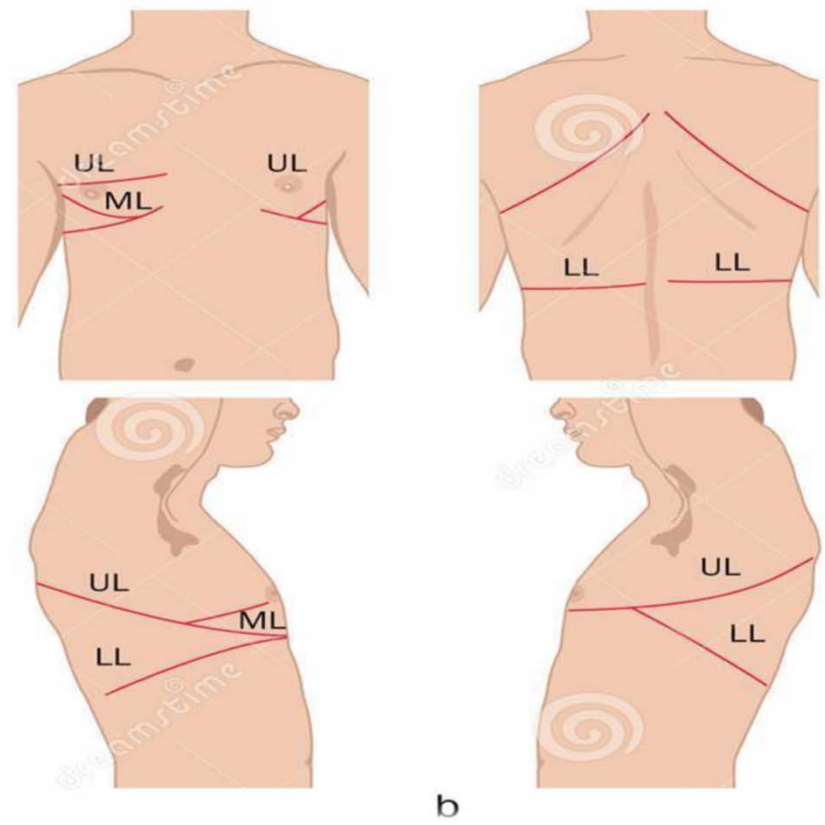
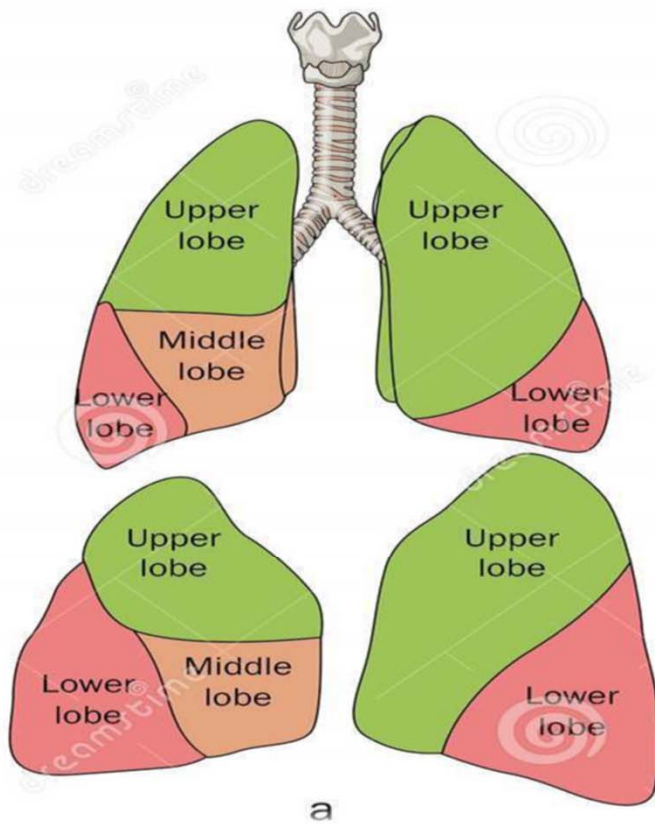


The respiratory system



Anatomy

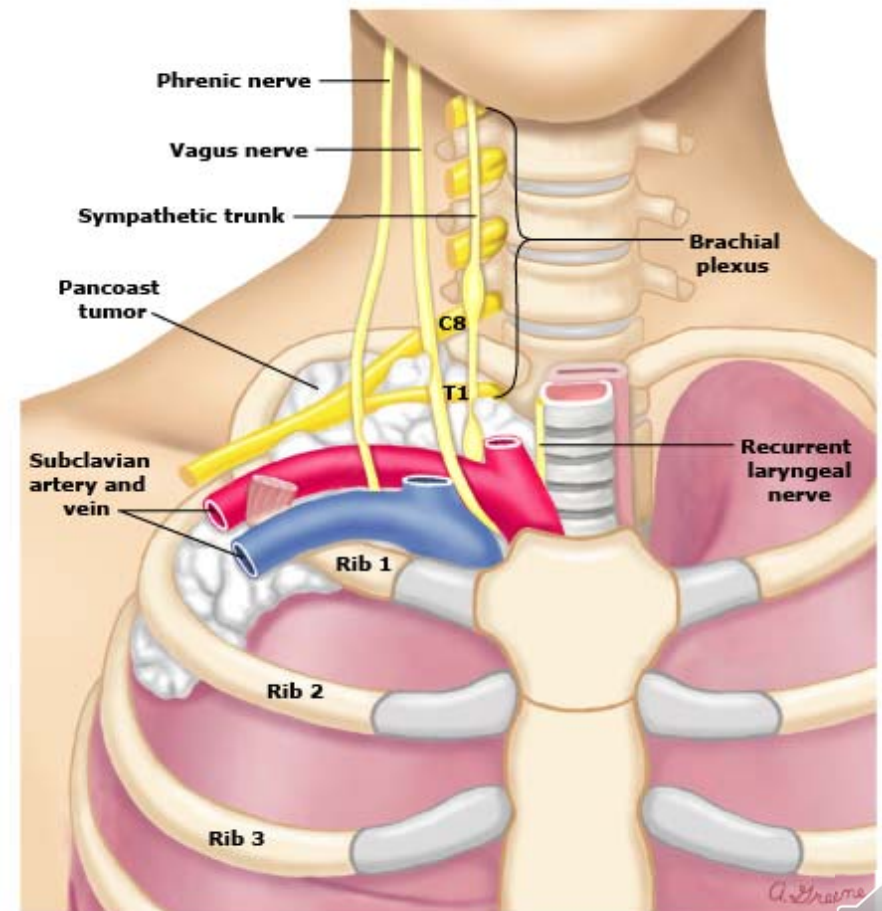


Apical lung tumors

- Disrupt T1 root fibers
- Compromise upper thoracic sympathetic outflow to the eye

Mid-lower mediastinal tumors

- Invade and compromise the pericardium, atria and esophagus



The history

Common presenting symptoms:

- Breathlessness
- Wheeze
- Cough
- Sputum/ haemoptysis
- Stridor
- Chest pain
- Fever/rigors/night sweats
- Weight loss
- sleepiness



Breathlessness

- ❖ Feeling of uncomfortable need to breath
- ❖ Most common reported respiratory symptom



Respiratory diseases can cause breathlessness by different mechanisms:

- ❖ Stimulation of intrapulmonary afferent nerves by interstitial inflammation or thromboembolism.
- ❖ Mechanical loading of respiratory muscles by airflow obstruction or reduced lung compliance in fibrosis.
- ❖ Hypoxia due to V/Q mismatch, stimulating chemoreceptors.



Causes of breathlessness

- Respiratory causes
- Cardiac causes
- Non-cardiorespiratory





7.5 Causes of breathlessness

Non-cardiorespiratory

- Anaemia
- Metabolic acidosis
- Obesity
- Psychogenic
- Neurogenic

Cardiac

- Left ventricular failure
- Mitral valve disease
- Cardiomyopathy
- Constrictive pericarditis
- Pericardial effusion

Respiratory

Airways

- Laryngeal tumour
- Foreign body
- Asthma
- COPD
- Bronchiectasis
- Lung cancer
- Bronchiolitis
- Cystic fibrosis

Parenchyma

- Pulmonary fibrosis
- Alveolitis
- Sarcoidosis
- Tuberculosis
- Pneumonia
- Diffuse infections, e.g. *Pneumocystis jiroveci* pneumonia
- Tumour (metastatic, lymphangitis)

Pulmonary circulation

- Pulmonary thromboembolism
- Pulmonary vasculitis
- Primary pulmonary hypertension

Pleural

- Pneumothorax
- Effusion
- Diffuse pleural fibrosis

Chest wall

- Kyphoscoliosis
- Ankylosing spondylitis

Neuromuscular

- Myasthenia gravis
- Neuropathies
- Muscular dystrophies
- Guillain–Barré syndrome





7.9 Acute breathlessness: commonly associated symptoms

No chest pain

- Pulmonary embolism
- Pneumothorax
- Metabolic acidosis
- Hypovolaemia/shock
- Acute left ventricular failure/pulmonary oedema

Pleuritic chest pain

- Pneumonia
- Pneumothorax
- Pulmonary embolism
- Rib fracture

Central chest pain

- Myocardial infarction with left ventricular failure
- Massive pulmonary embolism/infarction

Wheeze and cough

- Asthma
- COPD



Medical research council (MRC) breathlessness scale

Grade	Degree of breathlessness related to activities
1	Not troubled by breathlessness except on strenuous exercise
2	Shortness of breath when hurrying on the level or walking up a slight hill
3	Walks slower than most people on the level, stops after a mile or so, or stops after 15 minutes walking at own pace
4	Stops for breath after walking about 100 yds or after a few minutes on level ground
5	Too breathless to leave the house, or breathless when undressing



Specific questions to distinguish the causes of breathlessness;

How did the breathlessness come on?

How is your breathing at rest and overnight?

Is your breathing normal some days?

When does the breathlessness come on?

Tell me something you do that would make you breathless?





7.6 Breathlessness: modes of onset, duration and progression

Minutes

- Pulmonary thromboembolism
- Pneumothorax
- Asthma
- Inhaled foreign body
- Acute left ventricular failure

Hours to days

- Pneumonia
- Asthma
- Exacerbation of COPD

Weeks to months

- Anaemia
- Pleural effusion
- Respiratory neuromuscular disorders

Months to years

- COPD
- Pulmonary fibrosis
- Pulmonary tuberculosis



Wheeze

- ❖ High-pitched musical sounds produced by turbulent air flow through narrowed small airways .
- ❖ It is most commonly heard during expiration , when airway caliber is reduced.
- ❖ It is commonly associated with asthma, exacerbation of COPD, acute respiratory tract infection or with exacerbations of bronchiectasis.



Specific questions to distinguish the causes of wheezes;

Is the wheeze worse during or after exercise ?

Do you wake with wheeze during the night?

Is it worse on waking in the morning and relieved by clearing sputum?

History of smoking?

History of allergies?

Are there daily volumes of yellow or green sputum, sometimes with blood?



Cough

- ❖ The cough reflex has evolved to dislodge foreign material and secretions from the central airways, and may be triggered by pathology at any level of the bronchial tree.
- ❖ Inspiration that is followed by an expiratory effort against a closed glottis. Then sudden opening of the glottis with rapid expiratory flow produces the characteristic sound.
- ❖ Bovine cough is an important symptom warning of possible hilar malignancy.



Specific questions to distinguish the causes of cough;

Duration of the cough?

Whether it is present every day?

Is it associated with sputum production?

Is there any triggers?



Specific questions to distinguish the causes of cough;

If it is intrusive/irresistible or whether the patient coughs to clear a perceived obstruction.

Associated symptoms (wheeze, heartburn, altered voice or swallowing).

History of smoking?

Drug history?



	Normal chest X-ray	Abnormal chest X-ray
Acute cough (<3 weeks)	<ul style="list-style-type: none"> Viral respiratory tract infection Bacterial infection (acute bronchitis) Inhaled foreign body Inhalation of irritant dusts/fumes 	<ul style="list-style-type: none"> Pneumonia Inhaled foreign body Acute hypersensitivity pneumonitis
Chronic cough (>8 weeks)	<ul style="list-style-type: none"> Gastro-oesophageal reflux disease Asthma Postviral bronchial hyperreactivity Rhinitis/sinusitis Cigarette smoking Drugs, especially angiotensin-converting enzyme inhibitors Irritant dusts/fumes 	<ul style="list-style-type: none"> Lung tumour Tuberculosis Interstitial lung disease Bronchiectasis



Sputum

- ❖ In health, the airway lining fluid coating the transbronchial tree ascends the mucociliary escalator to the larynx, where it mixes with URT secretions and saliva and then swallowed.
- ❖ In acute or chronic infection, accumulation of neutrophils, mucus and proteinaceous secretions in the airways result in cough with sputum production.



Specific questions to distinguish the causes of sputum production;

What is the consistency of sputum?

Amount of sputum?

What is the color of sputum?

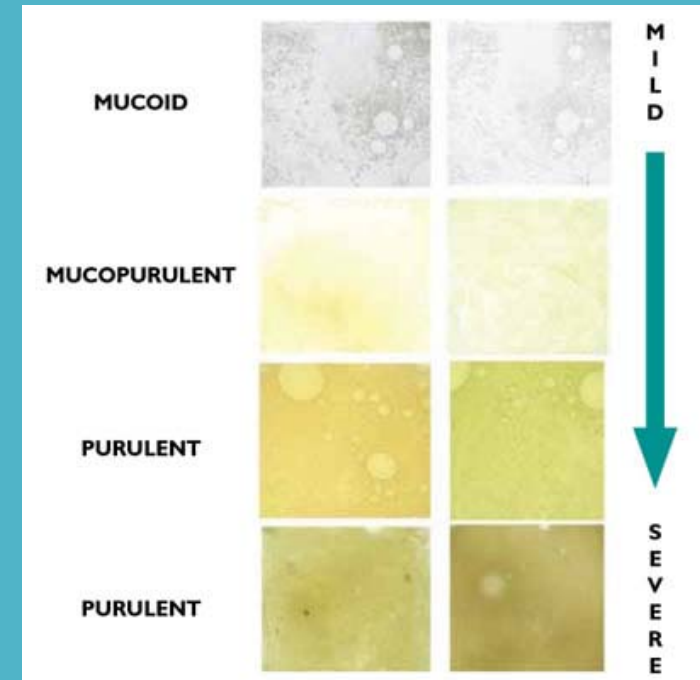


Types of sputum



7.3 Types of sputum

Type	Appearance	Cause
Serous	Clear, watery Frothy, pink	Acute pulmonary oedema Alveolar cell cancer
Mucoid	Clear, grey	Chronic bronchitis/chronic obstructive pulmonary disease
	White, viscid	Asthma
Purulent	Yellow	Acute bronchopulmonary infection Asthma (eosinophils)
	Green	Longer-standing infection Pneumonia Bronchiectasis Cystic fibrosis Lung abscess
Rusty	Rusty red	Pneumococcal pneumonia



Hemoptysis

- ❖ Was the blood definitely coughed up from the chest ?
- ❖ Amount of blood?
- ❖ is it pure blood or mixed with sputum?
- ❖ Duration and frequency?



Massive Haemoptysis:

more than 20ml/one time, OR
more than 200ml/24hrs



Larger volumes of hemoptysis suggest:

Lung cancer
eroding a
pulmonary
vessel

Bronchiectasis

Cavitatory
disease

Pulmonary
vasculitis

Pulmonary
arteriovenous
malformation





7.4 Causes of haemoptysis

Tumour

Malignant

- Lung cancer
- Endobronchial metastases

Benign

- Bronchial carcinoid

Infection

- Bronchiectasis
- Tuberculosis
- Lung abscess

- Mycetoma
- Cystic fibrosis

Vascular

- Pulmonary infarction
- Vasculitis
- Polyangiitis
- Trauma
- Inhaled foreign body
- Chest trauma
- Cardiac
- Mitral valve disease
- Haematological
- Blood dyscrasias

- Arteriovenous malformation
- Goodpasture's syndrome
- Iatrogenic
- Bronchoscopic biopsy
- Transthoracic lung biopsy
- Bronchoscopic diathermy
- Acute left ventricular failure
- Anticoagulation



Stridor

Harsh high-pitched respiratory sound caused by vibration of the walls of the trachea or major bronchi when the lumen is critically narrowed by compression, tumour, or inhaled foreign body.

Timing with respiration:

1. Inspiratory stridor (extrathoracic trachea narrowing)
2. Expiratory stridor (intrathoracic large airway narrowing)
3. Inspiratory and expiratory stridor (biphasic) (narrowing at thoracic inlet)



Chest pain

➤ Chest pain can originate from the musculoskeletal, respiratory, cardiovascular and gastro-oesophageal disease.

- Pleural pain:

Sharp, stabbing and intensified by inspiration or coughing.

Site and radiation varies

Common causes of pleuritic chest pain are pulmonary embolism, pneumonia, pneumothorax and fractured ribs.



Chest pain

- Chest wall pain:

Sudden and localised after coughing or direct trauma is characteristic of rib fractures or intercostal muscle injury.

Prevesicular herpes zoster and intercostal nerve root compression can cause chest pain in a thoracic dermatomal distribution.

Chest wall pain due to direct invasion by lung cancer, mesothelioma or rib metastasis is typically dull, unrelated to respiration, progressively worsens and disrupts sleep.



Chest pain

- Massive pulmonary thromboembolism acutely increasing right ventricular pressure may produce central chest pain similar to myocardial ischaemia.
- Burning retrosternal pain may indicate oesophagitis but also occurs with myocardial ischemia. Alteration of discomfort after eating or antacids helps to distinguish oesophageal pain.



Non-central

Pleural

- Infection: pneumonia, bronchiectasis, tuberculosis
- Malignancy: lung cancer, mesothelioma, metastatic
- Pneumothorax
- Pulmonary infarction
- Connective tissue disease: rheumatoid arthritis, SLE

Chest wall

- Malignancy: lung cancer, mesothelioma, bony metastases
- Persistent cough/ breathlessness
- Muscle sprains/tears
- Bornholm's disease (Coxsackie B infection)
- Tietze's syndrome (costochondritis)
- Rib fracture
- Intercostal nerve compression
- Thoracic shingles (herpes zoster)

Central

Tracheal

- Infection
- Irritant dusts

Cardiac

- Massive pulmonary thromboembolism
- Acute myocardial infarction/ ischaemia

Oesophageal

- Oesophagitis
- Rupture

Great vessels

- Aortic dissection

Mediastinal

- Lung cancer
- Thymoma
- Lymphadenopathy
- Metastases
- Mediastinitis



Fevers/rigors/chills/night sweats

- ❖ Infection is the usual cause but other etiologies should be considered.
- ❖ Rigors are generalized ,uncontrollable episodes of body shaking lasting a few minutes.
- ❖ Night sweats are closely associated with chronic infection and malignancy rather than acute infection.



Weight loss

A common feature of several important respiratory diseases:

- Lung cancer
- Chronic infective diseases
- Diseases causing chronic breathlessness



Sleepiness

Normal sleeping habit?

Shift or night work?

Does the patient wake refreshed or exhausted?

Have they struggled to stay awake in the day?

Seek description of any night-time breathing disturbance from a bed partner.



Past medical history

Eczema, hay fever
Childhood asthma
Pneumonia, pleurisy
Whooping cough, measles, inhaled foreign body
Tuberculosis
Connective tissue disorders
Cancer, recent travel, surgery or immobility
Recent surgery, loss of consciousness
Previous malignancy
Neuromuscular disorders



Family history and social history

❖ Family history of respiratory disease

❖ Social history

- Home circumstances /effect of and on disease
- Smoking
- Occupational history



Occupational History:



Heavy industry

Asbestos

Asbestosis,
mesothelioma,
lung cancer

Silica dust

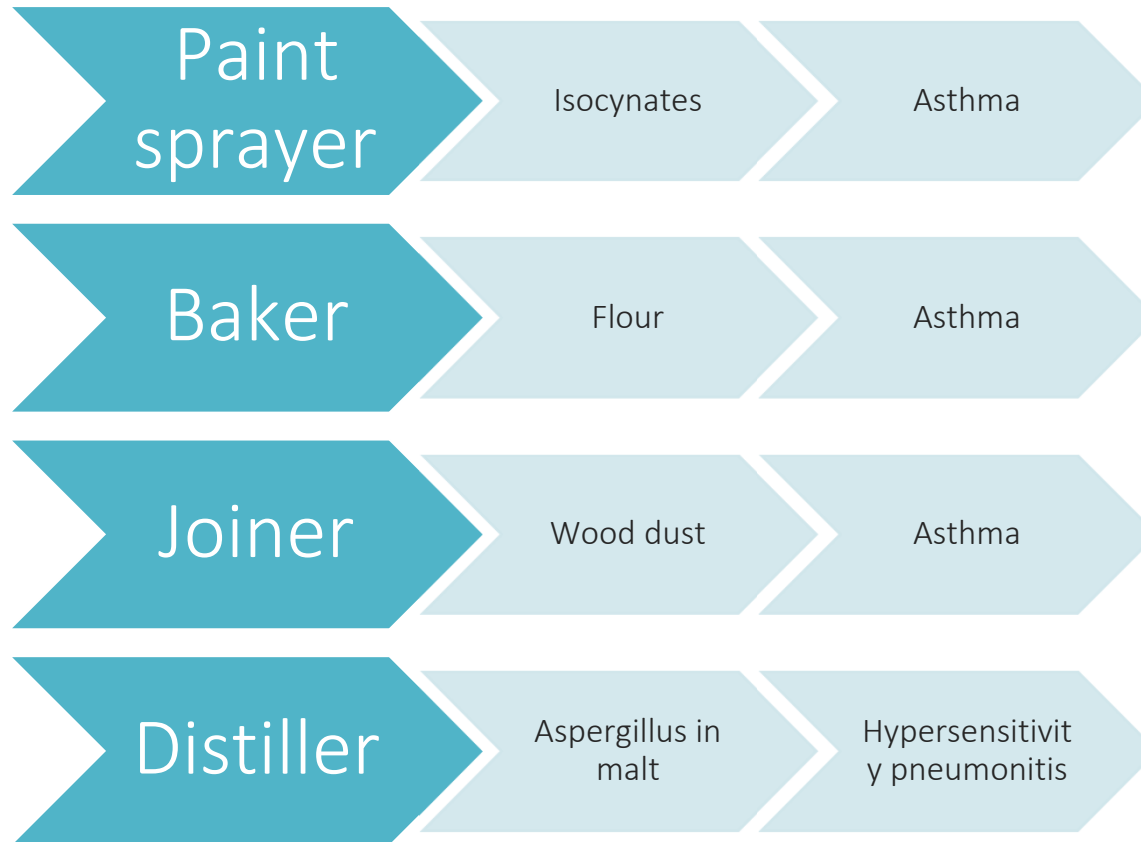
Silicosis, massive
fibrosis

Coal dust

Pneumoconiosis,
massive fibrosis



Factory



Farm

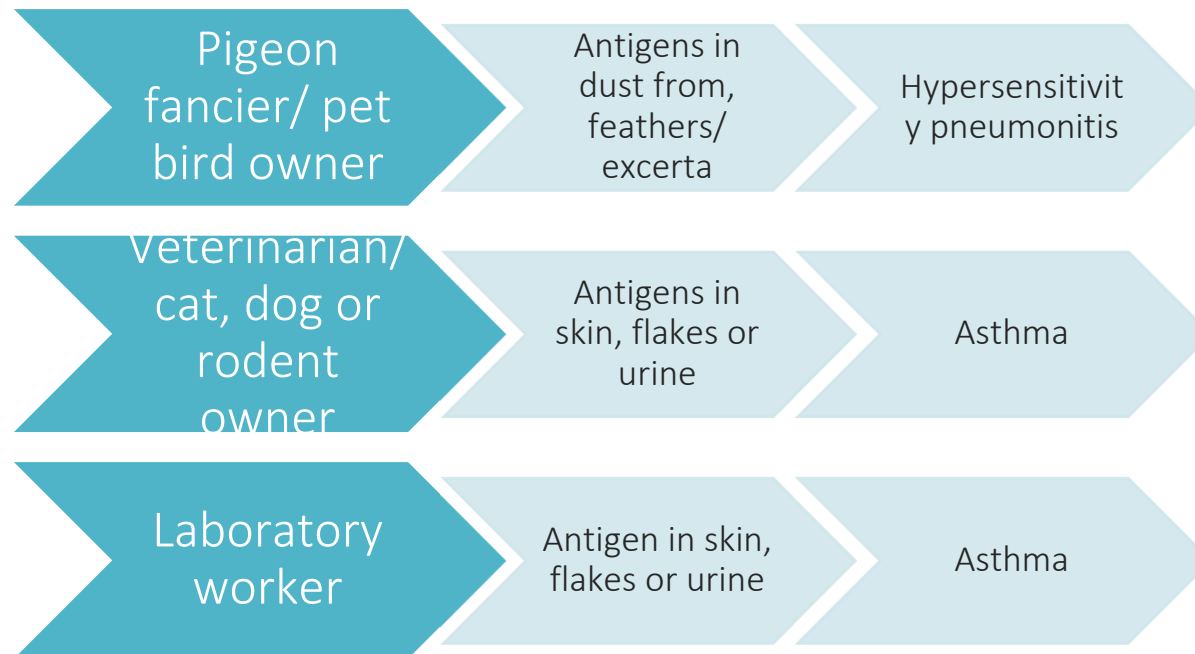
Farm labourer

Fungal spores in mouldy hay

Hypersensitivity
pneumonitis



Animal contact



Thank you

