



# Occupational Diseases in the Republic of Srpska from 2011-2020

Nada Marić,<sup>1,2</sup> Sonja Peričević Medić,<sup>3,4</sup> Milorad Španović<sup>3,4</sup>

## Abstract

**Background/Aim:** The importance of occupational diseases is due to their influence on workers' quality of life and significant socioeconomic problems for the health sector, employers and the state. Occupational diseases are generally not curable but are preventable diseases, so it is extremely important to develop a good system of detection, registration and prevention. Therefore, special attention should be paid to the occupational incidence analysis. Aim of this study was to assess the incidence of occupational diseases in the Republic of Srpska.

**Methods:** The research was conducted as a cross-sectional study based on the obtained data on occupational diseases in the Republic of Srpska for ten years (from 2011 to 2021).

**Results:** In the observed period, 12 cases of occupational diseases were registered in the Republic of Srpska and the incidence was less than 1/100,000 per year. Occupational diseases were diagnosed in: - agriculture, forestry and fishing; - construction and - healthcare and social welfare.

**Conclusion:** The study showed a low incidence of occupational disease and it was observed that certain industrial sectors were particularly undervalued. The current situation regarding occupational diseases in the Republic of Srpska requires an urgent response from the occupational medicine services and the state. It is necessary to initiate procedures as soon as possible to ensure uniformity in the criteria of diagnosis and records of occupational diseases and revision of the list of occupational diseases by the International Labour Organisation. In the future, it is necessary to conduct additional and more detailed research in the field of occupational diseases.

**Key words:** Occupational health; Employee; Occupational morbidity; Workers; Occupational medicine.

1. Institute of Occupational Health and Sports Medicine of the Republic of Srpska – Centre Bijeljina, Bijeljina, the Republic of Srpska, Bosnia and Herzegovina.
2. Faculty of Medicine, University of Banja Luka, Banja Luka, the Republic of Srpska, Bosnia and Herzegovina.
3. Department of Occupational Medicine, Institute of Occupational Health Novi Sad, Novi Sad, Serbia.
4. Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia.

### Correspondence:

NADA MARIĆ

E: nada.maric@medicinaraadaisporta.net

M: +387 65 842 103

### ARTICLE INFO

Received: 4 December 2022

Revision received: 14 January 2023

Accepted: 14 January 2023

## Introduction

According to the Convention of the International Labour Organisation (ILO) from 2002, the term occupational disease includes any illness that occurs as a result of exposure to risk factors at the workplace. The main two elements of occupational diseases are the cause-and-effect relationship

between exposure and specific working conditions or work activities and the fact that these diseases occur in a certain group of people with a higher frequency than in the rest of the population.<sup>1</sup>

In the Republic of Srpska, the definition of occupational diseases is regulated by the Law on Pension and Disability Insurance of the Republic of Srpska<sup>2</sup> and according to it: "Occupational diseases are certain diseases that occurred during insurance, caused by a longer direct influence of processes and working conditions at workplaces, ie jobs that the insured performed". In addition to the Law on Pension and Disability Insurance, the field of occupational diseases in the Republic of Srpska is regulated in more detail by the Rulebook on the List of Occupational Diseases, adopted in 2018 ("Official Gazette of RS" No 84/2018). According to Article 2 of the Rulebook on the List of Occupational Diseases, occupational diseases, by the Law on Pension and Disability Insurance, are certain diseases that occurred during the course of insurance, caused by a longer direct influence of the work process and working conditions at workplaces, ie the jobs performed by the insured, such as and diseases that are known to be the result of harmful effects related to the work process or working environment and the intensity of the harmfulness and the length of the period of exposure to that harmfulness is at a level that is known to cause damage to health. Following the same Rulebook, it is determined that occupational diseases in the Republic of Srpska must be proven in the reference institution of occupational medicine and a list of occupational diseases that belongs to the category of closed lists is defined (which means that only the diseases listed in the Rulebook, 59 of them, can be verified as professional).<sup>3</sup> However, it should be mentioned that the list of occupational diseases in the Republic of Srpska can be considered partially open, but only for diseases caused by biological hazards, where paragraph 46 states that all infectious and parasitic diseases caused by work in activities where the risk of infection is increased with a certain diagnostic algorithm can be verified as occupational diseases.

In addition to workers' quality of life, occupational diseases also represent a significant socioeconomic problem for the health sector, employers and the state. Occupational diseases can cause a significant economic burden on the country by reducing the productivity of the working population, leading to temporary or complete incapacity for work and eventually to death.<sup>4,5</sup> For example, according to data from Croatia, only costs in 2015 amounted to 900 million HRK [0.3 % of gross domestic product (GDP)], while previously estimated the annual average for the period 2002-2009

of all costs amounted to HRK 1.1 billion (0.4 % of GDP).<sup>5-7</sup> In the Republic of Srpska, sick leave is paid as a result of occupational disease in the amount of 100 %.<sup>8</sup> It must not be forgotten the costs of healthcare, which includes diagnosis, treatment and rehabilitation of workers. If there is a complete loss of working ability, the costs of early (disability) pension, that is, in case of death, are the costs of paying compensation to the family of the deceased.

Enormous importance of occupational diseases is also shown by the fact that in 1925 the ILO published the first list of occupational diseases and since then the lists have been regularly revised. In Europe, as early as 1957, it was determined that one of the basic tasks of the European Commission is the development of protective measures for occupational diseases and injuries at work. In 2003, the European Commission emphasised that in the future it is necessary to improve the list of occupational diseases, to improve data collection and adequate prevention of occupational diseases.<sup>1</sup> Also, according to the ILO Convention C155, all member countries should have a single registration system that would provide information and enable the creation of policies for the prevention of occupational diseases.<sup>9</sup> However, registers of occupational diseases differ in terms of diagnosis, criteria, records and legal regulations from country to country in the European Union.<sup>10</sup> That is why it is difficult, or almost impossible, to make a comparison between countries. The situation is the same with the Republic of Srpska, where the list of occupational diseases differs and the problem of data collection and processing is even more evident.

Davodi et al<sup>4</sup> state that because occupational diseases are generally not curable, but are preventable diseases, it is extremely important to develop a good system of detection, registration and prevention. Therefore, special attention should be paid to the analysis of the frequency and incidence of occupational diseases, as well as to the identification of the main challenges, that is, to the investigation of possibilities for solving the problems of prevention and control of occupational diseases to form guidelines and strategies for the prevention of occupational diseases. In the territory of the Republic of Srpska, no research was found that dealt with the issue of occupational diseases.

This study aimed to assess the incidence and

trend of occupational diseases in the Republic of Srpska for ten years, from January 2011 to December 2020 and to analyse the influence of gender and the industrial sector on the occurrence of occupational diseases, to determine the most frequent occupational diseases in the analysed period and to make a proposal further measures.

## Methods

The research was conducted based on the obtained data on occupational diseases in the Republic of Srpska. Data on occupational diseases from January 2011 to December 2021 were collected from the Register of Occupational Diseases of the Institute of Occupational Medicine of the Republic of Srpska (Register). This Register records occupational diseases that were diagnosed at the Institute for Occupational and Sports Medicine of the Republic of Srpska in the specified period. Diseases diagnosed out of the territory of the Republic of Srpska (Federation of Bosnia and Herzegovina, Brčko District, Republic of Serbia) were not included in the analysis.

For data analysis, the records of the Bulletin of the Statistical Office of the Republic of Srpska on employment in the Republic of Srpska in the analysed period<sup>11</sup> were used.

Based on data on employment and the number of occupational diseases, the incidence of occupational diseases per 100,000 employees and the trend of occupational diseases concerning gender, industry sector and diagnosis were analysed.

Descriptive statistics were used for data analysis. The Statistical Package for the Social Science (SPSS) program version 18.0 was used for statistical processing and data analysis. The results were presented tabularly and graphically.

## Results

From January 2011 to December 2020 a total of 12 cases of occupational diseases were registered and recognised in the Republic of Srpska. Of these, 10 cases (83.3 %) were registered in males and 2 (16.7 %) in females. The largest number of diseases

was registered among employees aged 55-64, with 5 cases (41.7 %), with exposure to work experience of 5-9 years (3 or 25 %). Table 1 shows the number and frequency of occupational diseases in the Republic of Srpska in the analysed period.

**Table 1:** Occupational diseases in the Republic of Srpska from 2011-2020

Parameter	N	%
<b>Gender</b>		
- Male	10	83.3
- Female	2	16.7
<b>Age (years)</b>		
- < 25	0	/
- 25-34	1	8.3
- 35-44	5	41.7
- 45-54	1	8.3
- 55-64	5	41.7
- > 65	0	/
<b>Occupation</b>		
A - Agriculture, forestry and fishing:		
- Logger	4	33.3
- Tractor operator	2	16.7
F - Construction:		
- Worker (asbestos processing)	1	8.3
- Driver	1	8.3
Q - Healthcare:		
- Doctor of medicine	1	8.3
- Medical technician	2	16.7
- Senior laboratory technician	1	8.3
<b>Working experience (years)</b>		
- 10-14	1	8.3
- 15-19	2	16.7
- 20-24	1	8.3
- 35-39	2	16.7

The incidence of occupational diseases by year in the analysed period is shown in Figure 1.



**Figure 1:** Incidence of occupational diseases

Figure 2 showed the incidence of occupational diseases concerning gender per 100,000 employees in the analysed period.

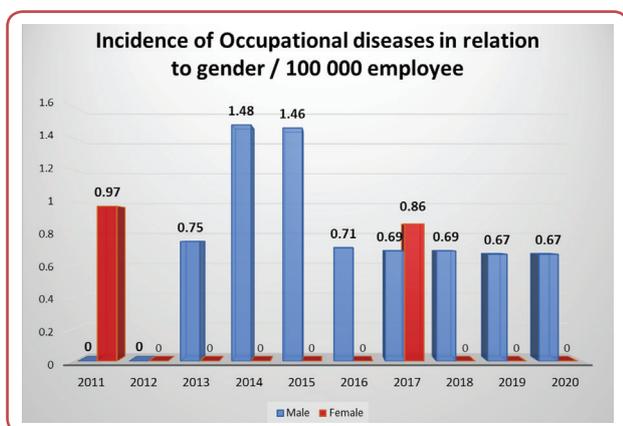


Figure 2: Incidence of occupational diseases related to gender

The incidence of occupational disease concerning the industry sector is shown in Figure 3.

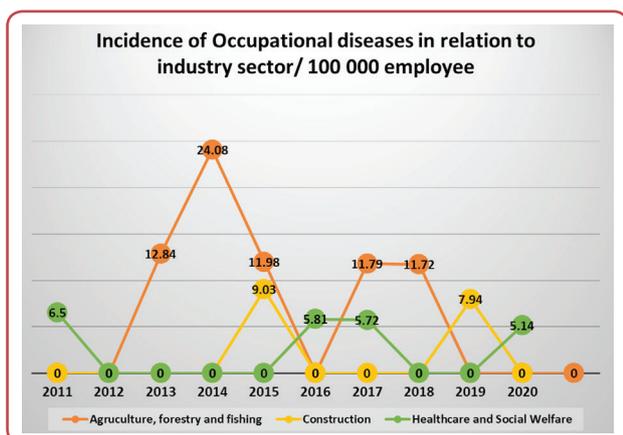


Figure 3: Incidence of occupational diseases concerning the industry

Table 2: Occupational diseases in an accordance to the International Classification of Diseases (ICD-10)

ICD-10	Total N (%)	Gender		Industrial sector		
		Male N (%)	Female N (%)	A N (%)	F N (%)	Q N (%)
A98.5	4 (33.3)	4 (40.0)	0	4 (66.7)	0	0
B18.1	1 (8.3)	1 (10.0)	0	0	0	1 (25.0)
C34.3	1 (8.3)	1 (10.0)	0	0	1 (50.0)	0
L23.5	2 (16.7)	0	2 (100.0)	0	0	2 (50.0)
T75.2	3 (25.0)	3 (30.0)	0	2 (33.3)	1 (50.0)	0
U07.1	1 (8.3)	1 (10.0)	0	0	0	1 (25.0)

A - Agriculture, forestry and fishing; F - Construction; Q - Healthcare; A98.5 - Haemorrhagic fever with renal syndrome; B18.1 - Chronic viral hepatitis B without delta agent; C34.3 - Malignant neoplasm: Lower lobe, bronchus or lung; L23.5 - Allergic contact dermatitis due to other chemical products; T75.2 - Effects of vibration; U07.1 - COVID-19, virus identified.

The analysis of occupational disease concerning diseases according to the International Classification of Diseases (ICD-10) is shown in Table 2.

## Discussion

According to the available data, this is the first study in the Republic of Srpska that dealt with the issue of occupational diseases in country. The research aimed to analyse the incidence of occupational diseases in the Republic of Srpska, to analyse the influence of gender and industrial sector on their occurrence, as well as to determine the most frequent occupational diseases, to form further research plans and guidelines to improve the health of the working population.

The results of this research showed that the incidence of occupational diseases in the Republic of Srpska is extremely low. In the analysed ten-year period, the incidence of occupational diseases ranges from 0 - 0.83/100,000 employees, while, for example, in the Czech Republic in 2013 it was 1.4/10,000<sup>12</sup> and in Poland, in 2011 it was even 24.6/100,000 employees.<sup>13</sup> It should be noted that the comparison of the results of this study with the results of other countries is difficult due to the difference in the diagnostic criteria and the lists of occupational diseases. Also, the number of studies on occupational diseases is limited. In the research of Geharn et al, it is stated that there is a significant stagnation in publications on occupational diseases over the past 60 years compared to the increased number of publications from other branches of medicine.<sup>14</sup> However, the incidence of occupational diseases in the Republic of Srpska is underestimated, that is, there is a significant number of unverified occupational diseases in the country. According to data, even in the countries of the European Union, the number of occupational diseases is underestimated.<sup>1</sup>

Automation of the work process, which led to the improvement of working conditions or better prevention, could have contributed to the reduction of occupational morbidity; however, it is unlikely that working conditions in the Republic of Srpska are better than conditions in other countries. The important fact is that during the two thousand years healthcare has undergone certain reforms. Family medicine doctors treat the working population in primary healthcare institutions or direct them to specialists in secondary and tertiary institutions. A large number of sick working people do not direct to occupational medicine specialists. Furthermore, there is an inevitable lack of knowledge of specialists in family medicine, as well as all other specialists (internists, ENT, ophthalmologists, etc) because there is no

basis for training in occupational medicine in any specialisation program. The lack of knowledge of occupational medicine and reduced contact with occupational medicine services contributed to the enormous and apparent reduction of occupational morbidity.

It must not be forgotten the fact that there has been significant privatisation of the industry, which has led to a decrease in employers' interest in recognising occupational diseases. Also, the workers' fear of losing their jobs certainly led to a certain extent to a reduced number of patients reporting to doctors and thus to a reduction in the number of registered occupational diseases and these assumptions are stated by other authors as well.<sup>1</sup>

By analysing occupational diseases concerning gender, the results showed that occupational diseases occur more often in men. The incidence of occupational diseases in males ranged from 0-1.48/100,000 employed men and in females from 0-0.97/100,000 employed women. The possible gender difference stems from the traditional division of labour and the fact that women more often do "easier" jobs, ie jobs in which risk factors are less prevalent.

A worrying fact is a result that in the ten years, occupational diseases were verified only in three industrial sectors: agriculture and forestry, construction and healthcare. Inevitably, other industrial sectors are unjustifiably underestimated, such as mining, the chemical industry, metal processing, etc. That difference in the verification of occupational diseases in healthcare could be explained by the significantly higher "health literacy" of healthcare workers compared to workers from, for example, the mining and metal-working industry. Diagnosis of diseases is also more accessible to healthcare workers. However, the fact is that this result indicates the need for urgent activation of occupational medicine services and the state to solve the problem of recognition and verification of occupational diseases. Also, in the industrial sectors where occupational diseases have been verified, the incidence is either low or there is a discrepancy in the results. For example, in agriculture and forestry, the incidence ranges from 0-24.08/100,000 workers or employees, which indicates irregular reporting and verification, as well as the need for more detailed analyses.

Analysing the data in the examined ten-year period in the territory of the Republic of Srpska, it is observed that out of the total number of occupational diseases, only one case of lung cancer was verified, while according to the data of a group of British researchers, it is estimated that more than 8 % of deaths due to cancer in men are the result of occupational exposure and of these about 20 % of cases are lung cancer.<sup>15</sup> Also, it should be mentioned that other malignant diseases probably remained unrecognised. It should be mentioned that in the Republic of Srpska, according to the Rulebook, there is a possibility of recognising COVID-19 as an occupational disease and this was verified in 2020 in only one case with a health worker. What about other health workers who had severe forms of illness with the development of consequences or the families of deceased health workers? This degrading information speaks in favour of the lack of basic knowledge about occupational diseases in healthcare.

The disadvantages of this research are imprecise data on occupational diseases from the Register of the Institute of Occupational and Sports Medicine, due to the possibility that some diseases are recognised outside the territory of the Republic of Srpska.

Regardless of the mentioned shortcomings, the results of this research provided insight into the trend and problems related to occupational morbidity in the Republic of Srpska. For better prevention in the future, it is necessary to revise the list of occupational diseases and harmonise it with the list and criteria of the ILO list, establish national registers and uniformly enter data by recommendations. Furthermore, one of the eternal problems is inadequate supervision and reduced contact of the sick working population with occupational medicine services, on the one hand and insufficient knowledge about occupational diseases among other health workers. Faculties, health institutions, occupational medicine institutions or other competent services should in the coming period consider the introduction of education for other medical activities on the basics of occupational medicine and the causes of occupational diseases. No less important and necessary is the health education of employers and employees to prevent the occurrence and consequences of occupational diseases.

## Conclusion

This study provided insight into the trend of occupational diseases in the Republic of Srpska in the period 2011-2020 and showed a significantly low incidence of occupational morbidity. The incidence of occupational disease was less than 1/100,000 employees per year in the research period. In addition, results showed that certain industrial sectors are particularly undervalued (for example chemical industry, mining etc). It is obvious that the current situation regarding occupational diseases in the Republic of Srpska is problematic and requires an urgent response from the occupational medicine services and the state. It is necessary to initiate procedures as soon as possible to ensure uniformity in the criteria of diagnosis and records of occupational diseases and revision of the list of occupational diseases following the list of the ILO. In the future, it is necessary to conduct additional and more detailed research in the field of occupational diseases, which would help in the formation of guidelines and strategies for the prevention of occupational diseases at all levels of health-care.

## Acknowledgements

We are grateful to Jovanka Koprena, a resident in occupational medicine, for help in collecting data from the Registry of Occupational Disease Institute of Occupational Health and Sports Medicine, Banja Luka.

## Conflict of interest

None.

## References

1. Graczyk H, Francois M, Krief P, Canu Guseva I. The role of the Swiss list of occupational diseases in the protection of workers' health. *Swiss Med Wkly* 2021;151:w20538. doi: 10.4414/sm.w.2021.20538.
2. [The Law on Pension and Disability Insurance Republic of Srpska]. *Sl.Glasnik RS* 2022;(134/11, 82/13, 96/16, 103/15, 11/21, 15/22):1-46. [Internet]. [Cited: 30-Oct-2022]. Available at: <https://www.paragraf.ba/propisi/republika-srpska/zakon-o-penzijskom-i-invalidskom-osiguranju.html>. Serbian.
3. [Rulebook on the List of Occupational Diseases]. *Sl.Glasnik RS* 2018;(84/2018). [Internet]. [Cited: 30-Oct-2022]. Available at: <https://www.paragraf.ba/propisi/republika-srpska/pravilnik-o-listi-profesionalnih-bolesti.html>. Serbian.
4. Davoodi S, Haghghi KS, Kalhori SRN, Hosseini NS, Mohammadzadeh Z, Safdari R. Occupational disease registries-characteristics and experiences. *Acta Inform Med* 2017; 25(2):136-40.
5. Driscoll T, Leigh J, Steenland K, Nelson DI, Prüss-Üstün A, Corvalan C, et al. The global burden of selected occupational diseases and injury risks: Methodology and summary. *Am J Ind Med* 2005;48(6):400-18.
6. Bađun M. Costs of occupational injuries and illnesses in Croatia. *Arh Hig Rada Toksikol* 2017 Mar 1;68(1):66-73.
7. Driscoll T. Global and regional burden of disease and injury in 2016 arising from occupational exposures: a systematic analysis for the Global Burden of Disease Study 2016. *Occup Environ Med* 2020;77:133-41.
8. [Rulebook on exercising the right to salary compensation during temporary incapacity for work]. *Sl. glasnik RS*. 2018;(113/2018). [Internet]. [Cited: 30-Oct-2022]. Available at: <https://www.paragraf.ba/propisi/republika-srpska/pravilnik-o-ostvarivanju-prava-na-naknadu-plate-za-vrijeme-privremene-nesposobnosti-za-rad.html>. Serbian.
9. International Labour Organisation. ILO Convention No. 155 1981. [Internet]. [Cited: 30-Oct-2022]. Available at: <https://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang-en/index.htm>.
10. Spreeuwens D, de Boer AG, Verbeek JH, van Dijk FJ. Evaluation of occupational disease surveillance in six EU countries. *Occup Med (Lond)* 2010 Oct;60(7):509-16.
11. Institute of Statistics Republic of Srpska. [Statistical bulletin: Wages, employment and unemployment 2021]. [Internet]. [Cited: 30-Oct-2022]. Available at: [https://rzs.rs.ba/static/uploads/bilteni/rad/BiltenStatistike\\_Plata\\_Zaposlenosti\\_i\\_Nezaposlenosti\\_2021\\_WEB.pdf](https://rzs.rs.ba/static/uploads/bilteni/rad/BiltenStatistike_Plata_Zaposlenosti_i_Nezaposlenosti_2021_WEB.pdf). Serbian.
12. Jan J, Pavel U. Twenty-year development of occupational diseases in the Czech Republic: medical and geographical aspects. *Cent Eur J Public Health* 2014;22(4):251-6.
13. Szeszenia-Dąbrowska N, Wilczyńska U. Occupational diseases in Poland - An overview of current trends. *Int J Occup Med Environ Health* 2013;26(3):457-70.
14. Gehanno JF, Postel A, Schuurs M, Rollin L. Trends and topics in occupational diseases over the last 60 years from PubMed. *Scand J Work Environ Health* 2018;44(6):670-7.
15. Straif K. Estimating the burden of occupational cancer as a strategic step to prevention. *Br J Cancer* 2012;107:S1-2.