

T. M. Zielonka RESPIRATORY HEALTH IN THE WORLD

Polish Respiratory Society

Respiratory diseases constitute a major health problem of the world today. In developed countries high incidence of asthma, chronic obstructive pulmonary disease (COPD) and lung cancer is observed [1]. This is the effect of cigarette smoking, developing industries and pollution of the environment. In underdeveloped countries major problems include tuberculosis (TB) and other respiratory system infections [2]. Every fifth death case is believed to be caused by a lung disease — the global annual mortality rate amounts to 10 million [3]. The most frequent causes of deaths related to lung diseases are, as follows: pneumonia (more than 4 million), TB (more than 2 million), COPD (more than 2 million) and lung cancer (about 1 million) (fig. 1). Average death rate, due to lung diseases, is estimated at 70/100,000 [1]. This indicator, however, is higher in Ukraine (80/100,000), and lower in Poland, at only 40/100,000 [1]. Polish data seem to be underestimated.

Respiratory diseases have become a significant socio-economic problem. In Europe, they are responsible for additional costs of more than 100 billion EUR p.a., of which 50 % are indirect costs of lost work days [1]. Drug expenditures account only for 7 % of total outlays, ambulatory care accounts for 9 % while inpatient care — 18 % [1] (fig. 2). Cost distribution varies, significantly, between individual countries (fig. 3). In Western Europe the highest costs are incurred due to asthma and COPD (primarily indirect costs). On the other hand, in Central and Eastern Europe countries both tuberculosis and occupational respiratory diseases play major role. Cost distribution also varies within incidents of individual diseases. With respect to COPD 2/3 of the costs are related to disability, while drugs, outpatient and inpatient care account for ca. 10 % of the costs [1]. Asthma generates high outpatient care costs (mainly drugs at more than 25 %), while the share of costs related to lost work days accounts for 50 %. With respect to pneumonia most of the costs are related to hospitalization, with smaller share of drugs and ambulatory care in total costs.

Tuberculosis

Tuberculosis continues to be one of the major health problem but incidence rate and change dynamics vary between different regions. WHO estimates point out to more than 8 millions new cases of tuberculosis annually and more than 2 millions deaths [4]. Majority of these cases occur in countries of Asia, Africa, and South America. Nearly half of the total number of new cases are recorded in India (1,8 millions), China (1,5) and Indonesia (0,6) (fig. 4) [2]. The highest incidence rate has been observed in Zimbabwe (700/100,000), Cambodia (550), Kenya (540), Mozambique (436), Congo (383), Uganda (363), Thailand (377), Ethiopia (370), Afghanistan (333), Philippines (320), Nigeria (304) and Bangladesh (221) (2). For economic reasons most of the affected population is not receiving any antituberculous treatment. International subsidies are insufficient to effectively overcome epidemics in these countries. According to WHO effective combating of tuberculosis in poor countries will require increasing the subsidies by additional 1 billion €p.a.

European epidemiological situation is much better although significant regional differences occur (fig. 5). In isolated populations such as Island, Malta, San Marino incidence of tuberculosis amounts to as low as 4 cases per 100,000 [5]. In Western Europe incidence rate is higher (ca. 10/100,000) while in Central European countries the incidence level is nearly four times higher. The worst situation is observed in the countries of the former Soviet Union with average incidence exceeding 80/100,000 (5). In Poland, annual incidence rate amounts to 26/100,000 while in Ukraine — 82/100,000 [2].

Furthermore, the change dynamics also vary significantly. In many countries such as: Belgium, the Netherlands, Ireland, Den-

mark, Germany, France, Switzerland, Poland, Slovenia, and Croatia the tuberculosis incidence rate is consistently decreasing [1]. In other countries (e.g. Romania, Bulgaria, Albania, Moldova) consistent increase in the number of new cases is observed, while in yet other countries (e.g. Russia, Belarus, Ukraine, Lithuania, Latvia, Estonia) the number of cases of tuberculosis doubled within a short time [1]. During the last decade, the number of TB new cases increased by more than 100,000 (from 232,000 to 335,000) and the average incidence rate increased from 28 to 40/100,000 [2].

TB spread is facilitated by poverty, malnutrition, alcoholism, limited access to medical care, increased migration, and HIV infections [4]. TB has remained a significant cause of deaths with majority registered in poor countries of Africa and Asia. In many European countries TB related mortality has declined significantly. In the Netherlands the TB related mortality rate amounts to 0.1/100,000 and in Scandinavia, the UK, Germany, Austria, and Switzerland the mortality rate remains below 1/100,000 [5]. In other countries, such as France, Italy, Spain, Portugal, and Poland TB mortality remains higher (at 1–5/100,000) but in Eastern Europe (Russia, Ukraine, Lithuania, Moldova, Romania etc.) mortality rate exceeds 10/100,000 [1]. TB constitutes a significant cause of death in Asian and African countries. In the countries of high incidence rates (Cambodia, Kenya, Mozambique) mortality exceeds the level of 100/100,000, while Zimbabwe recorded as much as 150/100,000 [2].

Pneumonia

Respiratory system infections are widely spread around the world, accounting for 25 % of the total number of physician consultations. Within this number, pneumonia accounts for 2–3 %. In majority, these are cases of community-acquired pneumonia, normally subject to outpatient treatment. Epidemiological data is diversified and include, primarily, hospitalized patients: 1625/100,000 in the U.S., 900 in Finland, 470 in the UK, 266 in Spain and 242 in Italy [6, 7]. Incidence rate has been increasing in the young and elderly populations. In the U.S. the number of pneumonia cases requiring hospitalization has increased from 93/100,000 for the age group of below 45 to 1010/100,000 for the age group of above 65 [7]. In majority of cases, etiology of pneumonia remains unknown and there are significant regional differences in pathogens causing pneumonia. The most frequent causes of pneumonia are, as follows *Streptococcus pneumoniae*, *Hemophilus influenzae* and atypical pathogens (*Mycoplasma pneumoniae*, *Chlamydia pneumoniae* and *Legionella pneumophila*). In the U.S. more than 100,000 patients are hospitalised because of *S. pneumoniae* and *Mycoplasma pneumoniae*, about 50,000 suffering from *Chlamydia pneumoniae* and nearly 18,000 suffering from *Legionella pneumophila* [7]. In the pediatric population pneumonia is mainly caused by *Mycoplasma pneumoniae* and *S. pneumoniae* [8]. In mechanically ventilated patients majority of pneumonia cases (83 %) are caused by Gram (–) bacteria and as much as 57 % results from drug resistant bacteria (MRSA, *P. aeruginosa*, *A. baumannii*, or *S. maltophilia*) [9]. The most frequent cause of bronchial and upper respiratory tract infections are viruses (*respiratory syncytial virus*, *rhinovirus*, influenza, parainfluenza viruses etc.) [10]. Each year the 5–15 % of the total population suffers from flue [10].

Pneumonia constitutes one of the most important causes of deaths. About 10 % of the hospitalized patients die from pneumonia. The morbidity rate is the highest in the UK (120/100,000 males and 80/100,000 females), in the Netherlands (80/100,000 and 60/100,000 respectively) and in Ireland (70/100,000) [1]. The lowest morbidity rate, below 15/100,000, has been recorded in Greece, Hungary, Macedonia, and Armenia [1]. Poland registered 20 deaths per 100,000 both in male and female population (fig. 6). The fact that also Ukraine registers only few deaths caused by pneumonia should be interpreted conservatively since the data is very likely to be underestimated [1]. Morbidity resulting from pneu-

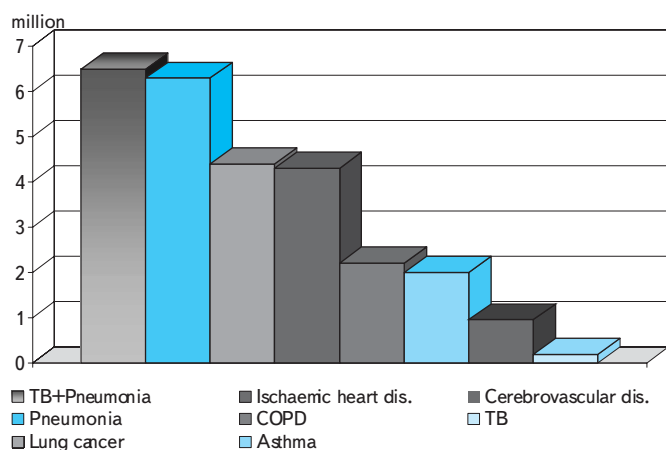


Figure 1. Leading causes of death worldwide (3)

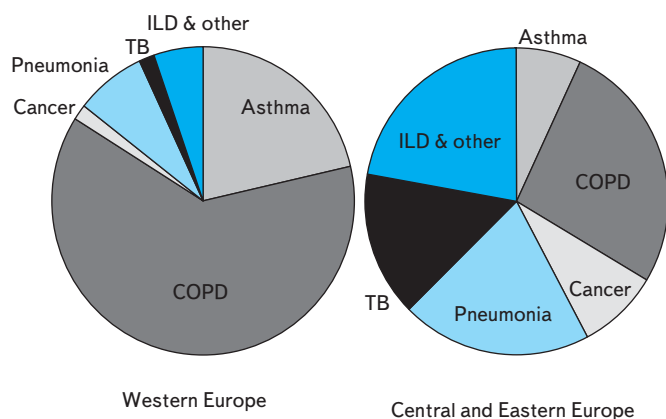


Figure 3. Distribution of annually lost work days due to lung diseases (1)

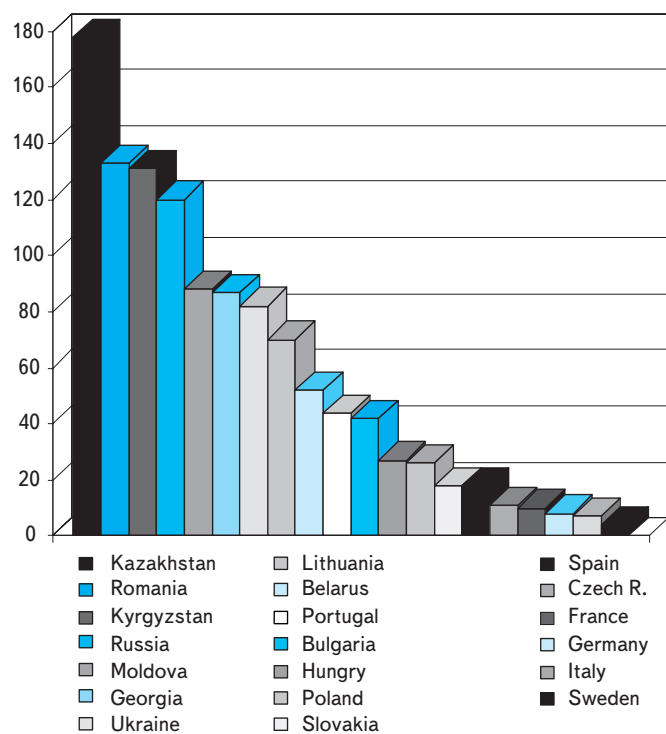


Figure 5. Tuberculosis incidence rate per 100,000 in Europe (2)

monia increases with the age of the patients and reaches the level 10 times higher in the age group of above 75 (e.g. in the UK 1300/100,000, in Poland 400/100,000) [11]. In poor countries pneu-

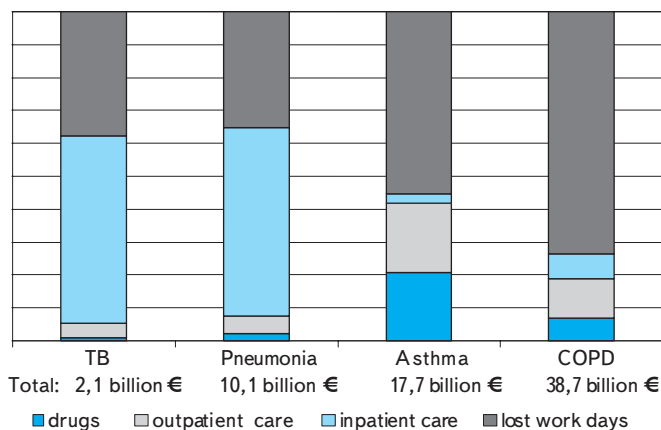


Figure 2. Distribution of costs in Europe for major lung diseases (1)

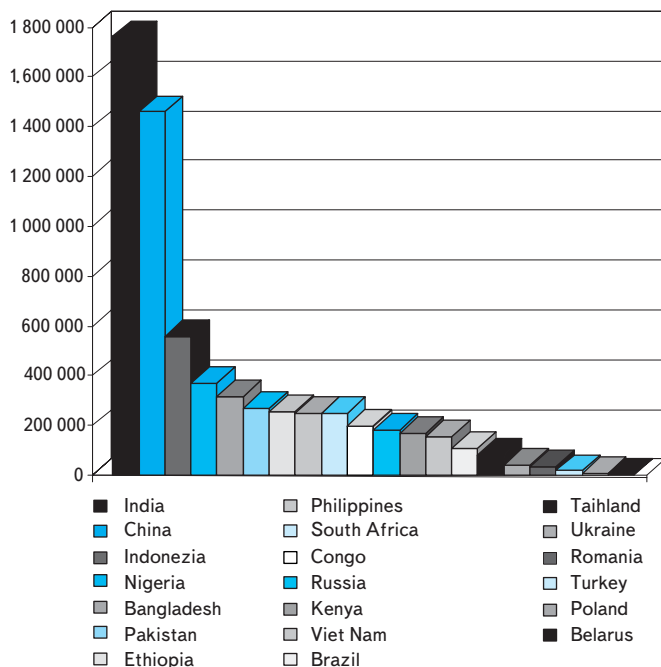


Figure 4. Number of new tuberculosis cases in selected countries (2)

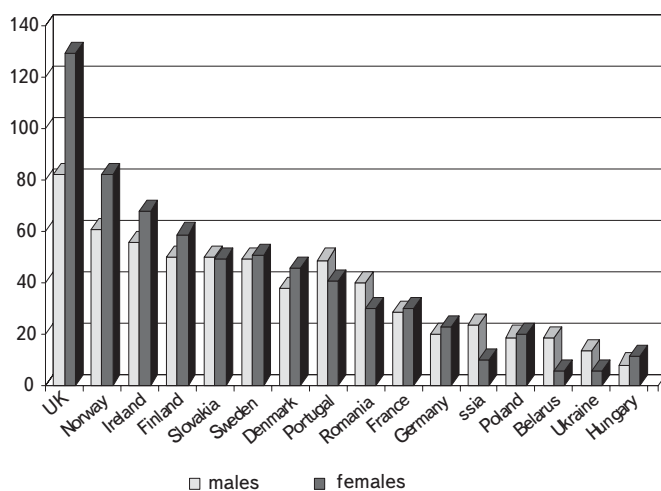


Figure 6. Pneumonia mortality rate per 100,000 in Europe (11)

monia is a cause of 30 % of deaths of children of up to 5 years of age (more than 1 million deaths p.a.). In industrialized countries, the infant mortality rate remains below 10/100,000 [1].

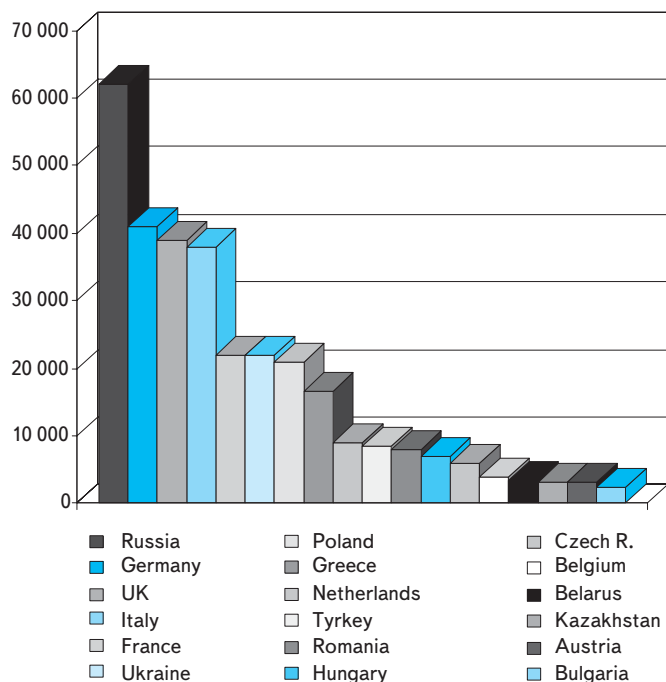


Figure 7. Annually number of new lung cancer cases in Europe (13)

Lung cancer

For many years an increase in incidence of lung cancer has been observed. The lung cancer has become the most frequent cancer in the male population and the second most frequent in female population [14]. There are significant geographic differences in the incidence rates and in New Zealand and in the afro-American population more than 100/100,000 cases are registered each year, while in India, Uganda, and Mali the rate is not exceeding 1–4/100,000 males [12, 14]. Among the female population this cancer is rare e.g. 1.5/100,000 in Mali, 0.4/100,000 in Uganda and 0.3/100,000 in India [13]. The European incidence rate is not that diversified and reflects smoking habits of individual populations. The list of countries registering the highest incidence rates (above 60/100,000) includes: Hungary, the Czech Republic, Poland, the UK, Denmark, Greece, Italy and Croatia. Ukraine's incidence rate remains at European average (46/100,000 [1]. Cases of lung cancer are less frequent in Sweden, Finland, Ireland, Belgium, Austria, and Turkey (ca. 30/100,000) [1]. Even lower incidence rates (ca. 10/100,000) are registered in Asian, former USSR republics (e.g. Kyrgyzstan, Uzbekistan, Turkmenistan, Armenia, and Azerbaijan). Males suffer from lung cancer more often than females, but proportion in terms of numbers of cases in male and female populations are changing and more and more frequently reach similar levels. In Europe, the lung cancer male incidence rate is the highest in Greece, Italy, Hungary, Croatia, Poland, and the Czech Republic while with respect to female populations the leaders include: Denmark, the UK, Greece, Iceland, Norway, and the Netherlands [13]. In Poland, male incidence rate amounts to 82/100,000 and female 22/100,000 while in Ukraine these numbers are, respectively 66/100,000 and 15/100,000 [1]. The risk is increasing with age. The highest lung cancer annually prevalence is registered in Russia (62,000), Germany (41,000), and in the UK (39,000). Ukraine (21,000) and Poland (20,000) rate ranked sixth and seventh respectively (fig. 7) [1].

Morbidity rate of lung cancer is very high with only 5–12 % of patients surviving more than 5 years [13, 14]. The lung cancer is responsible for more than 20 % of all cancer related deaths in Europe (in male population this rate is higher at 30 % and in female population — 11 %) [13].

COPD

The second important disease related to tobacco smoking is COPD. Only 15 % of the patients have never smoked [15]. 4–10 %

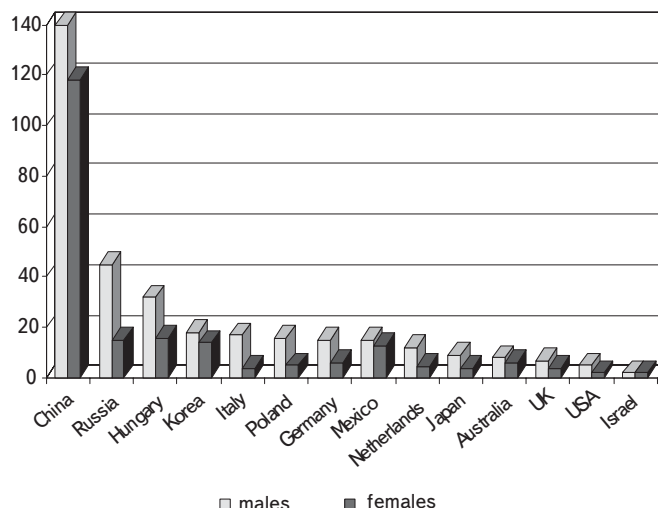


Figure 8. COPD mortality rates per 100,000 in selected countries (15)

of adult population suffer from clinically relevant COPD [16]. It was estimated that 3.0 million people suffer from COPD in the UK, 2.7 million in Germany, 2.6 million in Italy, 2.5 million in France, 2.0 million in Poland and 1.8 million in Spain [1]. COPD prevalence above 10,000/100,000 in Europe has been recorded in Germany and Italy. In Poland and Ukraine incidence remains at similar levels (2–5 thous./100,000) [1]. Average rate of incidence worldwide is estimated at 834/100,000, [16]. The COPD incidence increases with age. Cases of COPD below 45 years of age are very rare.

COPD, worldwide, accounts for 4 % of male deaths and 2 % of female deaths, however in the U.S. the rate is higher, reaching up to 8 % [15, 17]. In total, COPD is responsible for 2.2 millions deaths annually [1]. In Ukraine, as in Kyrgyzstan, Kazakhstan, Ireland, and Romania the highest COPD mortality rates in Europe have been recorded (more than 75/100,000 males) [1]. The lowest mortality (under 10/100,000) has been registered in Greece, Finland, Switzerland, and in Sweden (fig. 8). In Europe, the COPD mortality rate in male population amounts to 50/100,000 and in female population — 20/100,000 [16]. Spread of the disease in China raises concerns, with mortality reaches the level six times higher than in India, and countries of Africa and South America. Although COPD mortality rate is 2–3 times higher in male than female population, it is necessary to underscore dynamic increase of this rate in the female population. In the U.S., during the last decade, female mortality rate increased from 3 to 17/100,000, while male mortality increased only from 29 to 32/100,000 [17]. COPD is ranked six as a cause of all deaths but it is expected to rise to the third place soon [15].

Asthma

Epidemiological importance of asthma has been continuously growing. In many countries, irrespective of the rates of their respective economic growths, asthma has quickly become one of the most frequent chronic diseases. The asthma cases are frequently recorded not only in the U.S. and Canada but also in Peru, Nigeria, Kenya, Iran, and Malaysia [18]. According to WHO estimates, even up to 150 million people may suffer from asthma [1].

Significant regional differences occur all over the world. In Europe more than 10 % adults suffer from asthma in the UK, France, Sweden, Denmark, the Netherlands, Switzerland, Austria and Greece [19]. The highest prevalence of asthma is reported in Australia and New Zealand. Poland is in the group of countries with moderate prevalence of asthma (5.4 %), but Ukraine with Russia and Lithuania belong to those with the lowest prevalence in Europe (less 1 %) [1]. The prevalence of asthma is the highest among the 14 year-old children and in some countries it reaches even 30 % (Australia, New Zealand Kenya, Peru, Uruguay, Ireland, the UK — figure. 9) [18]. Asthma is a common chronic disease in children and its prevalence in Europe has increased markedly during the last 20 years.

Progress and development of new treatment methods has reduced the asthma related mortality (180,000 deaths annually) [20]. In Europe, the mortality above 8/100,000 was recorded only in Portugal, Belgium, Germany, and Russia. Poland, with the Czech Republic, Austria, France, and Lithuania is located in the middle group (with mortality below 2–4 deaths per 100,000) while Ukraine is among the countries with the lowest rates (below 2/100,000) [1]. The lowest rate was recorded in the Netherlands (0.5/100,000) [19]. Asthma constitutes a significant economic problem with outlays on asthma treatment amount to 1–2 % of total medical care outlays (18 billion € in Europe and 13 \$ billion in USA) [20].

Interstitial lung disease (ILD)

ILD constitutes a significant and diverse group of respiratory diseases including nearly 200 various types of diseases, accounting for 15 % of all lung diseases [21]. ILDs occur mostly in middle-aged or older subjects. In 65 % of ILDs the cause is still unknown [1]. Only a few countries (Germany, Italy, Spain, and Belgium) have collected reliable epidemiological data on ILD (fig. 10). In Italy 1 case per 100,000 is registered each year, while Spain registers 20/100,000. Incidence rate is significantly higher (in the U.S. 81/100,000 in male population and 67/100,000 in female) [21]. Idiopathic pulmonary fibrosis (IPF) constitutes the most frequent ILD. Incidence rate in the U.S. has reached 7–11/100,000 and in Europe 3–6/100,000. Incidence rate clearly increases with age reaching the level of 175/100,000 for population above 75 years of age [21]. Sarcoidosis is a disease of northern countries. Incidence rates in Sweden, Denmark, Germany, and Ireland remains at 40–60 per 100,000 populations [24]. In southern countries (e.g. Greece, Italy, Spain, Portugal, and China) there are only 0.5/100,000 [24]. In Poland the incidence has been estimated at 7/100,000. Sarcoidosis occurs primarily in younger population (third and fourth decade). Hypersensitivity pneumonitis (bird fancier's lung and farmer's lung) occurs in up to 10 % persons exposed to antigens [25]. Lung changes of connective tissue disease account for 10 % of all ILD. Incidence rate is estimated at 7/100,000 for males and 12/100,000 for females [26]. The disease results in lung changes in 10–80 % cases [26]. Drug related lung changes account 2–3 % of all ILD [27]. More than 300 drugs are recognized as causing respiratory changes, in particular ILDs. ILD mortality rate in Europe is estimated at 0.5–1/100,000. Only in the UK and Slovakia the rate is higher at 2/100,000 (1). IPF is a most frequent cause of death from ILD (44 %), followed by connective tissue diseases (30 %), hypersensitivity pneumonitis (12 %) and sarcoidosis (2 %) [19].

Occupational respiratory diseases

Occupational respiratory diseases are also important. In Germany they account for 37 % of all occupational diseases [28]. In Europe, the highest incidence rate has been recorded in the Czech Republic (10/100,000) and the lowest in Lithuania (0.4/100,000)

[1]. Developing industries and modern civilization resulted in changes in incidence of individual occupational diseases. In Western Europe incidence of occupational pneumoconiosis is no longer recorded in the Netherlands, while Poland registers 800 cases each year [1, 28]. In developed societies, asthma seems to be the most frequent occupational respiratory disease with incidence exceeding that of pneumoconiosis — so popular in the past. In industrialized countries (e.g. Germany, the UK, and the U.S.) incidence of occupational asthma amounts to 2–15/100,000 employees, accounting for 5–15 % of total number of asthma cases [29]. Occupations most frequently falling to asthma include farmers, paint shop employees, bakers, workers of timber industry, food processing and plastic manufacturing, as well as employees of chemical, pharmaceutical, and rubber industries. Asbestos is primarily responsible for a cancer and non cancer related occupational changes of pleura. Due to lengthy period of latency of pathological changes pleural changes will continue to be discovered during the near future, in spite of significant limitation in the use of asbestos, due to past exposure to this agent. The number of deaths from mesothelioma is expected to increase in the near future [28]. About 12 % of lung cancer cases and COPD result from

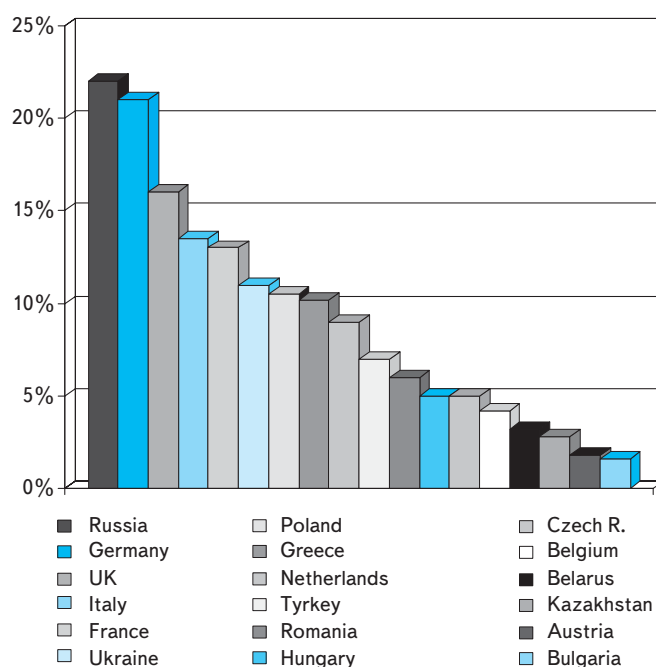


Figure 9. Prevalence of asthma in 13–14 olds child (18)

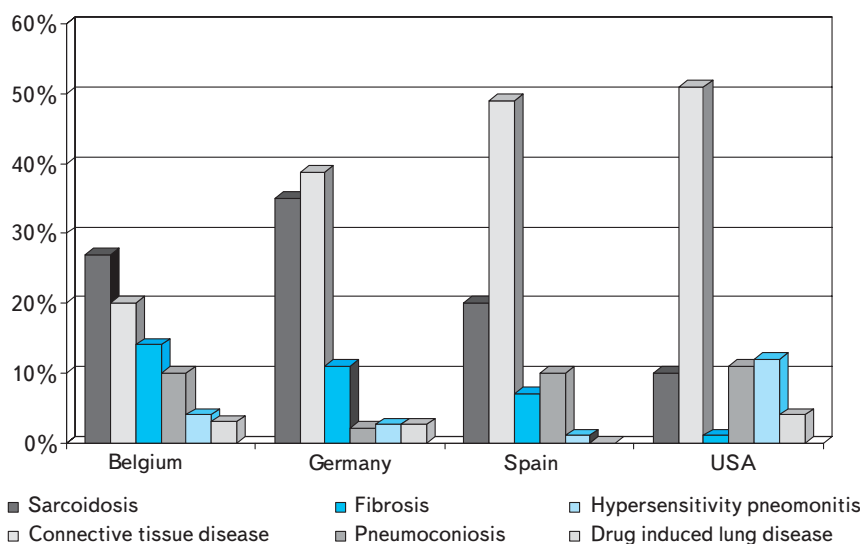


Figure 10. Epidemiology of interstitial lung diseases (21, 22, 23)

occupational exposures [15]. The highest occupational lung disease mortality rate has been registered in Austria (1,1/100,000) and in the Czech Republic (0,9/100,000) and the lowest in France (0,34/100,000) [10].

According to epidemiological assessments, respiratory diseases are included in the list of most frequent diseases of the world today. Civilization changes are responsible for growing incidence. In the near future importance of these diseases is expected to increase even more.

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