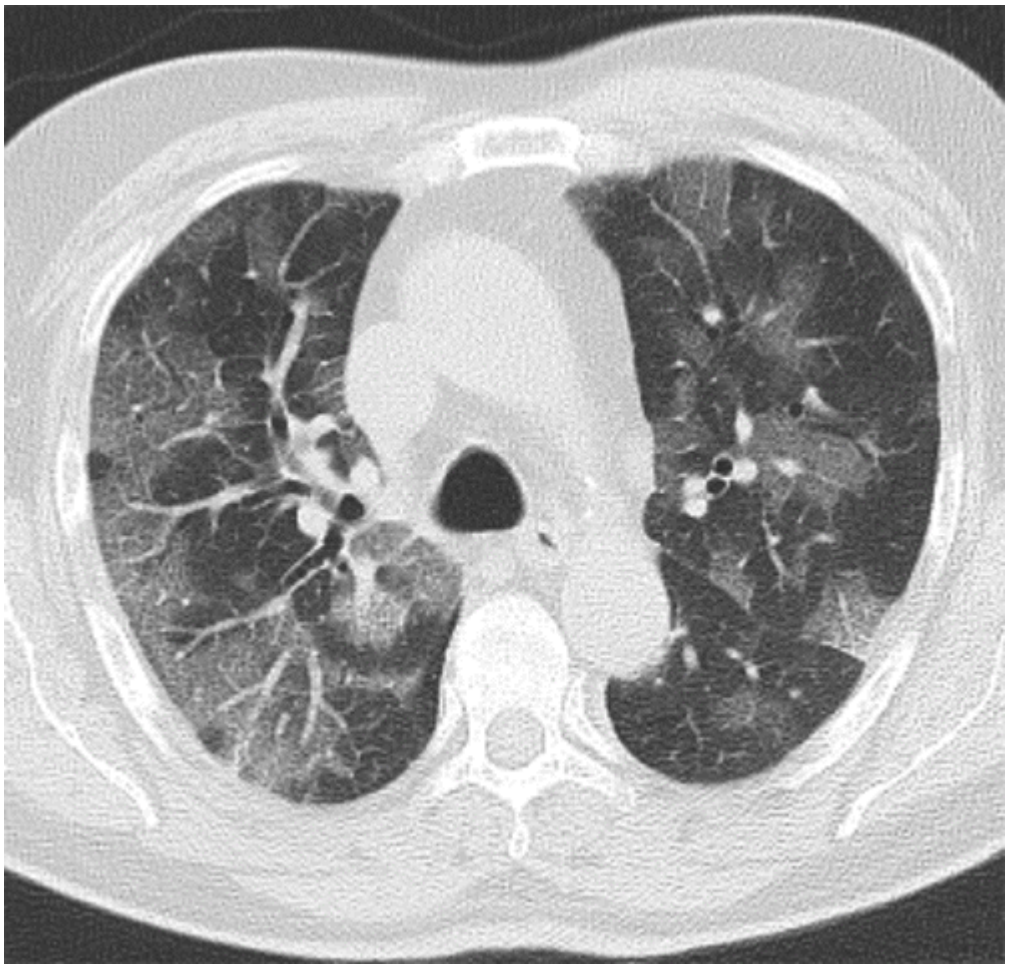
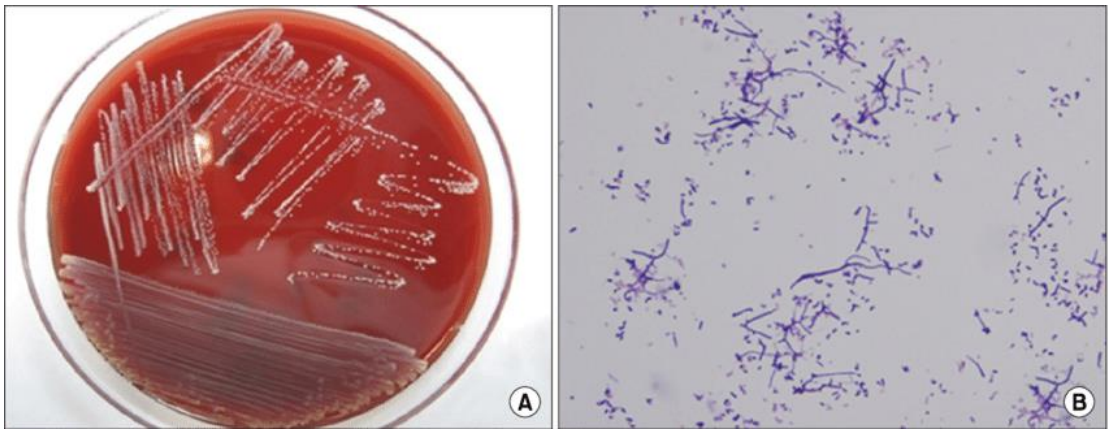


Chest CT in COVID-19



(A) Colonial morphology of gram positive bacilli on a blood agar plate. (B) Gram-positive branched rods are observed

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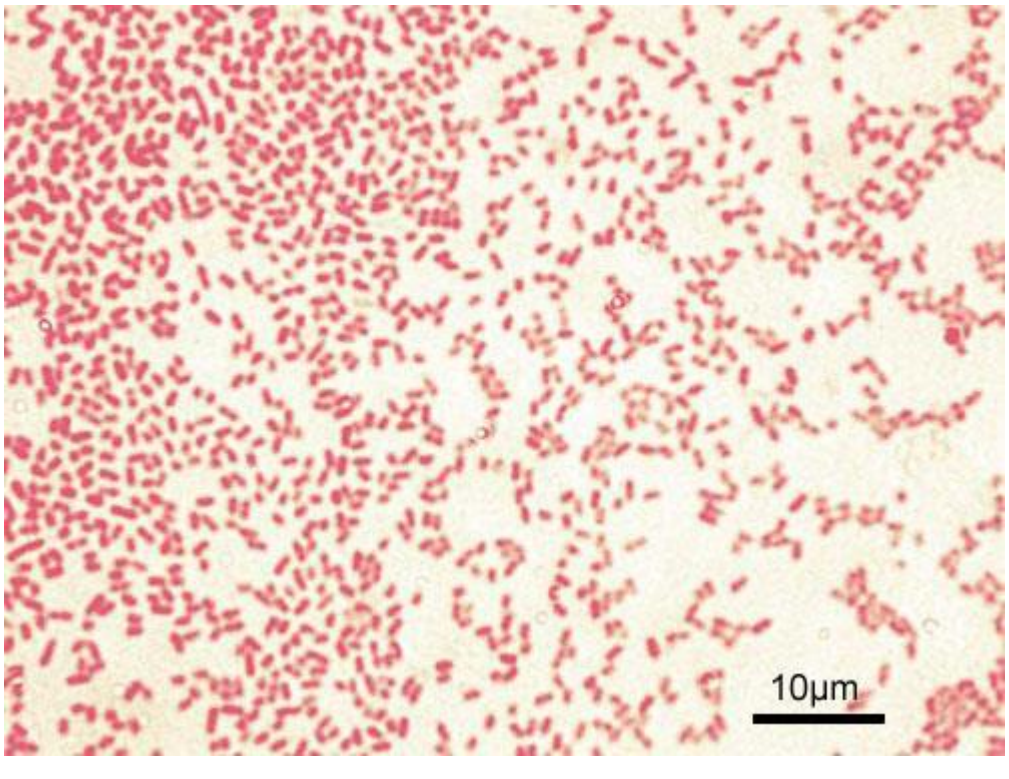

Gram-negative bacteria

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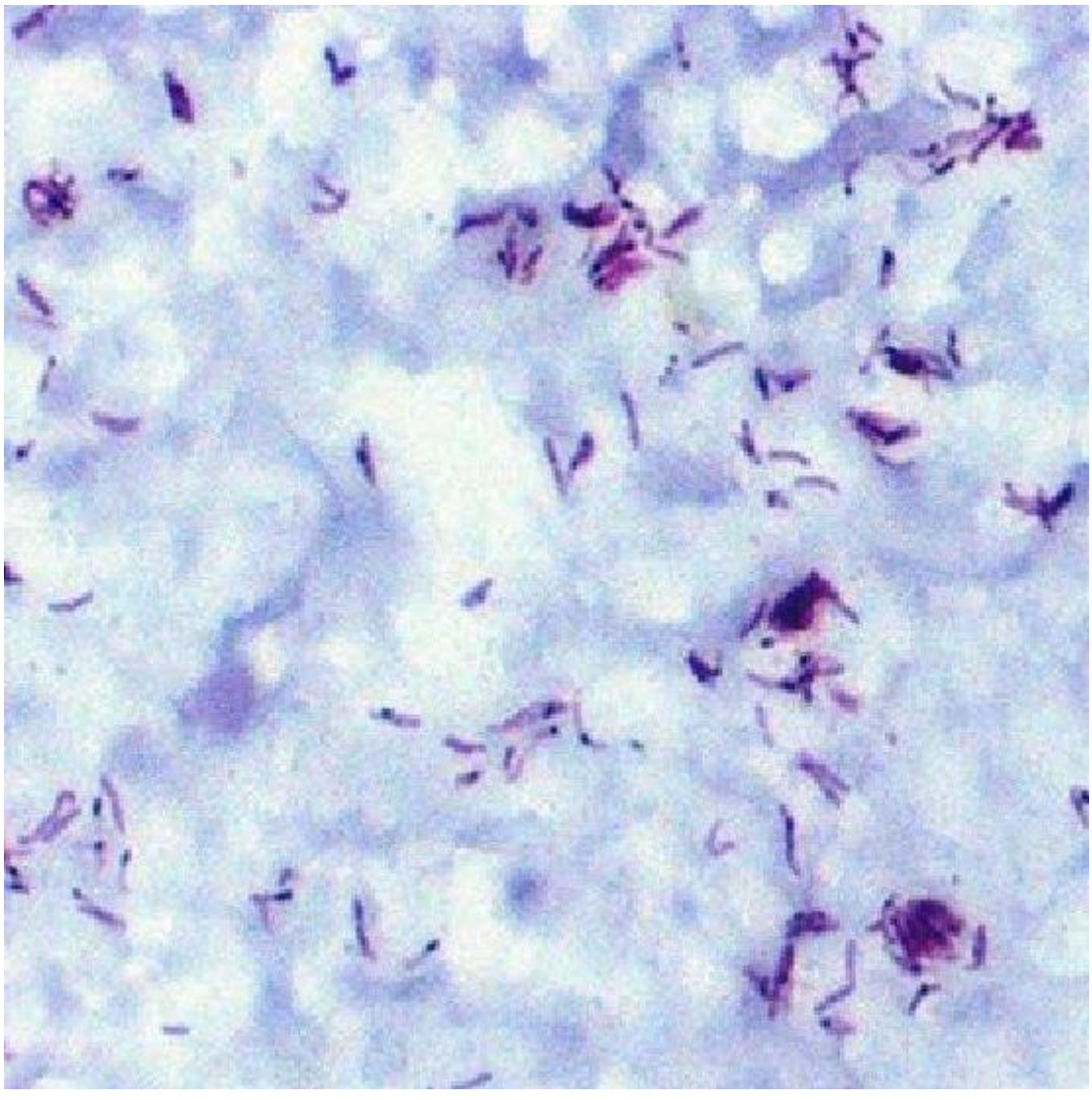

Ziehl-Neelsen staining revealed acid-fast bacilli

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respectively. The diffusing capacity, DLCO, is reduced demonstrating a decrease in the surface area for gas exchange.

	Baseline				Post Bronchodilator		
	Actual	Pred	%Pred	LLN	Actual	%Chng	%Pred
Spirometry							
FVC (L)	4.15	3.82	109	2.95	4.50	8	118
FEV1 (L)	1.32	2.74	48	2.00	1.38	4	50
FEV1/FVC(%)	32	72	44	62	31	-4	42
FEF Max (L/sec)	4.19	7.15	59	4.96	4.42	6	62
FEF 25-75% (L/sec)	0.44	1.94	23	0.42	0.56	27	29
Lung volumes							
TLC (Pleth)(L)	9.23	6.72	137	5.32			
SVC (L)	4.94	3.99	124				
ERV (L)	1.81	0.91	199				
IC (L)	2.99	3.08	97				
RV (Pleth) (L)	4.29	2.73	157	1.91			
RV/TLC (Pleth) (%)	46	44	106	33			
Raw ($cmH_2O/L/s$)	2.13	1.45	147	0.66			
Gaw ($L/s/cmH_2O$)	0.47	1.03	46				
Diffusion							
DLCOcor (ml/min/mmHg)	8.53	21.45	40	11.77			
DLCOunc (ml/min/mmHg)	8.69	21.45	41	13.46			
VA (L)	6.82	6.43	106	5.06			
DL/VA (ml/min/mmHg/L)	1.25	3.83	33	2.37			
IVC (L)	4.75						
Hgb (gm/dL)		12-18			15.3		

PFT OF ASTHMA

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