STEP CHANGE IN SAFETY

Occupational Lung Diseases

Dr Stuart Scott

Chief Medical Officer

TAC Healthcare

TAC Healthcare

Occupational Lung Diseases

Dr Stuart Scott
Chief Medical Officer
TAC Healthcare

Making Healthcare *Better*

The Lungs

- The lungs are sacks of tissue located just below the rib cage and above the diaphragm. There are 2 lungs which site on either side of your heart. They are made up of areas called lobes. Your right lung has three lobes, and your left lung has two. Your left lung is smaller than your right because it shares that side of the chest with your heart.
- As a person breathes, air travels down the throat and into the trachea (windpipe). The trachea divides into smaller and smaller airways. The lungs absorb oxygen from the air you breathe in and transfer it into your bloodstream so that it can get to every part of your body. As the cells in your body work, they produce a waste gas called carbon dioxide that is released into the bloodstream. Your lungs get rid of this waste gas when you breathe out.
- Air doesn't only carry oxygen, it also carries germs and other foreign bodies. As a result, your lungs are also designed to prevent unwanted materials from getting into your body.

TAC Healthcare

Lung Disease

The lungs can have a wide range of problems that can stem from genetics, bad habits, an unhealthy diet and viruses.

Conditions include:

- Chronic Obstructive Pulmonary Disease
- Asthma
- Lung Cancer
- Mesothelioma
- Tuberculosis
- And others

TAC Healthcare

Lung Disease

Statistics

In the UK

100K

are diagnosed with a lung condition each week

334M

people worldwide are diagnosed with asthma

&

200M

people worldwide are diagnosed with COPD

Worldwide, there are around

1.6M

deaths cause by lung cancer

In the UK, every

5 min

somebody dies from lung disease

There are around

48,500

new lung cancer cases in the UK

Estimated

12K

lung diseases deaths each year are to be linked to past exposures at work

TAC Healthcare

Work-Related Lung Disease

Making Healthcare *Better*

Breathing in dust, fumes, gases and vapours in the workplace could cause serious lung damage and diseases such as work-related asthma, work-related lung cancer, silicosis, asbestos-related work disease amongst others.

The HSE advise occupational lung disease develop over a long period of time following exposure to the agent. It is believed that there are 12,000 lung disease deaths each year linked to past exposure at work and 18,000 annual new cases of self-reported lung problems caused or made worse by work.

TAC Healthcare

Occupational Asthma & Rhinitis

- In the UK, 8 million people have been diagnosed as having asthma – about 5.5 million people are on treatment.
- Around 9-15% of asthma in adults of working age is occupational.
- Caused by immunological sensitisation to agents in the workplace. Once sensitised, symptoms can occur after very low-level re-exposure and by non-specific irritation (cold air or cigarette smoke).
- Causal exposures
  - High molecular weight proteins (e.g. animal and plant proteins)
  - Low molecular weight substances that act as haptens (e.g. isocyanates, acid anhydrides)
- Susceptibility – smoking and atopy (30% of population atopic)
- Prognosis – remove from exposure and symptoms often resolve – but can restrict employment choices.

TAC Healthcare

Causal Exposures & Industries

Exposure

- Isocyanates
- Flour, grain dust
- Acid anhydrides
- Rosin flux
- Proteolytic enzymes
- Metal working fumes
- Wood dust
- Persulphate salts or henna

Industry/ Uses

- Painting/Flooring/Glues
- Bakeries, agriculture
- Epoxy resins/varnishes
- Electronics/soldering
- Biological washing powder
- Manufacturing
- Construction, forestry
- Hairdressing

TAC Healthcare

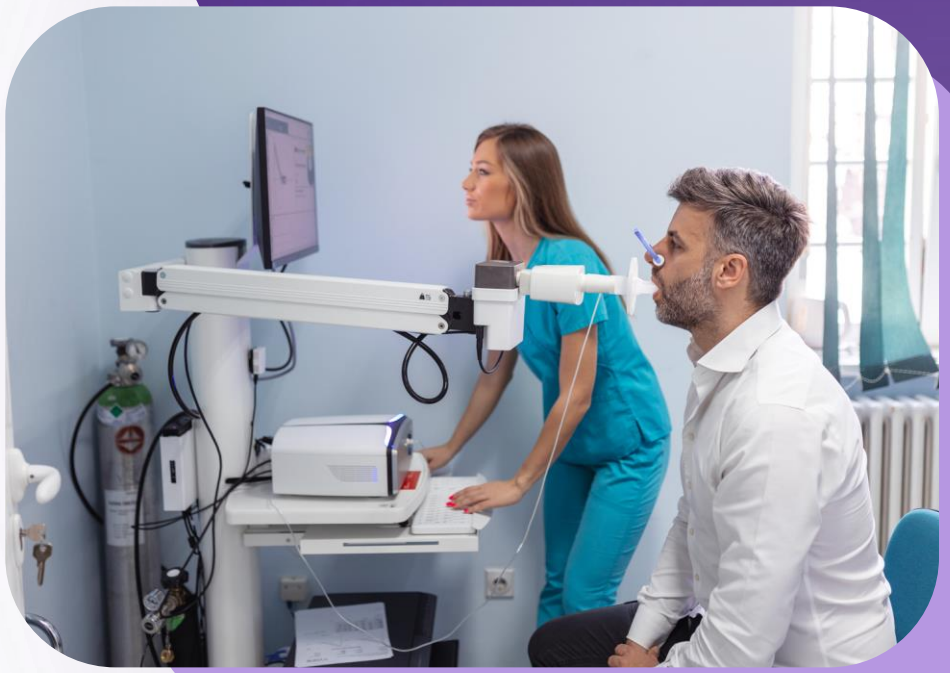
Chronic Obstructive Pulmonary Disease (COPD)

- Chronic obstructive pulmonary disease (COPD) is the name for a group of lung conditions that cause breathing difficulties. It includes:
  - Emphysema – damage to the air sacs in the lungs
  - Chronic bronchitis – long-term inflammation of the airways
- COPD is a long-term lung disease that prevents a person from breathing properly due to excess mucus or the degeneration of the lungs.
- COPD usually develops because of long-term damage to your lungs from breathing in a harmful substance, usually cigarette smoke. Jobs where people are exposed to dust, fumes and chemicals can also contribute to developing COPD.
- Symptoms include:
  - Getting short of breath easily when you do everyday things such as
  - Going for a walk or doing housework
  - Having a cough that lasts a long time
  - Wheezing in cold weather
  - Producing more sputum or phlegm than usual
  - You might get these symptoms all the time, or they might appear or get worse when you have an infection or breathe in smoke or fumes.

TAC Healthcare

Unlike asthma, with COPD the airways are permanently narrowed.

- Diagnosis will be confirmed with tests such as spirometry, where lung function is measured by blowing hard into a machine - spirometer.
- The spirometer takes 2 measurements: the volume of air you can breathe out in a second, and the total amount of air you breathe out. You may be asked to breathe out a few times to get a consistent reading.
- The readings are compared with normal results for your age, which can show if your airways are obstructed.



TAC Healthcare

Causal Exposures/ Industries

- **Mineral dusts**

  Coal mining/oil mists/cement/silica/manmade vitreous fibres.

- **Organic dusts**

  Flour mill/baking/cotton textile/wood/paper milling.

- **Chemicals**

  Cadmium/welding fumes/vanadium/polycyclic aromatic hydrocarbons/isocyanates.

TAC Healthcare

Lung Cancer

- Lung cancer is the third most common cancer in the UK. About 48,500 people are diagnosed with it each year.
- It's rare in people younger than 40. More than 45 out of 100 people diagnosed with lung cancer in the UK are aged 75 and older.
- Smoking tobacco is the cause of most lung cancers and the biggest risk factor (90% of lung cancers). This includes smoking cigarettes, cigars and pipes. People who do not smoke can still develop lung cancer, but their risk is much lower.

TAC Healthcare

There are two main forms of primary lung cancer. These are classified by the type of cells in which the cancer starts growing. They are:

- Non-small-cell lung cancer – the most common form, accounting for more than 87% of cases. It can be one of
- three types: squamous cell carcinoma, adenocarcinoma or large-cell carcinoma.
  Small-cell lung cancer – a less common form that usually spreads faster than non-small-cell lung cancer.

There are usually no signs or symptoms in the early stages of lung cancer, but many people with the condition eventually develop symptoms including:

- A persistent cough
- Coughing up blood
- Persistent breathlessness
- Unexplained tiredness and weight loss
- An ache or pain when breathing or coughing
- Unresolving pneumonia

TAC Healthcare

Causal Exposures/ Industries

The interaction between smoking and both asbestos and nickel are multiplicative (1+1=5).

- Crystalline silica
  Mining/quarrying/stone masonry/shot-blasting and grinding
- Asbestos fibres
  Shipbuilding & fitting/mining/asbestos textiles/construction/engineering
- Nickel
  Nickel refining
- Radon daughters
  Tin mining
- Arsenic
- Polycyclic aromatic hydrocarbons
  Aluminum smelting
- Chromates
- Passive smoking

TAC Healthcare

Asbestos-related Diseases

- Asbestosis
- Pleural disorders
  - Mesothelioma
  - Diffuse pleural thickening
  - Benign pleural effusion
  - Pleural plaques
- Lung Cancer
- Laryngeal cancer

Making Healthcare *Better*

TAC Healthcare

Asbestosis

- Chronic pulmonary interstitial fibrosis.
- Long latency 25-40 yrs/clear dose-response.
- Gradual progression of breathlessness and cough.
- Smoking causes increased severity and rate of deterioration.
- No specific intervention can halt the disease.

TAC Healthcare

Mesothelioma

- Mesothelioma is a type of cancer that develops in the lining that covers the outer surface of some of the body's organs. It’s caused by asbestos exposure.
- Mesothelioma mainly affects the lining of the lungs (pleural mesothelioma), although it can also affect the lining of the abdomen (peritoneal mesothelioma), heart or testicles.
- More than 2,600 people are diagnosed with the condition each year in the UK. Most cases are diagnosed in people aged 60 to 80 and men are affected more commonly than women.
- It usually takes a while for this to cause any obvious problems, with mesothelioma typically developing more than 15-60 years after exposure to asbestos (mean 40 years).
- No dose-response relationship.

TAC Healthcare

- Common symptoms include

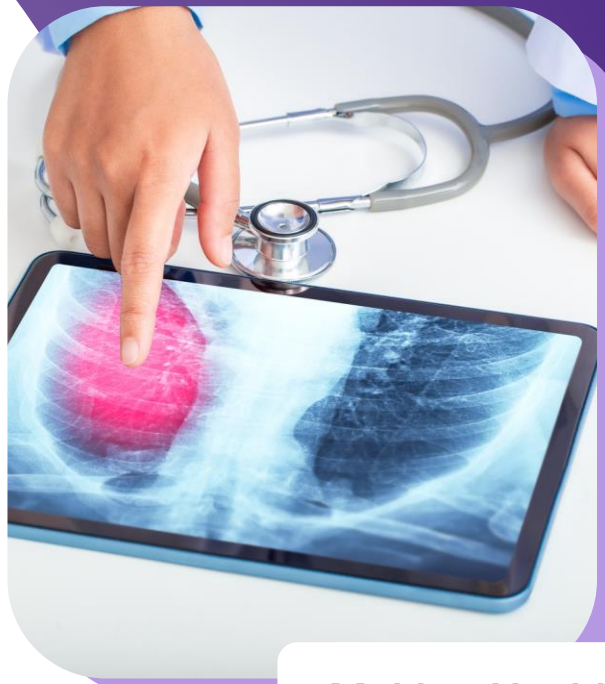
  - Dry cough
  - Shortness of breath
  - Respiratory complications
  - Chest or abdominal pain
  - Fever or night sweats
  - Pleural effusion (fluid around the lungs)
  - Fatigue
    Weakness in the muscles

- Typically fatal over 1-2 years.

TAC Healthcare

Other Occupational Lung Diseases

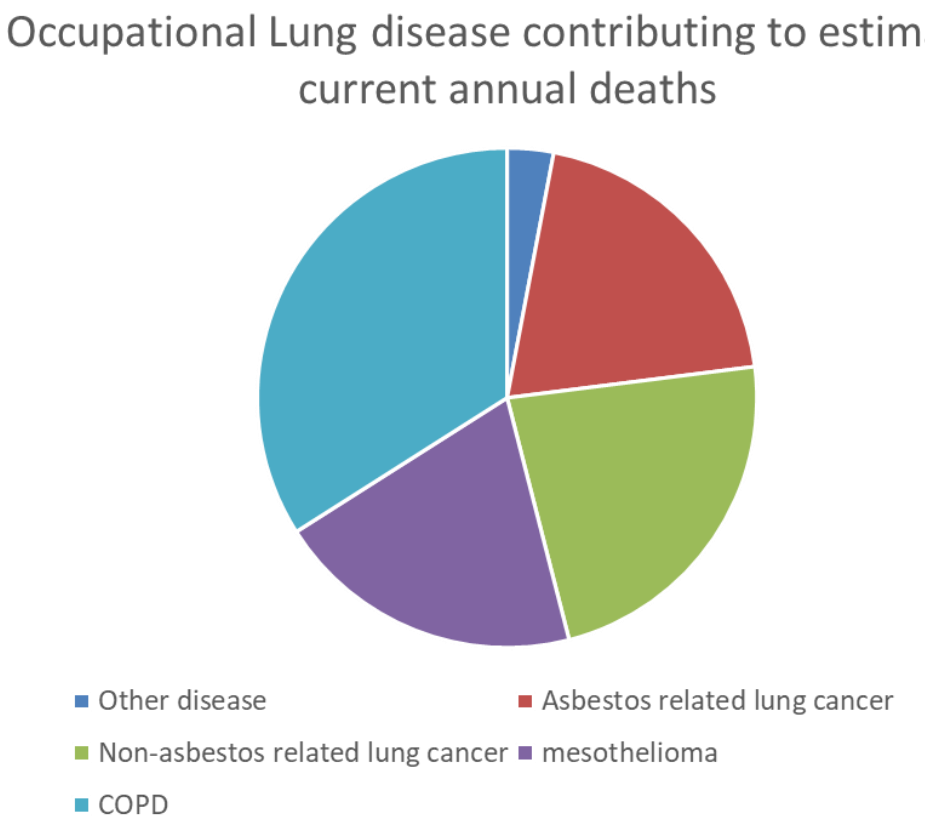
- Hypersensitivity pneumonitis (Farmers Lung)
- Byssinosis (Raw cotton/cotton dust exposure)
- Metal Fume Fever (zinc oxide fume)
- Coal Workers Pneumoconiosis
- Silicosis (Mining/stone-working/shot-blasting)
- Berylliosis (Nuclear industry/x-ray tubes)
- Kaolin pneumoconiosis (China clay mining)



Making Healthcare *Better*

TAC Healthcare

Occupational Lung Disease Statistics



TAC Healthcare

Smoking

Cigarettes are still available tax-free in bonds offshore in some assets.

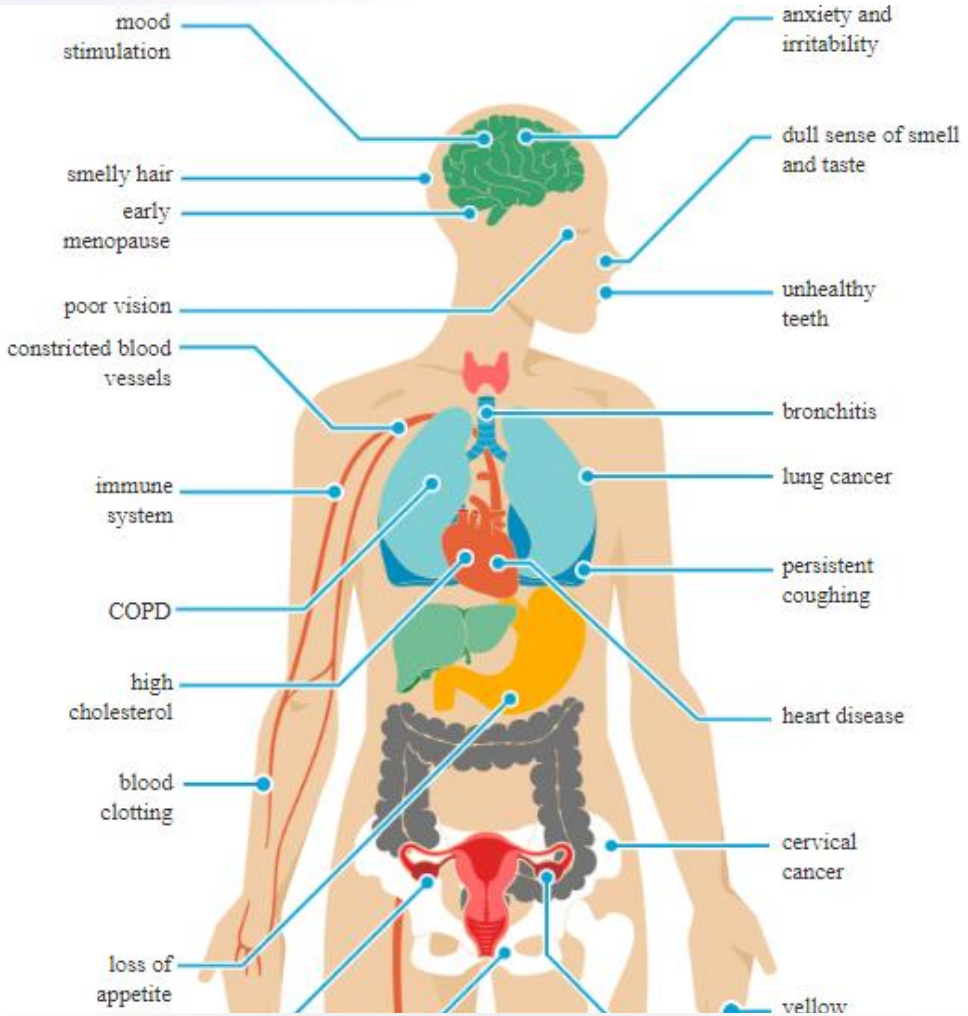
We are complicit.

- Smoking is the leading cause of preventable death and disease in the UK. Approximately half of life-long smokers will die prematurely, losing on average 10 years of their life expectancy.

- Most smoking-related deaths arise from one of three diseases:
  - Lung Cancer
  - COPD
  - Coronary Heart Disease

TAC Healthcare

Smoking Effects On The Body



TAC Healthcare

Passive Smoking

- Passive smoking is breathing in other people’s tobacco smoke.
- When you smoke a cigarette (or roll-up, pipe etc.) most of the smoke goes into the air around you for others to breathe in.
- Second hand smoke can cause lung cancer and other health problems like heart disease.
- Pregnant women exposed to passive smoking are prone to premature birth with the baby being at an increased risk of low birthweight and cot death.
- Children exposed to second hand smoke are more prone to developing breathing problems such as asthma and allergies.

TAC Healthcare

Vaping - Chemicals in the Cloud

- Nicotine

  Can be very high concentrations, one 200 puff vape as much as 20 cigarettes

- Pulegone

  Mint/menthol flavouring – known carcinogen

- Diacetyl, Acetoin, Pentanedione

  - Diacetyl, linked to “popcorn lung,” a common term for bronchiolitis obliterans, inflamed airways, causing breathing issues when inhaled. It is banned in e-liquids in Europe but can still be found elsewhere and in illegal vapes in the UK.
  - Acetoin is less toxic but transforms into diacetyl over time.
  - Acetyl propionyl, also called pentanedione, leads to respiratory inflammation and lung damage.

TAC Healthcare

Heavy Metals

Vape juice releases heavy metal particles into the aerosol when heated with metal components.

Vitamin E acetate

Used illicitly to mix THC in vape juice, is also heavily linked to e-cigarette vaping-associated lung injuries (EVALI) and other health risks.

Diethylene Glycol

Used in various products, including antifreeze, but was found in some e-cigarettes in 2009, posing toxic risks despite its sweet taste.

TAC Healthcare

Air Pollution

- Air pollutants are any substance that could cause harm to health.
- Air pollution is described as the UK government as the biggest environmental risk to public health. Long term exposure can cause respiratory disease as well as lung cancer and reduce life expectancy.
- Between 28,000 and 36,000 deaths a year are attributed to long-term air pollution exposure.
- The amount of air pollution can be affected by things such as weather and season. For example, it is harder for pollution to disperse during a still, sunny summer day. This causes the pollution to become more concentrated causing a high pollution episode.

TAC Healthcare

Indoor Air Pollution

- Indoor air pollution is dirt, dust or gasses in the air inside a building that can be harmful if breathed in.
- Types of pollution include:
  - Particulate matter
    Microscopic particles of dust and dirt in the air
  - Gases
    Carbon Monoxide, Nitrogen Oxides, Sulphur Dioxide
- Air pollution can be caused by a number of things such as:
  - Heating systems
  - Poor ventilation
  - Damp
  - Building materials
  - Tobacco
  - Volatile Organic Compounds (VOCs) in products such as paint, carpets, cleaning products, air freshener's, polish etc.
  - Radon

TAC Healthcare

Health Surveillance

Health surveillance is an ongoing system of health checks.

Health surveillance may be required by law for employees exposed to a number of workplace hazards such as noise, vibration, biological hazards, dust, fumes etc.

Making Healthcare *Better*

TAC Healthcare

Why Carry Out Health Surveillance?

Health surveillance is important for a number of reasons:

- Ill-health effects can be identified at an early stage so employers can introduce better controls to prevent them worsening
- Provides data to help employers evaluate health risks
- Enables employees to raise concerns about how work affects their health
- Highlights lapses in workplace control measures, therefore providing invaluable feedback to the risk assessment
- Provides an opportunity to reinforce training and education to employees (for example - the impact of health effects and the use of personal protective equipment)

Health surveillance can be used to identify issues but should not be used as a substitute for risk assessments or appropriate control measures.

TAC Healthcare

Thank You!

Any Questions?