



# Lung health in Europe

# **FACTS & FIGURES**

A better understanding of lung disease and respiratory care in Europe



**ELF** EUROPEAN  
LUNG  
FOUNDATION



**ERS** EUROPEAN  
RESPIRATORY  
SOCIETY

All the data contained in Lung health in Europe – facts and figures are taken from The European Lung White Book, which is available online at [www.erswhitebook.org](http://www.erswhitebook.org).

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# Foreword

The European Respiratory Society (ERS) and European Lung Foundation (ELF) “Lung Health in Europe Facts and Figures” provides an accessible and reliable summary of the state of lung health in Europe. At a first glance, the problems appear insurmountable. Respiratory disease causes about 1 million deaths annually in the World Health Organization (WHO) European Region, of which two-thirds occur in the 28 countries of the European Union (EU). Lung cancer is the leading cause of respiratory death, followed by chronic obstructive pulmonary disease (COPD), lower respiratory infections and tuberculosis (TB). 5.4 million disability-adjusted life-years are lost annually to respiratory diseases such as asthma. More than half of all the deaths from respiratory disease are due to diseases caused by smoking. The total cost of respiratory disease in the EU 28 exceeds a staggering €380 billion. It is an unacceptable cost, and one which the EU should tackle through, for example, actively reducing tobacco use.

From a public health perspective, not only are the numbers worrying, but so too is the rise in diseases such as COPD and the re-emergence of multidrug-resistant TB. In order to counter the problem, as a first step, clear data are needed, and I commend the European Lung White Book, on which this publication is based, for providing the first comprehensive update in 10 years of the scale of the problem we face.



Identifying the problem is only one side of the coin, and I particularly welcome the engagement of ERS and ELF in providing solutions to improve lung health for European citizens. Patients, as represented by the ELF are the ultimate beneficiaries. 2013 – in addition to being the Lithuanian Presidency of the EU - is also the Lithuanian year for Health Promotion. Initiatives such as this publication are essential in order to ensure that those unfamiliar with health concerns understand the burden of disease.

This collection of data shows that the burden of respiratory disease is far from a relic of the past, it is still with us today. I sincerely hope that future updates will show a vast improvement in the lung health of European citizens.

**Vytenis Povilas Andriukaitis**

Minister of Health of Lithuania



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# ELF



Founded by the European Respiratory Society (ERS), the European Lung Foundation (ELF) works to bring together patients and the public with respiratory professionals to positively influence lung health. ELF's key role can be seen as being the public voice of the ERS and the public's voice in the ERS.

The heart of ELF's work is to ensure that people with lung diseases and the general public have the opportunity to influence healthcare for lung conditions at the European level. It has set up a network and advisory group of patient organisations across Europe, covering all lung conditions. ELF ensures patient involvement in the creation of clinical guidelines and invites respiratory patients to the ERS Congress, to meet clinicians and ERS leaders and make sure their concerns and opinions are heard.

ELF brings the latest information and advances in respiratory medicine to people outside the respiratory profession, making it comprehensible to a non-specialist audience and in a range of European languages.


The majority of this information is disseminated widely through the ELF website – [www.europeanlung.org](http://www.europeanlung.org).

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ELF is also responsible for communicating the ERS's scientific activities to the public and the press, preparing lay summaries and press releases to accompany major publications from the European Respiratory Journal and key abstracts from the ERS Congress.

For over 10 years, ELF has run public awareness campaigns and events centred around lung function testing. Initially, these were "spirometry screening events", set up in major European cities to coincide with the annual ERS Congress. Working with international respiratory societies, ELF now coordinates a biennial global World Spirometry Day campaign, which in 2012 attracted participation from more than 70 countries.



# ERS



The mission of the European Respiratory Society (ERS) is to alleviate suffering from respiratory disease and promote lung health through research, sharing of knowledge, and medical and public education.

The ERS was founded in 1990 and is now a 10,000-member nonprofit professional society, devoted to respiratory medicine and science. Open to clinicians, scientists and other health professionals, the society draws its members from every continent and plays a leading role in improving standards of respiratory care in Europe and beyond. Its activities centre around four pillars: Congress, publications, advocacy, education and the European Lung Foundation (ELF) as its public voice.


The international ERS Congress is the central event of the Society's year. It attracts about 20,000 delegates each year, making it the largest annual scientific gathering in respiratory medicine worldwide and the primary forum in Europe for presenting research, exchanging knowledge and forging collaborations. Outside the main Congress, the Society organises an annual Lung Science Conference and a biannual Sleep and Breathing Conference (jointly with the European Sleep Research Society).

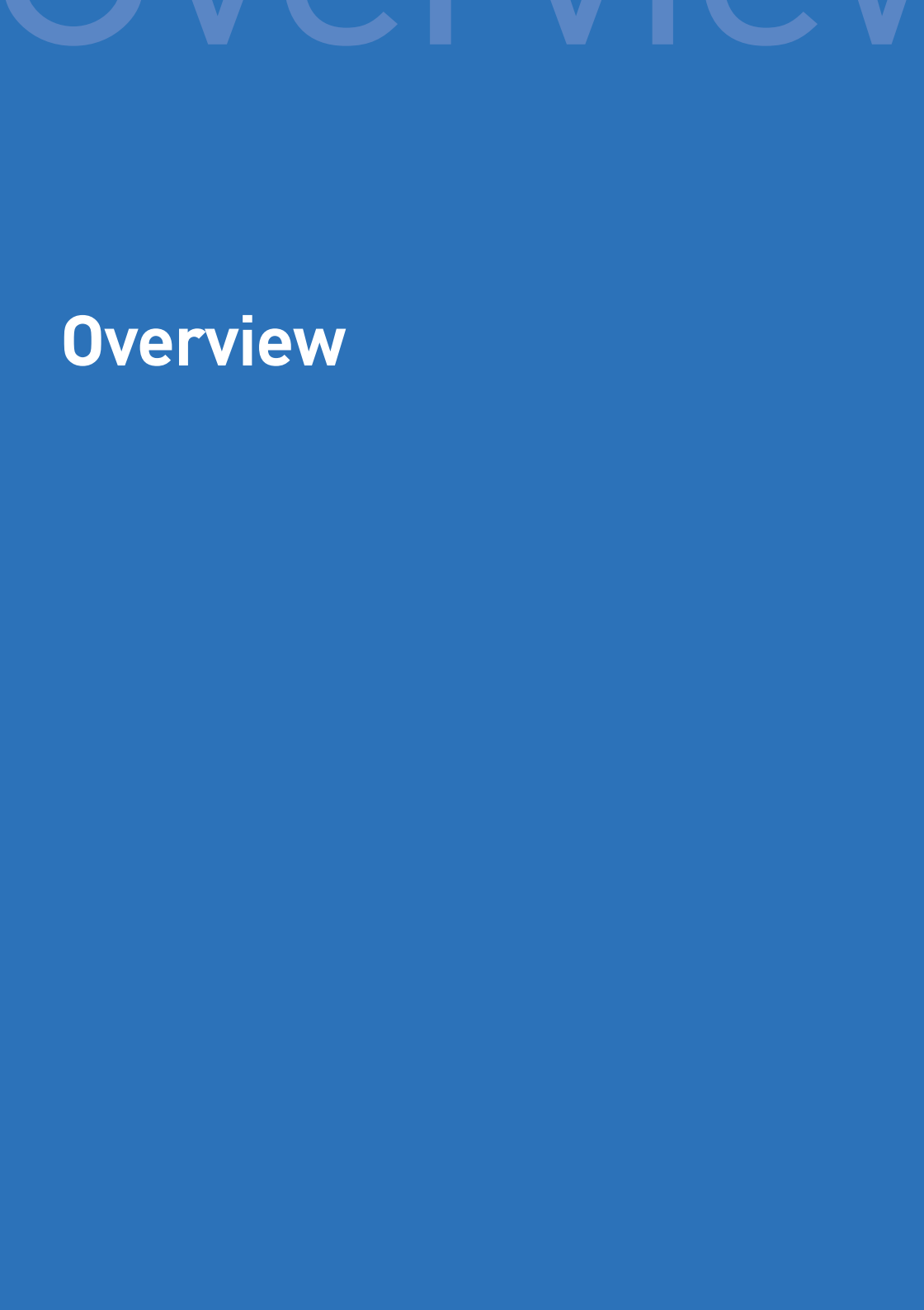
The ERS School runs educational events throughout the year, providing a range of hands-on and online courses and CME-accredited events and material. Resources from these events and many other ERS activities are collected on the ERS's Learning

Resources website. The School is also responsible for the HERMES initiatives, which aim to harmonise respiratory medical education in Europe.

ERS publications are led by the flagship European Respiratory Journal, which publishes the best in original research and scientific reviews each month, reaching almost 1 million online readers each year. There are also two quarterly journals, both freely available online: the European Respiratory Review and Breathe. The European Respiratory Monograph publishes four books each year, each one taking an in-depth look at an area of respiratory medicine.

In addition to its head office in Lausanne and publications office in Sheffield, the ERS maintains an office in Brussels, at the heart of the European Union, focusing on advocacy for better respiratory health. Current activities include lobbying for stronger tobacco regulation, promoting evidence on the harm of air pollution and ensuring that respiratory medicine is well represented in new EU research funding programmes.





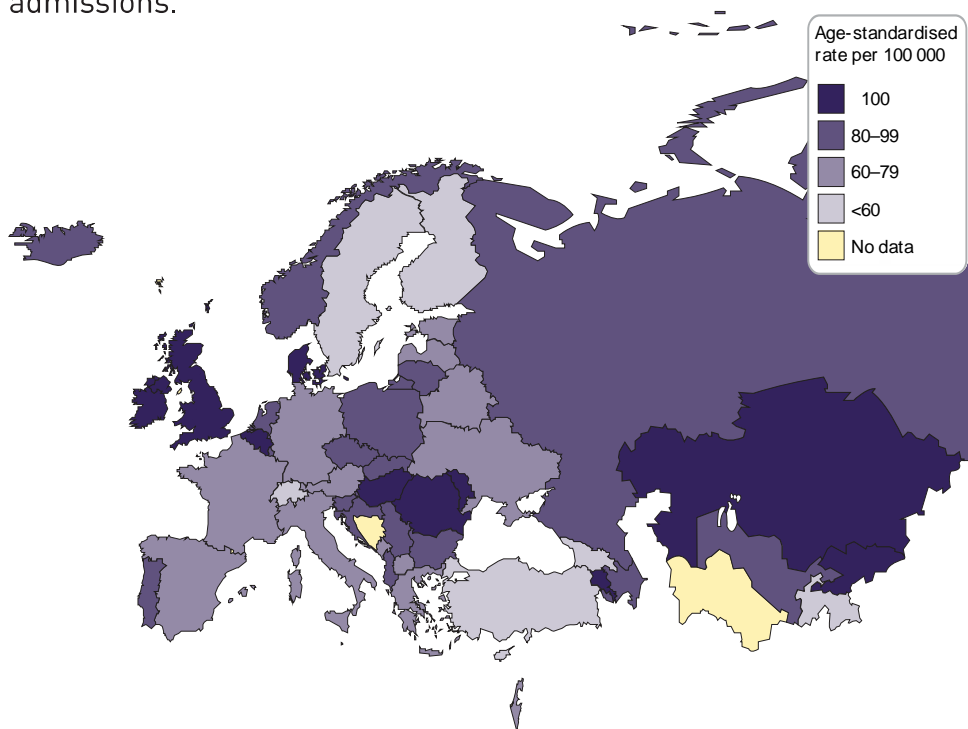
## Overview



# Burden

Lung diseases are one of the world's biggest health concerns, causing one sixth of all deaths worldwide.

The impact of lung diseases remains as large today as it was at the turn of the century and is likely to remain so for several decades. Each year in the EU, one in eight of all deaths are due to respiratory diseases and lung conditions cause at least 6 million hospital admissions.



Map of age-standardised mortality rates for all respiratory conditions. Source: World Health Organization World and Europe Detailed Mortality Databases, November 2011 update.



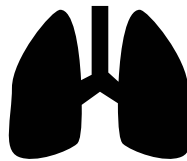
**1 in 8** deaths in the EU are from  
respiratory diseases



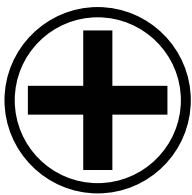
**600,000** people die every year in the EU  
from respiratory disease



**Over half** of these deaths are due to  
**lung cancer or COPD** and are linked to  
smoking



**6 million** hospital admissions per year  
are due to respiratory diseases



For many diseases, recorded hospital  
admissions and deaths are only the “**tip**”  
of the iceberg”



Lung diseases are projected to cause  
**1 in 5 deaths worldwide**

# Economic burden

Lung diseases cause disability and premature death. They have a huge cost related to primary care, hospital care and treatments, as well as the loss of productivity of those who cannot work and people who die early because of their condition.

The calculation of the economic burden is very difficult due to lack of information and data, and major gaps in cost estimates. The figures given here are likely to therefore be considerable underestimates.

	Direct costs# € bn	Indirect costs¶ € bn	Monetised value of DALYs lost € bn	Total costs € bn
COPD	23.3	25.1	93.0	141.4
Asthma	19.5	14. 4	38.3	72.2
Lung cancer	3.35	NA	103.0	106.4
TB	0.54+	+	5.37	5.9
OSAS	5.2	1.9	NA	7.1
Cystic fibrosis	0.6	NA	NA	0.6
Pneumonia/ALRI	2.5	NA	43.5	46.0
Total	55.0	41.4	283.2	379.6

Aggregated annual direct and indirect costs and the value of disability-adjusted life-years (DALYs) lost for EU countries 2011 by disease (billions of euro at 2011 values). COPD: chronic obstructive pulmonary disease; TB: tuberculosis; OSAS: obstructive sleep apnoea syndrome; ALRI: acute lower respiratory infections; NA: not available.

#: primary care, hospital outpatient and inpatient care, drugs and oxygen; ¶: lost production including work absence and early retirement; +: indirect costs included with direct costs.



# €380bn

The total cost of respiratory disease in the EU exceeds **380 billion euro**

# €300bn

**5.2 million disability-adjusted-life-years** are lost annually to respiratory disease in the EU at a value of **300 billion euro**

# €200bn

Greatest burden is from COPD and asthma – over **200 billion euro**

# €100bn

The total cost of lung cancer is **100 billion euro**

# 50%

Half of the economic burden of lung disease is due to **smoking**

# €27.4bn

The direct healthcare costs of respiratory disease attributable to smoking are **27.4 billion euro**

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## Policy

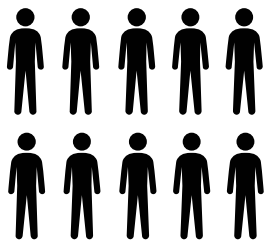
A policy can be seen as a statement of intent or a principle to guide decision making. According to WHO, the enjoyment of the highest attainable standard of health is a fundamental human right. Similarly, the EU Treaties require a high level of human health protection in the definition and implementation of policies. However, for these principles to be realised, national political will is essential. For lung health, political support in Europe for even the most basic prevention and control measures as outlined here would save many lives and immensely improve the care of patients.

### Areas for action

- More reliable and complete data for respiratory disease in Europe is needed
  - in particular covering disability due to chronic conditions
- All countries must improve and standardise surveillance and data collection relating to respiratory disease
- More detailed hospitalisation statistics are needed to understand the full picture of disease burden, as well as standardised coding and certification to avoid discrepancy in data
- The Framework Convention on Tobacco Control must be fully implemented, along with measures such as higher taxation, plain packaging and more prominent health warnings
- EU legislation governing pollutant emissions and air quality must be respected and implemented by member states, while moving towards levels deemed safe by WHO
- Greater cross-border cooperation is needed to combat TB with a minimum package of care
- More cross-disciplinary research is needed to tackle chronic disease in Europe. Both EU and member states should boost biomedical research funding



In WHO European Region,  
non-communicable diseases account  
for **86% of deaths and 77% of the  
disease burden**



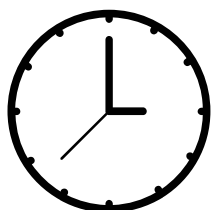
Only **10 EU member states** report  
having developed an integrated or topic  
specific policy/programme/action plan  
for chronic respiratory disease



**700,000 Europeans die every year** from  
tobacco consumption



The cost within the EU of  
tobacco consumption annually  
is **517 billion euro**



**8.6 months** is the average loss of life  
expectancy in Europe due to poor air  
quality and EU permitted levels of  
certain pollutants are currently **higher  
than those deemed safe by WHO**



There were **380,000 new cases of TB**  
in WHO European Region in 2011

# Risk Factors



# Tobacco smoking

[europeanlung.org/tobacco-smoking/](http://europeanlung.org/tobacco-smoking/)

Smoking tobacco cigarettes is the main cause of many lung diseases. Tobacco smoke contains more than 4,000 chemicals, many of which are toxic and can cause cancer.



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## Areas for action

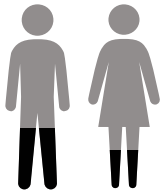
- More smoke-free areas in public across Europe can help prevent the uptake of smoking amongst younger people
- Increasing the price of cigarettes further can help to reduce long-term illness and death from smoking in the next 20 years and beyond
- Community, country and EU interventions against smoking should be strengthened, with plain packaging and large pictorial warnings
- All smokers should be encouraged to quit, reducing the burden of smoking over the next two decades
- Smoking cessation treatments are cost effective and proven and should be used more widely
- Education in cessation of tobacco should be included in the training of all health professionals and medical students
- The obligations and guidelines of the WHO Framework Convention on Tobacco Control should be further implemented across Europe. The ultimate aim should be the phasing out of tobacco use



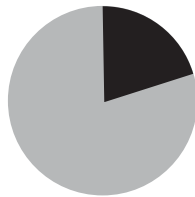
Around 100 million people worldwide were **killed by tobacco** in the 20th century and this number will increase to **1 billion in the 21st century**



Tobacco smoke contains more than **4,000 chemicals**, many of which are toxic and can cause cancer



In Europe, it is estimated that **24% of women and 32% of men smoke**



Lung cancer accounts for **20% of all cancer deaths** in Europe



Although only 15% of the world's population live in Europe, nearly a **third of the burden of tobacco-related disease** occurs in Europe



The total economic cost of tobacco in terms of gross domestic product (GDP) by as much as

# Passive smoking

[europeanlung.org/passive-smoking/](http://europeanlung.org/passive-smoking/)

Passive smoking, also known as second-hand smoke or environmental tobacco smoke, is when a person breathes in toxic fumes that have remained in the air or surrounding objects after a cigarette has been smoked. It also refers to exposure of unborn babies to their mother's smoke.



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## Areas for action

- Member states need to fully implement the WHO Framework Convention on Tobacco Control (FCTC) – including measures regarding taxation, advertising and packaging
- All public places across the EU should be smoke-free areas – including parks and playgrounds
- To protect children, further measures may be needed – for example a ban on smoking in cars





no safe level of exposure to second-hand smoke,



600,000 non-smokers worldwide die each year



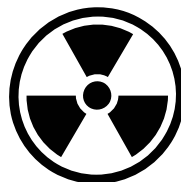
10.9 million years of disability-adjusted-life-years (DALYs) are lost annually because of diseases caused by exposure to second-hand smoke



coughing and wheezing



Second-hand smoke can cause lung cancer, coughing, wheezing and other illnesses such as **coronary heart disease and strokes** in adults



Over **250 chemicals** generated through the **smoking of tobacco** are known to be toxic or cancer-causing

# Outdoor air pollution

[europeanlung.org/outdoor-air-pollution/](http://europeanlung.org/outdoor-air-pollution/)

The term air pollution refers to harmful particles suspended in the air, or gases in the atmosphere, that can be breathed in. It is a mixture including particles, ozone, nitrogen oxides, volatile organic compounds and carbon monoxide. The mixture is different depending on location, season and sources of pollution in the area.



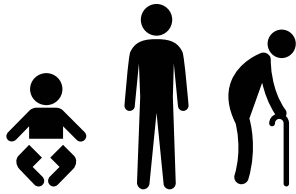
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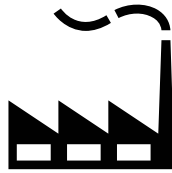
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## Areas for action

- Living close to a busy road increases a child's risk of developing asthma and urban planning needs to consider proximity of road traffic to housing/schools
- Current evidence shows urgent action is needed to tackle air pollution in Europe
- The EU should implement WHO-recommended air quality guidelines for outdoor air through an ambitious revision of limit values for ambient air pollution
- All European countries should support the WHO Parma Declaration on Environment and Health to reinforce efforts to reduce source pollution from all sectors – industrial, transport and energy
- EU member states must make air quality an integral part of their transport, industrial and energy policies and ensure that the correct level of governance – national, regional or local – is equipped to tackle the sources of pollution
- Member states need to improve cooperation on transboundary pollution



Air pollution of the population from



A **large proportion of Europe's population** live in areas with unhealthy outdoor air



Recent studies on childhood asthma have shown that the **benefits of clean air** have been underestimated in the past



**Short-term increases** in air pollution increase **respiratory symptoms**



In the long-term, air pollution can **reduce life expectancy, affect lung development**, increase asthma and lead to other lung and heart diseases



**Urgent action** reduce air pollution levels

# Indoor air pollution

[europeanlung.org/indoor-air-pollution/](http://europeanlung.org/indoor-air-pollution/)

Indoor air pollution is the term used to describe exposure to certain substances found in homes, schools, transport and subway stations. Over 900 different compounds have been detected in indoor air and some pollutants may be 2-5 times more concentrated inside rather than outside buildings.



## Areas for action

- Outdoor air pollution must first be reduced - only then will adequate ventilation be able to play a role to reduce indoor air pollution
- Building material standards should be tightened to avoid worsening indoor air quality
- Policies aimed at reducing health inequalities are needed to achieve health benefits
- Better housing for those at risk of sub-standard accommodation – be it from heating or damp/mould – would improve the situation for many
- Occupational respiratory diseases are caused by indoor air pollutants – greater attention is needed to highlight and tackle the risks posed to workers in the modern age



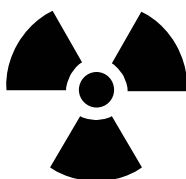
Indoor air pollution is the **8th most important risk factor** for disease and is responsible for an estimated **2.7% of the global burden of all diseases**



Between **1.5 million and 2 million deaths a year** could be linked to indoor air pollution



Around **50% of the world population** (about 3 billion people) are exposed to indoor air pollution from **open fires and wood-burning cooking stoves**



In the USA, between **2,100 and 2,900 cases** of lung cancer in non-smokers are linked to **radon exposure**



**Radon is the second biggest risk factor** for lung cancer



**Dampness and mould** increases risk of asthma-related problems by **30-50%**

# Occupational risk factors

[europeanlung.org/occupational/](http://europeanlung.org/occupational/)

Occupational risk factors is a term used to describe the harmful effects of breathing in various particles, gases, fumes or smoke in the workplace. These different factors are often referred to as 'agents'.



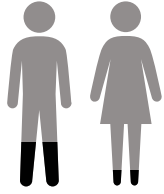
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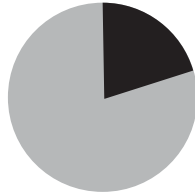
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## Areas for action

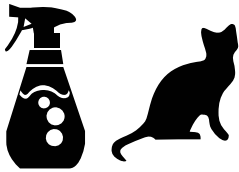
- Workplace limits should take into account what levels of agents can cause allergies, in addition to occupational diseases
- Physicians should be educated about taking adequate exposure history
- As new agents are identified they should be swiftly regulated



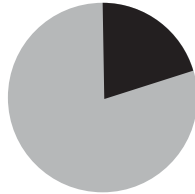
Exposure to **particles, gases, fumes or smoke** in the workplace is responsible for **15% of all respiratory cancers in men and 5% in women**



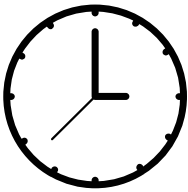
**15-20% of all adult asthma cases are work-related**



Between **350 and 400 different agents** are known to cause occupational asthma



**15-20% of COPD cases are work-related**



Symptoms of **mesothelioma** may take up to **50 years** to appear



**10% of all interstitial lung disease cases are work-related**

# Early-life risk factors

[europeanlung.org/early-life-risk-factors/](http://europeanlung.org/early-life-risk-factors/)

There are a number of factors that can occur early in a person's life that could lead to lung problems later in life. These include not breast feeding, weight gain, a mother's use of paracetamol during pregnancy, complications during childbirth and indoor and outdoor air quality.



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## Areas for action

- Women need to be educated about the dangers of smoking during pregnancy
- Education is required for new and future parents about the adverse effects of smoking on babies
- As survival rates of premature babies increases, so does the incidence of infants requiring treatment – more attention needs to be paid to improving care of pre-term infants

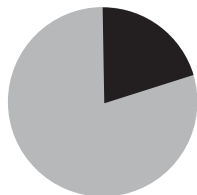




In children under 2 years, the **risk for lung disease** is increased by over 70% if the mother smokes



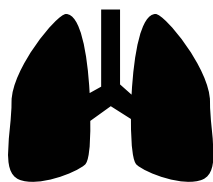
30-50% of children who develop **wheezing** as a result of an infection as an infant go on to **develop asthma**



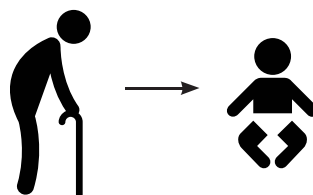
**Parental smoking** may account for 20% of all asthma cases in childhood



20% of infants whose mothers **smoked during pregnancy** are admitted for bronchitis in their first **5 years**



**Abnormal lung growth** is associated with 15-20% of deaths of newborn babies



impact on the lung health of their grandchildren

# Diet and nutrition

[europeanlung.org/diet-and-nutrition/](http://europeanlung.org/diet-and-nutrition/)

Most respiratory conditions are caused by an interaction between genetic and environmental factors such as smoking, pollution and diet. There is increasing evidence that diet and nutrition play a role in the development and progress of lung disease.



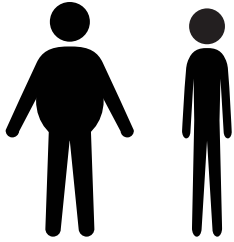
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## Areas for action

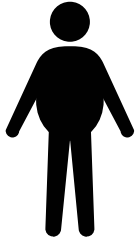
- More research is needed on the impact of diet on lung conditions
- Greater public awareness is needed of the impact of diet on lung conditions
- Health authorities should ensure screening of nutritional status and awareness of over and underweight
- Increased consumption of fruit and vegetables, antioxidants, flavonoids, fish and omega-3 fatty acids are all associated with better lung function and should be encouraged



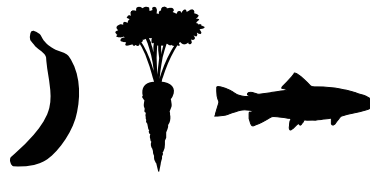
Being either **obese** or **underweight** can have harmful **consequences** for lung health



A high intake of **highly processed foods** may **accelerate decline** in lung function



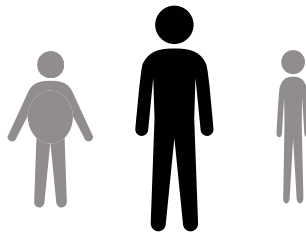
**60–90%** of people with **obstructive sleep apnoea** are obese



A high intake of **fruit, vegetables and fish** is recommended



The amount of **trans-fats** and **omega-6 fatty acids** in the diet should be restricted



An ideal weight should be maintained with a body mass index (BMI) between 21 and 30

# Genetic susceptibility

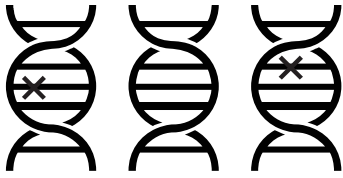
[europeanlung.org/genetic-susceptibility/](http://europeanlung.org/genetic-susceptibility/)

Some people may have an increased likelihood of developing a lung disease because of the genes they inherit from their parents. Genes are short sections of DNA that determine the characteristics of each living organism.

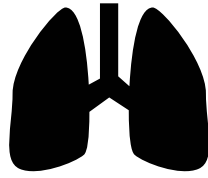


## Areas for action

- Genetic testing in lung health should focus on a number of different areas in the future, including early diagnosis, prediction of disease risk and prediction of treatment response.
- As genetic research develops, the focus should be on identifying targets for new drugs to help treat or cure lung diseases
- EU funding programmes such as Horizon 2020 should cover research in this area



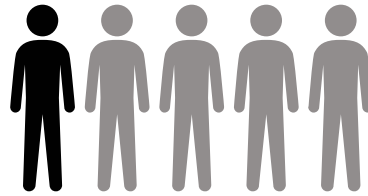
10 million variations in the genetic make-up of a person



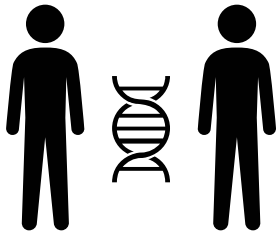
Several genes have been linked to lung function and lung development



More than 1,000 different mutations in one single gene (CFTR) have been identified as causing cystic fibrosis



20% of smokers develop COPD, suggesting genetic risk factors play a role



Several susceptibility genes are thought to be common between people with asthma and people with COPD



A group of genes has been linked with nicotine dependence, as measured by the number of cigarettes smoked per day

**Lung diseases**



# Adult asthma

[europeanlung.org/adult-asthma/](http://europeanlung.org/adult-asthma/)

Asthma is a common long-term condition that can affect people of all ages. It causes inflammation in the airways. The term adult asthma refers to either childhood asthma that has continued into adulthood, asthma that has returned after being present in childhood and then disappearing, or asthma that has developed only in adulthood. Adult asthma is often linked with allergies and accompanied by other allergic conditions, such as hayfever. Adult asthma is more common in females.



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## Areas for action

- There is a pressing need to understand the origins of asthma so that it can be prevented
- Exposures in the workplace need to be better controlled to help prevent the development of adult asthma
- More focused national programmes are needed to improve asthma control across the population and consequently reduce long-term illness, death and costs
- More research is needed to understand more about severe asthma and to personalise medicine in the future

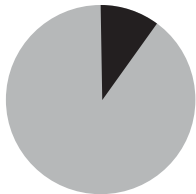




In Europe, almost **10 million people** less than 45 years of age have asthma



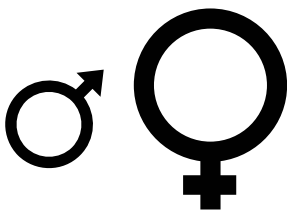
The **UK and Ireland** have some of the **highest asthma rates** in Europe and the world



Around **10%** of adults with asthma have **severe asthma**, which is difficult to treat



Despite the increasing use of asthma medications **asthma control remains relatively poor** across Europe



**Adult asthma** is more common in females



In some countries, such as **Finland and France**, action by government health departments has led to important improvements in asthma control

# Childhood asthma

[europeanlung.org/childhood-asthma/](http://europeanlung.org/childhood-asthma/)

Asthma is a condition that causes inflammation in the airways. It is the most common long-term condition in children. Asthma can start at any time of life, but is likely to begin in childhood.



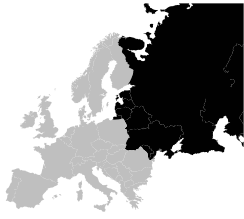
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## Areas for action

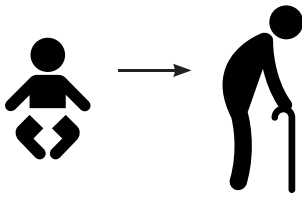
- In schools, precautions should be taken to reduce exposure for allergic asthmatic children
- Emphasis should be put upon mastering exercise-induced asthma in physical education classes in school
- More data are needed on environment and genetic causes of asthma



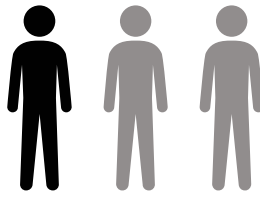
An increase in asthma prevalence is expected in **Eastern Europe**



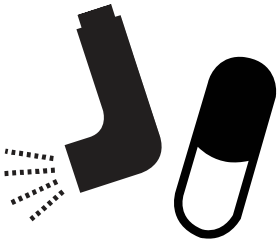
**13% of carers of asthmatic children** in Britain reported **giving up work** to care for their child



Asthma typically begins much earlier in life than other chronic diseases, imposing a **high lifetime burden** on individuals, their carers and the community



Approximately **one third of the population will develop asthma** at some time between the ages of 5 and 80 years, most before the age of 20 years



The development of **more effective drugs** would reduce the need for hospital admissions due to asthma



**65% asthma attacks in school** due to rhinovirus infection

# COPD

[europeanlung.org/COPD/](http://europeanlung.org/COPD/)

Chronic obstructive pulmonary disease (COPD) is a long-term condition that causes inflammation in the lungs, damaged lung tissue and a narrowing of the airways, making breathing difficult.

There are many different types of the condition, although little is known about what causes this variation and the best way to manage the different versions of the disease.



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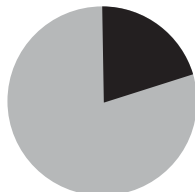
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## Areas for action

- More studies on prevention, education, medication, treatment and care are needed to drive higher standards across Europe
- More research is needed on the effectiveness of management techniques for COPD
- New therapies need to be found to slow the progression of the condition
- More effective smoking cessation strategies would have a positive impact
- Governments, industry and the general public need to be more aware of the high burden of COPD in Europe
- More research is needed on the different variations of COPD and their economic burden on European societies
- There is a lack of reliable data on the incidence of COPD – member states should improve reporting



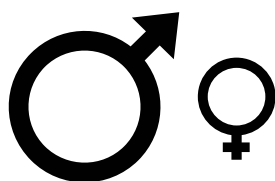
**40-50%**lifelong smokersCOPD



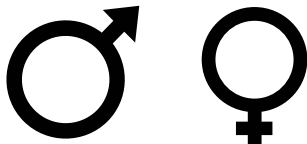
**15-20%** of COPD cases are due to exposures to occupational dust, chemicals, vapours or other **airborne pollutants in the workplace**



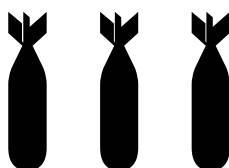
In the adult population aged over 40 years, **moderate and severe COPD** is prevalent in 5-10% of the population and including mild cases the prevalence is **15-20%**



COPD prevalence is **higher in men** than women



In people aged over 70 years, the prevalence of moderate and severe COPD is about **20% in men** and **15% in women**



**300,000 deaths**Europe from COPD3  
**Hiroshima bombs**

# Lung cancer

[europeanlung.org/lung-cancer/](http://europeanlung.org/lung-cancer/)

Lung cancer is cancer of the trachea (windpipe), bronchus (airway) or lung air sacs (alveoli).

Lung cancer was a rare disease at the start of the 20th century, but increase in exposure to tobacco smoke and other triggers of the disease have contributed to a pandemic in the 20th and 21st centuries.



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## Areas for action

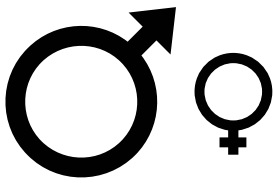
- Since smoking is the leading cause of lung cancer, tobacco control measures such as smoking prevention and smoking cessation remain the most effective methods of reducing the incidence of lung cancer
- Smoking bans in public places are needed to help reduce the effects of passive smoke
- A worldwide ban on asbestos use is urgently required to help prevent the development of lung cancer
- New techniques that help doctors understand what stage the lung cancer has developed to are needed to help reduce hospital admissions and speed up decisions about treatment
- More research is needed to refine radiotherapy techniques and identify markers for lung cancer to ensure early diagnosis
- Screening of people who are thought to be at high risk of developing lung cancer could lead to detecting the disease at an early stage while it is still curable
- A well-organised and reliable database of lung cancer cases is needed to allow for trends to be identified and investigation at a public health level to look at differences for survival in different countries
- There needs to be an increased understanding of lung cancer in people who have never smoked



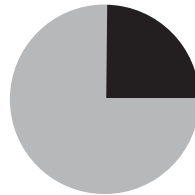
Lung cancer is the **biggest cancer killer in Europe**, accounting for approximately **20% of total cancer deaths**



**Tobacco smoke** is responsible for more than **80% of lung cancer cases**



**Men** are **more frequently affected** than women – this is expected to change



More than a quarter of lung cancer cases occur in the **under-60s**



**7 out of 8 patients** are dead 5 years after their first diagnosis



Lung cancer is the **leading cause of cancer deaths worldwide** with **1.38 million** in 2008

# Occupational lung disease

[europeanlung.org/occupational-lung-disease/](http://europeanlung.org/occupational-lung-disease/)

Occupational, or work-related, lung conditions are conditions that have been caused or made worse by the materials a person is exposed to within the workplace.

The impact of these conditions is underestimated due to under-reporting. For example, occupational disease is more likely to occur in the elderly, who are no longer at work but whose condition is due to their previous occupation.



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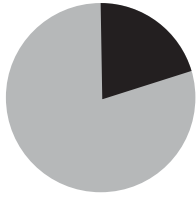


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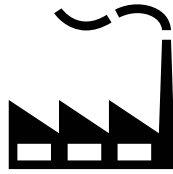
## Areas for action

- Exposure standards should be health based and uniform across Europe and updated to reduce the exposure of the working population to acceptable levels
- Work and health authorities should aim for realistic targets to decrease incidence of lung conditions caused by silicosis and working in mines
- Legislators must look at the use of nano-materials and how this is affecting health
- European efforts to detect and reduce occupational carcinogenic exposures need to be continued.
- European countries need to register occupational diseases in order to provide accurate data on burden and costs





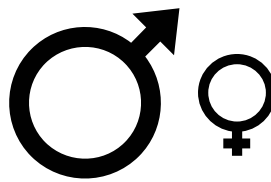
Up to **15% of all asthma** cases are linked to occupational factors



**15-20% of COPD** cases are linked to factors in the workplace



Research from Sweden and Finland found that **one in 10 farmers** has experienced an acute inhalation injury resulting from **exposure to dust**



**15% of lung cancer cases in men** and **5% in women** are thought to be caused by occupational exposures



The costs of occupational asthma are high, but this cost usually falls on the **state, health insurance, or the individual worker**, rather than the employer



**over 39,000 deaths** dusts and fumes

# Lung disease in children

[europeanlung.org/lung-disease-in-children/](http://europeanlung.org/lung-disease-in-children/)

Research has shown that lung problems account for about one quarter of all visits by children to a general practitioner. The two main conditions affecting children are asthma and cystic fibrosis. Other major lung conditions in children include bronchiolitis; lung conditions linked with prematurity, including bronchopulmonary dysplasia (BPD); pneumonia; tuberculosis (TB); lung problems present from birth (congenital lung problems); and whooping cough.



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## Areas for action

- There needs to be more focus on care of babies with BPD, particularly in central and Eastern Europe
- It is important to identify the causes of variation in deaths from pneumonia between countries, to help establish effective intervention programmes
- Better diagnostic tests for TB in children must be developed to ensure a reliable diagnosis
- More data are needed on the frequency of multi-drug resistant TB and extremely drug resistant TB across Europe
- There is an urgent need to develop vaccines for lifelong protection from whooping cough



The total number of **childhood cases of TB** in Europe in 2010 was about **11,000**



Premature babies have immature lungs and as many as **73% of babies born at 23 weeks of pregnancy** develop BPD



**151 million new cases of pneumonia** develop each year in **children under 5 years** in the developing world



**Lung problems** account for about **one quarter of all visits by children** to a general practitioner

# Tuberculosis

[europeanlung.org/tuberculosis/](http://europeanlung.org/tuberculosis/)

Tuberculosis (TB) is a disease caused by a bacterium called *Mycobacterium tuberculosis*. Although the number of TB cases has decreased over the past decades, mainly in high economic countries, it is still an important public health problem due to recently emerging bacterial strains, particularly in low and middle-income countries, that are not responsive to commonly used drugs.



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## Areas for action

- There have been significant advances in diagnostic methods for TB, but there remain logistical and financial obstacles to their widespread adoption
- Countries with high rates of TB have to set up and maintain accurate diagnostic methods and strategies to manage the large numbers of people with drug-susceptible and multi-drug resistant TB (MDR-TB)
- Significant advances in vaccines and drugs are needed to reach European and global control of the condition
- More research is needed to identify markers of the disease to help predict the success of new treatments and vaccines
- Better cross-border cooperation on management of treatment for migrants is urgently needed

# HIV+

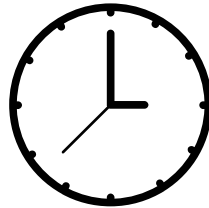
The WHO estimated that in 2011 there were **8.7 million new TB cases** of which **1.0-1.2 million** were HIV positive



The total number of **patients dying of TB** worldwide in 2011 was estimated to be **1.4 million**



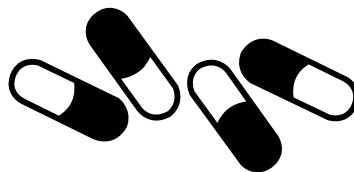
Each year, more than almost **400,000 new cases of TB** are diagnosed in Europe and more than 40,000 people die from the disease



The majority of people with untreated TB die within **1.5 years** after the development of the first symptoms



TB is **particularly problematic** among former **Soviet Union countries**, where MDR-TB is highly prevalent



**TB treatment** is complex and takes many months, using a **range of at least four drugs**

# Cystic fibrosis

[europeanlung.org/cystic-fibrosis/](http://europeanlung.org/cystic-fibrosis/)

Cystic fibrosis (CF) is an inherited disease, which is most common in white children and young adults, although it can affect people of any race. It used to be thought of as a disease of the lungs and digestive system, but it is now known to affect most organs in the body.



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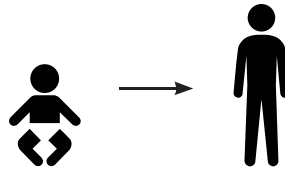
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## Areas for action

- There is a need to ensure that specialised services for adults with CF are established in all European countries and that they offer standards of care similar to paediatric clinics
- A dedicated CF unit is essential for best care
- CF should be diagnosed early, preferably by newborn screening
- As there will be an increased demand for lung transplantation, organ donation should be promoted to ensure that supply can meet the demand
- Treatment has in the past been solely aimed at symptoms of CF. Future research needs to concentrate on correcting the underlying abnormalities - the first treatment that corrects the basic defect has been developed (Kalydeco™ (Ivacaftor, VX-770)) for use in CF due to one specific gene variant
- Patients should be genotyped to allow for better targeted treatments



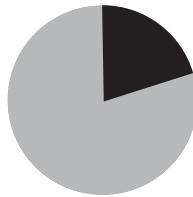
CF is an **inherited (genetic) condition**; a large number of variants of the faulty gene have been identified and the severity of the condition is dependent on the variation



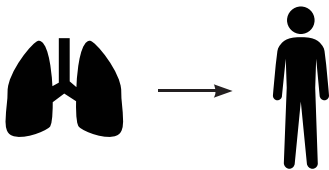
CF is **changing from a disease of childhood into a disease of adults**.  
Today, 42% of CF patients are aged >18,  
5% >40% years



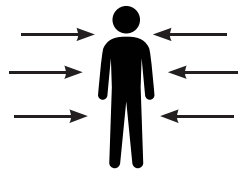
**Newborn screening** helps **reduce prevalence**, because parents are then able to make better informed decisions



**15%** of patients are **hospitalised** at least once a year



**0.6% of CF patients** have an **organ transplant** each year but this number is increasing; in most transplant centres CF is now the commonest reason for lung transplantation



Although CF has a major impact on the lungs **several other systems of the body are also affected** and non-respiratory complications are becoming more prominent as life expectancy increases

# Sleep disordered breathing

[europeanlung.org/sleep-disordered-breathing/](http://europeanlung.org/sleep-disordered-breathing/)

The term sleep disordered breathing refers to a range of conditions that result in abnormal breathing during sleep. The most common is sleep apnoea. Apnoea means a temporary pause in breathing. Although there are other types of apnoea, the term 'sleep apnoea' usually refers to obstructive sleep apnoea syndrome (OSAS) in which the individual is briefly unable to breathe due to temporary obstruction of the airway in the throat.



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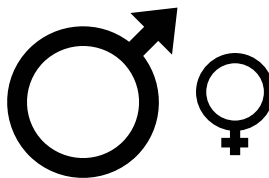
## Areas for action

- There needs to be more awareness of the condition and its consequences if untreated
- National health and transport authorities need to recognise the effect of sleepiness due to OSAS on driving in order to reduce the risks to affected individuals and the wider public
- More effort is needed to simplify investigations to diagnose the condition
- Facilities for treating sleep apnoea need to be expanded, as waiting times for assessment and treatment in Europe are a serious problem
- There needs to be a better understanding of which treatments work best with different groups of people in order to improve the effectiveness of therapy





OSAS is **common, underdiagnosed** and can be **treated highly effectively** using CPAP



In developed countries, it is reported to affect between **3 and 7% of middle aged men** and **2-5% of women**



People with untreated OSAS have a **1.2-2-fold increased risk of a driving accident**



**Moderate or severe obesity** is found in between **60 and 90%** of people with OSAS



Pre-diagnosis, OSAS is associated with **healthcare costs** per person of between **50% and 100% more** than those for the general population



**Smoking** and **alcohol** have both been linked with a **higher prevalence** of snoring and sleep apnoea

# Acute lower respiratory infections

[europeanlung.org/acute-lower-respiratory-infections/](http://europeanlung.org/acute-lower-respiratory-infections/)

Acute lower respiratory infections include pneumonia (infection of the lung or alveoli), as well as infections affecting the airways such as acute bronchitis and bronchiolitis, influenza and whooping cough. They are a leading cause of illness and death in children and adults across the world. The importance of lower respiratory infections may be underestimated.



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- The responsible and prudent use of antibiotics is vitally important to help stop cases of infections that are resistant to antibiotics
- There is a need to develop new or more effective vaccines against lung infections and viruses, involving greater international cooperation
- Innovative strategies against drug-resistant bacteria must be developed



Bronchiolitis is the most **common cause of admission to hospital** in the first 12 months of life



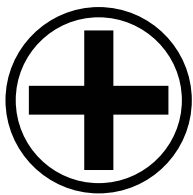
In the EU, about **3,370,000 cases of diagnosed pneumonia** are expected every year



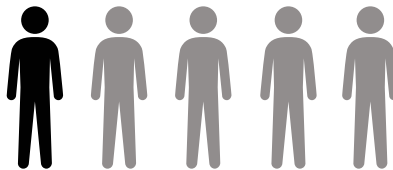
More than **90% of influenza-related deaths** occur in patients in the **older age group**



In Europe, approximately **16,500,000 cases of acute bronchitis** are seen each year



In children, **acute respiratory infections** account for almost **50% of visits to the doctor and hospitalisations**



**Influenza viruses** can affect up to **20%** of the global population each year

# Acute respiratory distress syndrome

[europeanlung.org/acute-respiratory-distress-syndrome/](http://europeanlung.org/acute-respiratory-distress-syndrome/)

Acute respiratory distress syndrome (ARDS) is a life-threatening condition where the lungs are unable to work properly. It is caused by injury to the capillary wall either from illness or a physical injury, such as major trauma. This results in the wall becoming leaky, leading to a build-up of fluid and the eventual collapse of the air sacs, leaving the lungs unable to exchange oxygen and carbon dioxide.



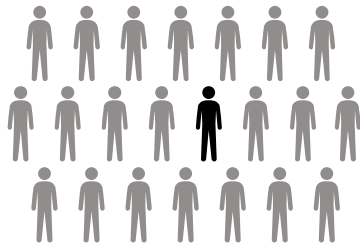
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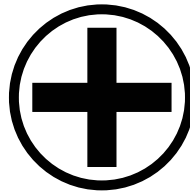
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## Areas for action

- Research is needed to develop pharmacological therapies for treatment
- Strategies looking at how to repair and regenerate the injured parts of the lungs are required
- Improvements should be sought in the treatment of ARDS patients in relation to ventilation techniques
- Further research is needed in new techniques and diagnostic tools
- Common working and standards need to be improved between nurses, physiotherapists and doctors in the intensive care unit



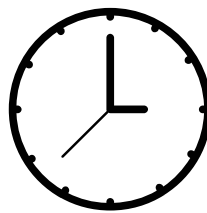
Between **10–58 people per 100,000** develop **ARDS** depending on location and how the condition is reported



**7.1% of people in critical care have ARDS**, rising to 12.5% when patients are in intensive care for more than 24 hours



**Death rates** range from between **27% and 45%** of people with ARDS



**Young patients** with ARDS following trauma are the most likely group of people to **fully recover from ARDS over 6–12 months**

# Bronchiectasis

[europeanlung.org/bronchiectasis/](http://europeanlung.org/bronchiectasis/)

Bronchiectasis describes the widening (“ectasis”) of some of the airways. This occurs in patches due to damage caused by infection. This prevents the effective clearance of mucus which then increases the chances of further infection and inflammation. The smaller airways are thickened and narrowed due to the inflammation and this leads to breathlessness.



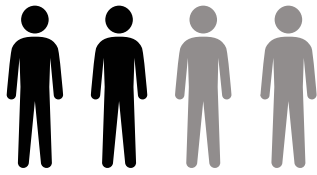
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## Areas for action

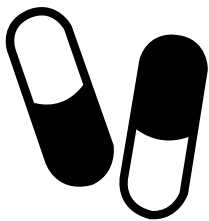
- Bronchiectasis, other than that due to cystic fibrosis (called “nonCF bronchiectasis”) is one of the most neglected respiratory diseases - there are currently few specialist services and few studies of the effectiveness of treatments
- Research is needed to improve both understanding of the condition and the management of people who suffer from it



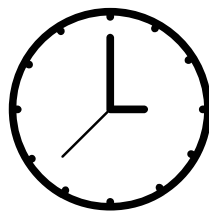
50% of people with bronchiectasis **have an existing condition**, such as cystic fibrosis or an immune deficiency, which makes them more likely to develop the condition



A **CT scan** is often needed to **diagnose** bronchiectasis



Recurring or persistent infections may require **regular physiotherapy and frequent antibiotic treatment**



**Prompt recognition and treatment** are key for **better long-term outcome**

# Interstitial lung diseases

[europeanlung.org/interstitial-lung-disease/](http://europeanlung.org/interstitial-lung-disease/)

Interstitial lung diseases (ILDs), also known as diffuse parenchymal lung diseases, result from damage to the cells surrounding the alveoli (air sacs) leading to widespread inflammation and fibrotic scarring of the lungs.



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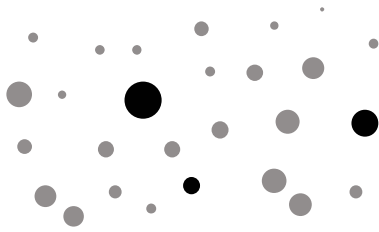


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## Areas for action

- ILDs are an increasing burden on healthcare resources - better availability of specialised services is necessary in order to improve management of these conditions
- Large-scale studies on the genetic causes of ILDs are needed to improve prevention and treatment





There are more than **300 different ILDs** but the large majority are very rare



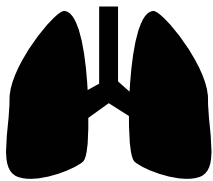
The hospitalisation rate for ILDs is highest in **Austria, Denmark, Norway, Finland, Poland and Slovakia** with more than 40 per 100,000 people



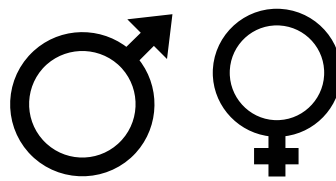
The highest death rate for interstitial lung diseases, of more than **2.5 per 100,000** is seen in the **UK, Ireland, Scandinavia, the Netherlands and Spain**



**Environmental factors** are recognised as causes in about **35% of people** with ILD



**Idiopathic pulmonary fibrosis and sarcoidosis** are the most common forms of ILDs and account for 50% of all ILDs



Sarcoidosis is more prominent in young adults of both sexes and in women over 50 years of age

# Pulmonary vascular disease

[europeanlung.org/pulmonary-vascular-disease/](http://europeanlung.org/pulmonary-vascular-disease/)

There are two main types of pulmonary vascular diseases: pulmonary embolism and pulmonary hypertension. Pulmonary embolism occurs due to blood clots which block branches of the arteries in the lungs, often following thrombosis in the veins of the leg or elsewhere.



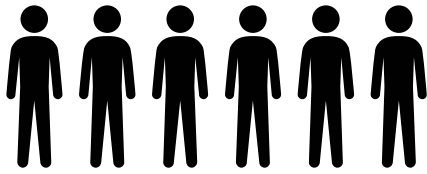
**ELF** EUROPEAN  
LUNG  
FOUNDATION



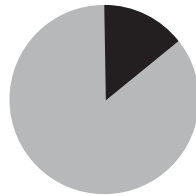
**ERS** EUROPEAN  
RESPIRATORY  
SOCIETY

## Areas for action

- There is a need to develop better diagnostic methods for acute pulmonary embolism
- More research is needed to determine the causes of pulmonary hypertension
- Better awareness of pulmonary hypertension is essential for earlier diagnosis and management of the condition
- Antithrombotic prophylaxis with low-molecular weight heparin significantly reduces the risk of venous thromboembolic diseases in patients who are at risk, and thereby the risk of pulmonary embolism
- New therapies are needed for pulmonary hypertension as there is no known cure
- Prevention methods should be improved for people at risk of pulmonary hypertension



In Europe, cases of pulmonary embolism range from **6 to 20** per **10,000 people** per year



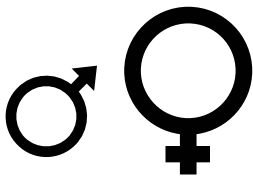
**7–11% of people** with pulmonary embolism **do not survive**



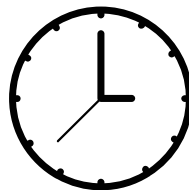
There are **1.5–5.2 cases of pulmonary arterial hypertension** per **100,000 people** in Europe



Pulmonary hypertension may result from any of a range of causes or may be of **unknown origin** (idiopathic)



More **women** than men develop pulmonary arterial hypertension



Pulmonary arterial hypertension without specific therapy has a **median survival rate of 2.8 years**

# Rare and orphan lung diseases

[europeanlung.org/rare-and-orphan-lung-diseases/](http://europeanlung.org/rare-and-orphan-lung-diseases/)

A rare disease is defined as one that affects fewer than one person in every 2,000 people in Europe. Orphan diseases are those which are not widely researched, those where specific treatments are not available, and those which may only be of limited interest to scientists and doctors. Examples include primary ciliary dyskinesia, multiple cystic lung diseases and idiopathic eosinophilic pneumonias.



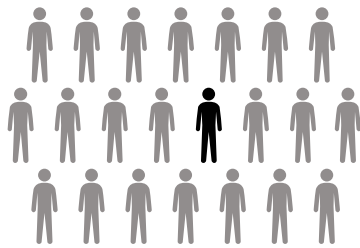
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## Areas for action

- New strategies are needed to encourage drug companies to develop treatments for rare and orphan diseases
- The time to be diagnosed needs to be urgently reduced to improve knowledge of the main features of rare diseases in healthcare professionals and this should be an ethical duty for all respiratory doctors
- There is a need to analyse the most effective strategies for encouraging drug companies to develop new treatments for rare and orphan diseases
- European reference networks should be further improved and registries and databases maintained



A **rare disease** is defined as one that affects fewer than **one person in every 2,000 people** in Europe

# 6,000

There are about **6000 rare diseases**, including well-characterised diseases as well as syndromes and anomalies



Around **80%** of rare diseases are caused by **genetic factors**



Orphan diseases are those which are **not widely researched and where specific treatment is not available**. They may be either common or rare



**Infectious orphan diseases** affect **1 billion people** worldwide and can cause disfigurement and lifelong disabilities



**1 million people die** each year from an **infectious orphan disease**

# Contributors

All the data contained in Lung health in Europe – facts and figures are taken from The European Lung White Book. A list of all the authors, reviewers, national respiratory societies, ERS national delegates and national respondents, patient organisations and ERS/ELF staff who contributed to the full publication can be found at:

<http://www.erswhitebook.org/contributors/>



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