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HEALTH STATUS OF THE POPULATION AND HEALTH CARE IN THE FEDERATION OF BOSNIA AND HERZEGOVINA IN 2021

Engleski jezik

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Sarajevo 71 000; Titova 9, tel.: +387 33 564 601, fax: 033 564 602

e-mail: kabinet.sa@zzjzfbih.ba

Mostar 88 000, Vukovarska 46, tel.: +387 36 328 101, fax: 036 382 116

e-mail: kabinet.mo@zzjzfbih.ba

Director of the Institute for Public Health of the Federation of Bosnia and Herzegovina

Siniša Skočibušić, MSc, MD

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FOREWORD



Siniša Skočibušić, MSc, MD

Director of the Institute for Public Health of the Federation of BiH

Health Status of the Population and Health Care in the Federation of Bosnia and Herzegovina in 2021 is a traditional publication issued by the Institute for Public Health of the Federation of Bosnia and Herzegovina. This publication is the result of comprehensive and continuous work of a large number of experts from several fields of public health, as well as a large number of associates. A good result cannot be achieved without teamwork. Thus, as part of its legally defined position and through developed cooperation, the Institute strives to collect information from all 10 cantonal public health institutes, from 3 clinical centres, from 15 general and cantonal hospitals and 80 health care centres, as well as other health care institutions in the Federation of BiH. The combined and appropriately presented information compared to the methodologically equally prepared information from previous years gives a clear direction in which health care system and population health in the Federation of BiH are developing.

The COVID–19 pandemic has shaken the whole world and posed new challenges to institutions and individuals in health care, as well as society as a whole. We are witnessing the devastating effects of the COVID–19 pandemic on the economy and health of developed and underdeveloped countries alike. The health care system in Bosnia and Herzegovina, as well as in the Federation of Bosnia and Herzegovina, has not been spared from negative effects either. In addition to the relatively high mortality that accompanies COVID-19, health personnel (physicians, nurses and numerous associates) were particularly affected and made efforts to maintain health care continuity. Unfortunately, with the redistribution of work tasks, one of the segments that suffered was the reporting on the health status. In recent years, the reporting system has been improved, digitized, harmonized with international needs and our future accession to the European Union, which is stressful in itself because it changes the routine of our associates. This fragile and fragmented structure was partially disrupted, but thanks to the overarching structure of the Institute, it did not give up or succumb to challenges. On the contrary, individuals and institutions as a whole managed to overcome all challenges and prepare this publication for professionals and the general public.

In this year's *Health Status of the Population and Health Care in the Federation of Bosnia and Herzegovina*, the situation of the COVID-19 pandemic was also presented, because the pandemic, which has been going on for several years, had a significant impact on the state of the health system. Having constant information about the emigration of the population, we also bring to the reader data on the number of future highly educated health workers enrolled in public and private faculties in the Federation of Bosnia and Herzegovina. There is no high-quality system without high quality people; therefore, investment in education is very important and shows in which direction it will be necessary to intervene with the aim of sustainability of the existing and future improvement of the health care system.

The comprehensiveness of this document is not only in the number of pages or the number of figures, but in the diversity of all areas that have been analytically processed. We recommend the reader to thoroughly read the prepared accounts, which will be indispensable for a better understanding of the current health and social moment in the Federation of Bosnia and Herzegovina. The ideas and thoughts that emerge from the well-founded arguments in this *Health Status of the Population and Health Care in the Federation of Bosnia and Herzegovina in 2021* will certainly be unavoidable for decision makers in health and society at all levels.

The Institute continues its long tradition of working in the service of public health and good quality health care in partnership with all those who wish well to each individual and society as a whole, and we want the reader to read this publication as a stimulus for the future.

ABSTRACT

The health care system in the Federation of Bosnia and Herzegovina is going through a dynamic period of reforms at different levels of health care, the adoption of new, as well as the harmonization of existing legal and strategic documents in line with international standards, whereby the monitoring of the health status of the population and the organization of health care are of exceptional importance as a key benchmark for monitoring and evaluating the effectiveness of measures within the health sector.

In addition to the new legal provisions in the field of health care, which came into force and which clearly defined public health functions at specific levels of activity, activities in the reform of the health-statistics system in the Federation of Bosnia and Herzegovina are of exceptional importance for the improvement of the health reporting system, which is again the key basis of planning, implementation and evaluation of health care measures. First of all, there are new reporting forms, uniform and binding on the entire territory of the Federation of Bosnia and Herzegovina.

For the identification of leading health problems and the definition of priorities for health policy makers and decision makers, at all levels, the most important public health activity is the analysis of the health status of the population and the organization of health care in the Federation of Bosnia and Herzegovina.

COVID and other infectious diseases in 2021

Public health surveillance and response to COVID-19 is the result of close cooperation between the IPH of the Federation of Bosnia and Herzegovina, cantonal public health institutes and health care institutions, which was crucial in the fight against the spread and impact of COVID-19. In the past year, the third wave of the COVID-19 epidemic in the Federation of BiH reached its peak in the last week of March 2021, when the alpha variant of SARS-CoV-2 was dominant, while the fourth wave began in September/October 2021 and lasted until the end of 2021, and then the delta variant was dominant. Vaccination against COVID-19 was carried out throughout 2021. More than 500,000 residents of the Federation of BiH were vaccinated with the primary series. Thanks to this result, during the fourth wave, there was less pressure on the health system and the number of deaths decreased by 40%, although the delta variant was more infectious and caused a more serious clinical picture.

When it comes to the mandatory immunization programme, we can once again state that the presented data speak of a worryingly low coverage, which is a consequence of the secondary effects of the pandemic, and which threatens with the re-emergence of epidemics of vaccine-preventable diseases.

Although after two years of the pandemic and a significant number of people vaccinated against COVID, an extended period of continuously controlled impact of COVID-19 on the population can be expected in the coming period as well, emphasis should be placed on strengthening surveillance, health care systems and preparedness for the pandemic.

In 2021, a total of 129,410 cases of infectious diseases were reported to the Institute for Public Health of the Federation of Bosnia and Herzegovina (15,923.5/100,000), in contrast

to 2020, when 99,857 cases were reported (14,516.3/100,000). A significantly higher total incidence of infectious diseases was recorded in 2020 and 2021, during the COVID-19 pandemic.

Population

The population is the bearer of economic development, because it represents the demographic framework for the formation of a force that drives and directs all activities in the society. All changes and disturbances in the natural movement of the population, migrations and demographic structures will be reflected in the country's socio-economic development.

The Federation of Bosnia and Herzegovina is characterized by negative demographic trends, manifested by a long-term decrease in the total number of inhabitants (depopulation), negative natural growth, demographic aging and a negative migration balance. According to the estimate, the total population in 2021 was 2,168,602. The negative difference recorded in relation to the total population of the previous year is 16,078, which represents a relative decrease of 0.74%.

Ever since 2013, the natural increase in the Federation of BiH has turned negative. The COVID pandemic has imposed itself as a pressing health care and public health problem, but in general the biggest problem facing the Federation of Bosnia and Herzegovina is depopulation.

Mortality and morbidity

The highest mortality in the last five years in the Federation of Bosnia and Herzegovina was recorded in 2021 (29,086 people died). The COVID-19 pandemic certainly had a significant impact on the increase in mortality.

In 2021, the general mortality rate per 100,000 population in the Federation of BiH was 1,341/100,000 and recorded a significant increase compared to 2020, when this value was 1,202/100,000.

General mortality is a reflection of the aging process of the population and old-age specific pathology.

In 2021, the leading group of diseases as the cause of death of the population of the Federation of Bosnia and Herzegovina are Diseases of the circulatory system (I00-I99) with an SDR rate of 336.7, while the second is COVID-19 virus confirmed with an SDR of 185.6 and a general rate of 273.4/100,000 population. The SDR for males is 239.1 and the SDR for females is 144.7.

As for the morbidity in the largest age group, from 20 to 64 years, we see that both women and men most often suffered from acute hypertension, more often women.

The second most frequent disease in this age group were acute upper respiratory tract infections, again more often in women than in men.

The third most frequent disease in the population of the Federation of BiH in 2021 was COVID-19, which affected women more often than men. Dorsopathies are the fourth most frequent, and men suffer from them slightly more often than women. Fifth is

non-insulin-dependent diabetes, which is somewhat more common in women than in men in the Federation of BiH.

The state of oral health of the population is poor.

Health risk factors

Environmental risk factors (contaminated water and food, polluted air, noise, hazardous chemicals, waste materials, etc.) are among the leading public health problems that require constant monitoring. Children, pregnant women, the chronically ill and the elderly are particularly at risk.

In the Federation of BiH, 60% of the population is covered by public water supply systems in which the water quality is continuously monitored for health safety. In urban areas, the coverage is 94%, and in rural areas, 20%.

Since there is no single register of local water supply systems in the territory of the Federation of BiH, a full insight into the water supply system, and thus the adoption of measures aimed at its improvement, is impossible.

The waters of public swimming areas (swimming pools) are mostly under the regular supervision of the Institute for Public Health, especially during the summer season.

Compared to the previous two years, the results of measuring the concentrations of air pollutants in 2021 showed a decrease in the concentrations of suspended particulate matter PM_{10} and $PM_{2.5}$ at almost all automatic measuring stations.

In 2021, sulphur dioxide concentrations were also slightly lower compared to 2019 and 2020, but not as marked as the case with PM particles.

The incidence rate of chronic obstructive pulmonary diseases in the territory of the Federation of BiH in the last three years has shown a gradual decline - in 2019 (158/10,000 population), 2020 (141/10,000 population) and 2021 (139/10,000 population).

There is no indoor air quality monitoring, nor domestic legislation in this area.

According to the results of research and studies conducted in recent years in the territory of the Federation of BiH, 47% of the population is connected to the public sewerage system.

On the territory of the Federation of BiH, there are about 2,000 locations of uncontrolled (wild) landfills on an area of 974,221 m², except in Canton Sarajevo and Canton 10, where such landfills have not been observed in all municipalities.

Due to microbiological and chemical contamination, the largest number of surface water samples, especially those taken downstream from the settlements, do not comply with regulations, which is why the use of most watercourses for recreational purposes is not recommended.

According to the latest available data from the Mine Action Centre in BiH, in the period from 2016 to 2021, a total of 24 people were injured by mines and explosive devices in the territory of the Federation of BiH, of which 11 cases were fatal (adults).

For the introduction of complete monitoring of environmental risk factors (polluted water, food, air, land) in the territory of the Federation of BiH, the existing modern equipment and personnel in the cantonal public health institutes are insufficient.

Health care organization

In 2021, there were 27,761 employees in the public health care sector in the territory of the Federation of BiH, which is more than in 2020 (27,517).

According to the health statistics, there were 580 employees working in the Institutes for Public Health, of which 365 (63%) were health care workers. Of the 79 medical doctors employed in public health institutes, 60 of them (76%) are specialists in public health disciplines. The largest part of the specialist staff is employed in the Institute for Public Health of the Federation of Bosnia and Herzegovina, the Institute for Public Health of the Sarajevo Canton and the Institute for Health and Food Safety of the Zenica-Doboj Canton.

In 2021, 73.6% of healthcare workers, 1.5% of healthcare associates and 24.9% of administrative and technical staff were employed in the public health care sector in the Federation of Bosnia and Herzegovina.

In 2021, there were 243 medical doctors, 27 doctors of dentistry, 20 masters of pharmacy and 651 nurses/technicians employed in the public health care sector in the Federation of BiH, per 100,000 inhabitants.

In 2021, almost two-thirds of all medical doctors in the public health care sector in the Federation of BiH were specialists in various disciplines (63.7%). The highest percentage was in Sarajevo Canton (71.8%), and the lowest in Bosnian-Podrinje Canton (49%).

In 2021, the share of employees with a degree in health studies was 5.4%, compared to 4.8% in 2020.

According to regular health statistics for 2021, there were 1,819 medical doctors (34.4% of the total number) and 3,402 nurses/technicians (26.9%) working in PHC services in the Federation of BiH (family medicine, health care for preschool and school-age children, emergency medical care, protection of women's reproductive health, community mental health centres, polyvalent community nurses, occupational medicine), that is, 87 medical doctors and 157 nurses/technicians per 100,000 inhabitants. In 2020, 1,891 medical doctors and 3,289 nurses/technicians were employed at the PHC level.

In 2021, there were an average of 1,192 inhabitants per one medical doctor in PHC, with the largest number of inhabitants per one medical doctor in the Una-Sana canton (2,097), and the smallest in the Bosnian-Podrinje canton (574).

Contrary to visits to the medical doctor, there were slightly fewer preventive examinations registered in family medicine services in 2021 than in 2020. Thus, 99,280 systematic examinations of the adult population were registered (121,759 in 2020); 1,028,361 consultations by medical doctors (832,237 in 2020); 1,074,188 consultations by nurses/technicians (936,461 in 2020); other preventive services of medical doctors 335,658, which is more than in 2020 (173,718); and 472,864 other preventive services of nurses/technicians (377,478 in 2020).

During 2021, 42,255 home visits by medical doctors were registered (29,780 in 2020), so the share of home visits in relation to the number of first visits to a medical doctor's office (1,353,770) was 3.1%.

The share of patients referred to the laboratory in relation to the first visits was 72%, and the share of patients referred to specialists in relation to the first visits was 119%, which means that the patient was referred to several doctors of different specialties at the first visit.

Mental health care services in the Federation of BiH in 2021, were provided in 65 geographic locations/outpatient clinics of mental health centres.

According to the regular health statistics report, 61 medical doctors were employed in 2021, of which 37 neuropsychiatry specialists and 21 psychiatry specialists, as well as 147 nurses/technicians, 19 occupational therapists, 76 psychologists and 45 social workers.

During 2021, there were 115,561 visits to doctors registered, slightly more than in 2020 (105,675), and 251,751 visits to other team members, which is more than in 2020 (208,602). There were 481 home visits by doctors (445 in 2020) and 3,073 home visits by other team members, and 704 patients were referred for hospitalization (585 in 2020). Despite the COVID-19 pandemic, group therapy (2,599) and community-based prevention and promotion programmes were carried out.

What particularly marked health care in the Federation of Bosnia and Herzegovina during 2021 was the restructuring of organizational units, due to the pandemic of the COVID-19 infection. A large number of COVID-19 hospitals, clinics and points were opened, which required staff, and that staff was redirected from all medical branches. During the biggest blow to the healthcare system, in the midst of the pandemic, many healthcare workers fell ill, and a significant number of them lost the battle for their lives, pursuing their honourable vocation.

ABBREVIATIONS

AFP	Acute Flaccid Paralysis
AIDS	Acquired immunodeficiency syndrome
AKAZ	Agency for Quality and Accreditation in Health Care in FBiH
BCG	Bacille Calmette-Guerin – vaccine against tuberculosis
BDP/GDP	Gross Domestic Product
DARNS	State Regulatory Agency for Radiation and Nuclear Safety
DT (paediatric)	Diphtheria Tetanus vaccine for children under 7 years of age
DT (pro adultis)	Diphtheria Tetanus vaccine for children older than 7 years
DtaP	Diphtheria Tetanus Acellular Pertussis Vaccine
DTwP	Diphtheria Tetanus whole cell Pertussis Vaccine– cellular
DTaP-IPV	Diphtheria Tetanus Acellular Pertussis Vaccine, inactive Polio Vaccine
DTaP-IPV-Hib	Diphtheria Tetanus Acellular Pertussis Vaccine, inactive Polio Vaccine and Hemophilus Influenzae type b Vaccine
FBiH	Federation of Bosnia and Herzegovina
FBiH MoH	FBiH Ministry of Health
FBiH IfS	FBiH Institute for Statistics
HBV	Hepatitis B virus
HBC	Hepatitis C virus
HepB	Hepatitis B vaccine
Hib	Hemophilus Influenzae type b Vaccine
HIV	AIDS – causing virus
IAEA	International Atomic Energy Agency
IPV	Inactivated Polio Vaccine
ITM/BMI	Body mass index
CPE	Continuing professional education
CVD	Cardiovascular diseases
MoCA	Ministry of Civil Affairs
MCD	International Classification of Diseases, Injuries and Causes of Death
MMR	Measles, rubella and mumps vaccine
FM	Family medicine
OPV	Oral Polio Vaccine
PAT	Programme of additional training
POLIO	Polio Vaccine (OPV or IPV)
PHC	Primary Health Care
ECD	Early Childhood Development and Growth
SDR	Standardized death rate
STI	Sexually Transmitted Infections
SZO/WHO	World Health Organisation
TT	Tetanus Toxoid Vaccine
IPH FBiH	Institute for Public Health of the Federation of Bosnia and Herzegovina

Selected indicators for 2021

DEMOGRAPHIC	EUROPEAN REGION*	FEDERATION OF BOSNIA AND HERZEGOVINA 2020
Population estimate (%)	0-14: 17.9 65+: 16.2	0-14:14.2 65+:16.7
GDP per capita	23814	9288
Unemployment rate (%)	6.7	19.9
Live births /1000 population	11.2	7.6
Fertility rate	1.7	1.1
MORTALITY: Standardized death rate (SDR)/100,000 population		
SDR all causes and all ages	690	273.4
SDR, circulatory system diseases, all ages	287	336.7
SDR, malignant neoplasms, all ages	147	152.4
SDR, suicides, all ages	9.3	
SDR, infectious and parasitic diseases	11.7	
INFECTIOUS DISEASES		
AIDS incidence/100,000 pop.	1,4	0.46
HIV incidence/100,000 pop.	15	1.06
Tuberculosis: incidence/100,000	23	9.8
CHILD AND YOUTH HEALTH		
Infant mortality (per 1000 live births)	6.2	6.0
Percentage of live births in women over 35 years of age	19.9	17.2
RISK FACTORS		
Tobacco consumption – adults (%)	23.8	Total: Men: Women:
Obesity (BMI – body mass index > 30)	Total: 23.3 Men: 21.9 Women: 24.5	Total: Men: Women:
Physical activity – active	...	Total: Men: Women:

RESOURCES/100,000 POPULATION AND USE OF HEALTH CARE		
Medical doctors, total	...	243
General practitioners	62	
Dentists	53	27
Masters of Pharmacy	57	20
Nurses/technicians	741	651
Hospitals (per 100,000 population)	3.1	1.1
Hospital beds	553	395
Average length of stay (days)	8.6	6.4
Total costs in health care (% of GDP)	7.3	...

* WHO, European Health for All data base

**Central Bank of BiH (preliminary data)

***Labour Force Survey 2019

1. DEMOGRAPHIC AND SOCIO-ECONOMIC INDICATORS

1.1 Demographic indicators

The population is the bearer of economic development, because it represents the demographic framework for the formation of a force that drives and directs all activities in the society. All changes and disturbances in the natural movement of the population, migrations and demographic structures will be reflected in the country's socio-economic development. The Federation of Bosnia and Herzegovina is characterized by negative demographic trends, manifested by a long-term decrease in the total number of inhabitants (depopulation), negative natural growth, demographic aging and a negative migration balance. According to the estimate, the total population in 2021 was 2,168,602. The negative difference recorded in relation to the total population of the previous year is 16,078, which represents a relative decrease of 0.74%.

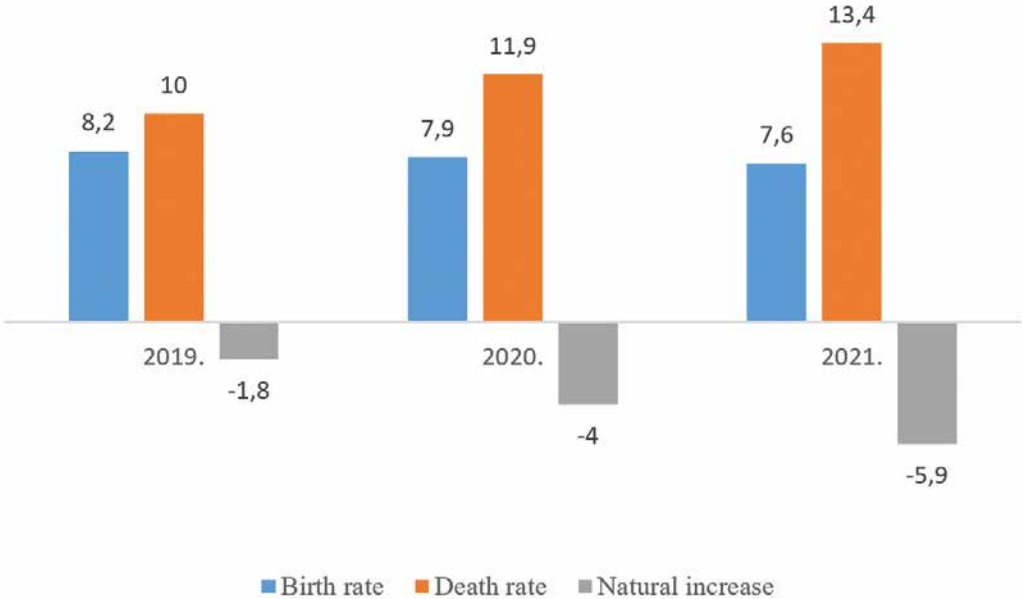
Table 1: Share of age groups in the total population in the Federation of BiH, 2019-2021

Year	Population	Age structure (%)			Aging index
		0–14	15–64	65+	
2019.	2,190,098	14.6 %	69.7 %	15.7 %	112
2020.	2,184,680	14.4 %	69.3 %	16.3 %	118
2021.	2,168,602	14.2 %	69.1 %	16.7 %	122

Changes in the age structure of the population are followed by two parallel trends: a decrease in the share of the children (0–14) and an increase in the share of the population over 65 years of age. Observing the values of the aging index, which in the last two years are significantly higher than the threshold value of 40, it is evident that we have gone deep into the process of population aging. The share of the population over the age of 65 increased to 16.7% and is higher than the share of children and youth up to 15 years of age, which fell to 14.2%. Therefore, it is clear that the aging of the population has an impact on all aspects of human life and brings multiple negative effects, mostly socio-economic. The extended life expectancy contributes the most to the increase in the share of the elderly. The average age in 2021 for men was 71.2, while it was slightly higher for women - 75.8.

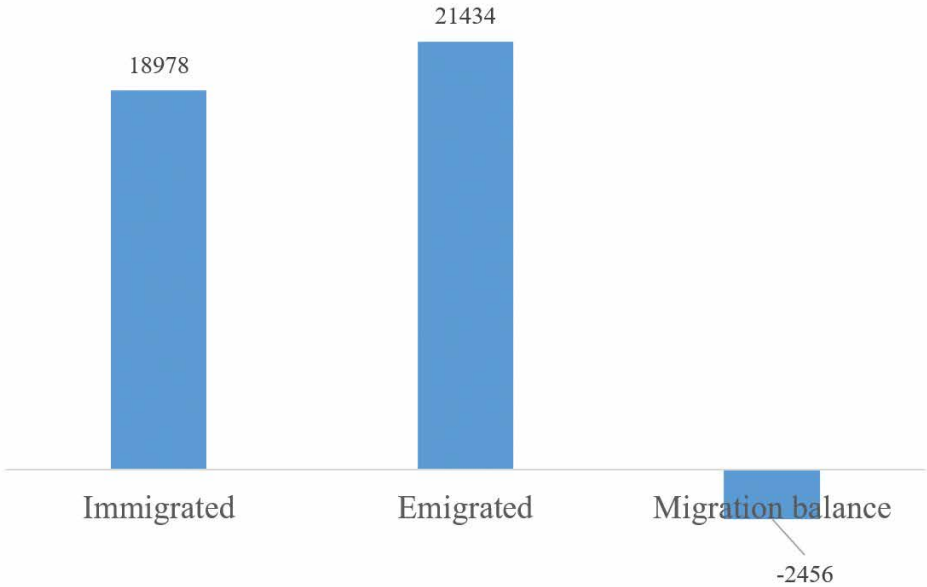
An extremely unfavourable natural increase is continuously present due to the worrying fact that the number of live births is decreasing year after year, while the number of deaths is increasing. As the population ages, the share of the younger population also declines, which further affects fertility and birth rates. The birth rate in 2021 was 7.6 while the mortality rate was 13.4 (Figure 1). The worst situation, with pronounced high mortality rates, was recorded in Posavina (14.5) and Bosnian Podrinje cantons (17.3).

Figure 1: Natural population change, Federation of Bosnia and Herzegovina, 2019–2021



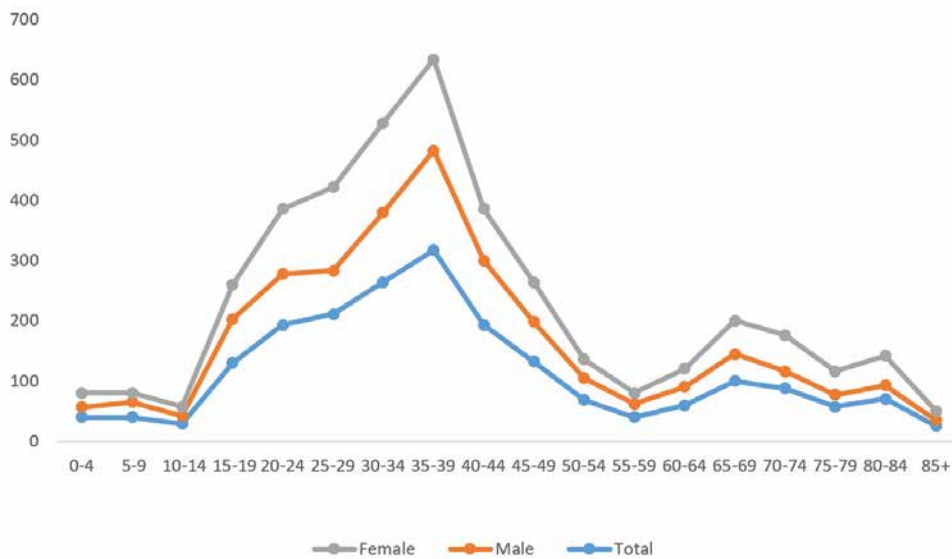
The latest data from the FBiH Institute for Statistics show that a total of 21,434 inhabitants took part in migrations during 2021. Of course, it is assumed that the actual number of people who left BiH in the mentioned period is not known, considering that most people do not deregister their residence in BiH.

Figure 2: Migration balance of population during 2021 in the Federation of BiH



Over the past few years, there has been a noticeable trend of increased emigration abroad, mostly to Croatia (25.3%), Germany (25.1%), Austria (22.96%) and Slovenia (17%). It is interesting to point out that slightly more women (53.7%) left the Federation of BiH than men (46.3%). If we look at the following Figure, we see that it is mostly the working-age population that left the country, predominantly in the age group from 25 to 39.

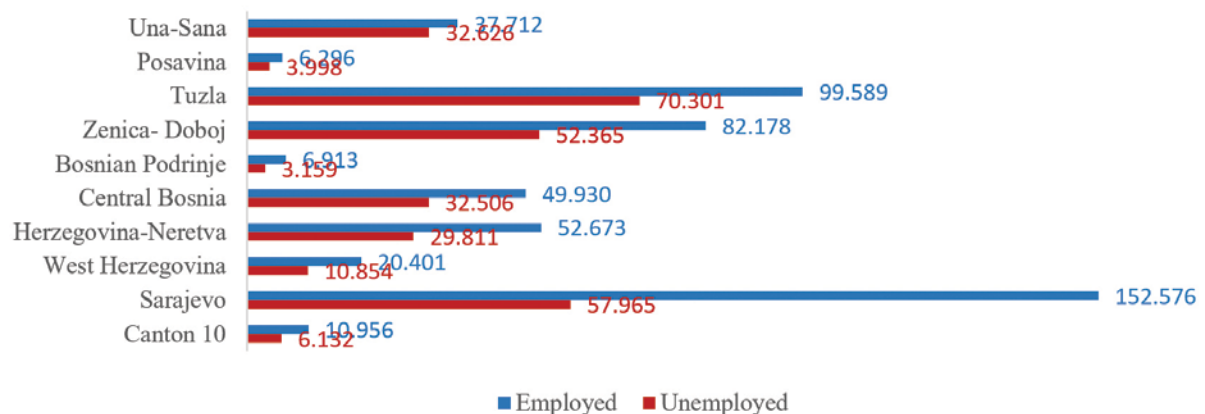
Figure 3: Registered emigration from the Federation of BiH abroad during 2021, by age and gender.



1.2 Socio-economic indicators

According to the data of the FBiH Employment Institute for 2021, positive trends were recorded on the labour market. The number of employed persons increased by 2.2% compared to the previous year, while at the same time the number of unemployed persons decreased by 7.8%.

Figure 4: Number of employed and unemployed persons by cantons of the Federation of BiH, 2021



The net monthly salary was slightly higher compared to the previous year and amounted to BAM 996. The lowest amount was in the Central Bosnian Canton (BAM 799), while the highest amount was in the Sarajevo Canton (BAM 1,251).

Pensions in the federation of BiH

According to the data from the regular payment of pensions for December 2021, the FBiH Institute for Pensions and Disability Insurance paid out pensions to a total of 429,545 beneficiaries.

Table 2: Overview of pensions, by type and amount

STRUCTURE BY TYPE OF RIGHT	NUMBER OF PAID PENSIONS	AVERAGE AMOUNT
OLD-AGE	247,285	466.85
DISABILITY	62,070	371.64
SURVIVORS	120,190	375.40
TOTAL	429,545	427.50

Structure of disability pension beneficiaries by gender: from the total number of 62,070 beneficiaries - 40,949 are men and 21,121 are women.

2. SELECTED POPULATION HEALTH INDICATORS

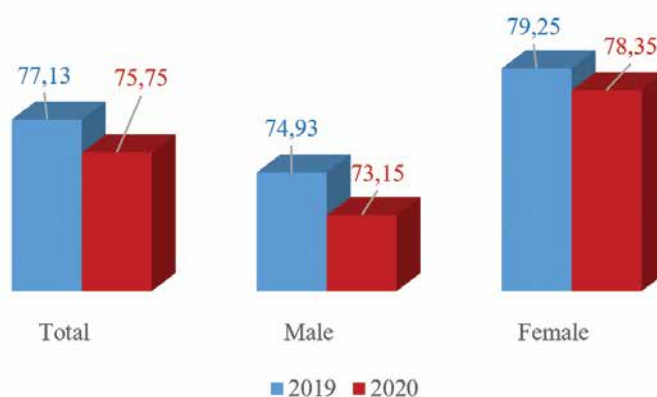
As in previous years, the selected indicators of health status and organization of health care in the Federation of BiH refer to the public health care sector.

This report used data from regular health statistics, population surveys and data from other sectors, which responded to the query.

2.1 Life expectancy

According to the latest available data of the FBiH Institute for Statistics, the life expectancy at birth for the population of the Federation of BiH in 2020 was 75.75 years and decreased compared to 77.13 years in 2019. The greater decline in life expectancy for men was largely influenced by COVID-19, which has been proven to cause higher mortality in men than in women.

Figure 5: Life expectancy of the population of the Federation of BiH at birth in 2019 and 2020, in total and by gender.



2.2 Mortality (Death rate)

The most reliable data for the assessment of the health of the population, both in the world and in our country, are mortality indicators. In addition, data and information from population surveys are used, as well as data from other sectors, in order to get a more realistic picture of the health status of the population.

The health indicators of the population in this report were analysed for 2020 and 2021 by monitoring trends or by comparison in order to determine the changes that have occurred.

2.2.1 General mortality

The highest mortality in the last five years in the Federation of Bosnia and Herzegovina was recorded in 2021 (29,086 people died). The COVID-19 pandemic certainly had a significant impact on the increase in mortality.

In 2021, the general mortality rate per 100,000 population in the Federation of BiH was 1,341/100,000 and recorded a significant increase compared to 2020, when this value was 1,202/100,000.

General mortality is a reflection of the aging process of the population and old-age specific pathology.

In 2021, the leading group of diseases as the cause of death of the population of the Federation of Bosnia and Herzegovina are Diseases of the circulatory system (I00-I99) with an SDR rate of 336.7, while the second is COVID-19 virus confirmed with an SDR of 185.6 and a general rate of 273.4/100,000 population. The SDR for males is 239.1 and the SDR for females is 144.7.

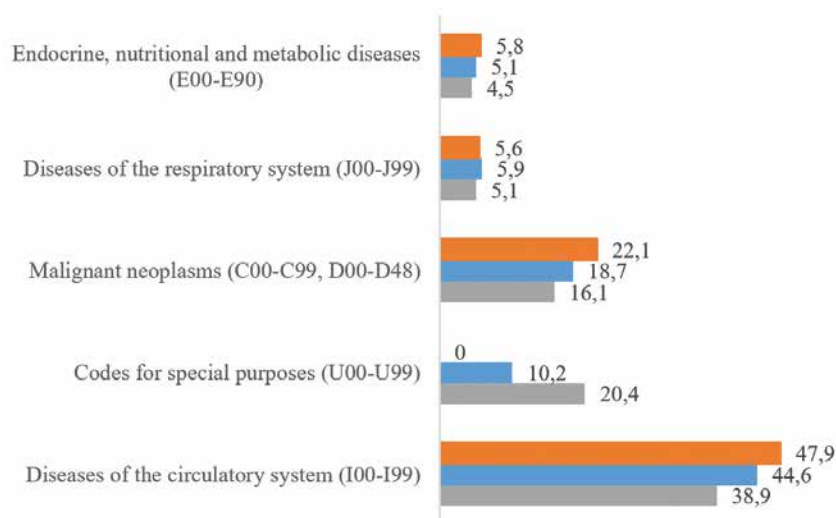
Five leading groups of diseases causing death in the Federation of BiH, comparatively for 2019–2021

The leading cause of death of the population of the Federation of BiH for 2021 by disease groups is the circulatory system diseases (I00-I99), with a share of 38.9, which is slightly less than in 2020, when the share of the circulatory system diseases in the mortality of the population of the Federation of BiH was 44.2 %.

The second leading group of diseases that were the cause of death in 2021 are diseases encoded with Codes for special purposes (U00–U99), with a share of 20.4%, while the third ones are malignant neoplasms (C00–C97) with a structure index of 16.1%, which is slightly less compared to the share of 18.5% in 2020. Diseases of the respiratory system (J00–J99) are somewhat less represented among the causes of death of the population of the Federation of BiH in 2021, with a share of 5.1% compared to the share of 5.9% in previous year.

Endocrine and metabolic diseases (E00-E99) are among the five leading causes of death of the population in 2021, with a share of 4.5%; slightly lower compared to the share of 5.1% in 2020. From the compared data for 2020 and 2021, it can be concluded that the population of the Federation of Bosnia and Herzegovina is aging and that the number of leading diseases that were the cause of death is increasing accordingly. Non-observance of healthy lifestyles, insufficient physical activity, smoking, inadequate nutrition, etc., are factors that contribute to the fact that the listed groups of diseases are the most common causes of death of the population of the Federation of BiH.

Figure 6: Five leading groups of diseases as causes of death in the Federation of BiH, 2019–2021, structure index

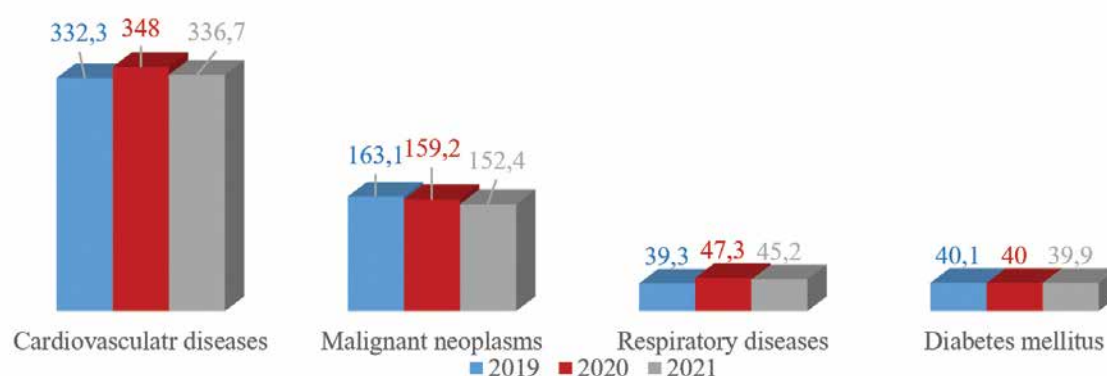


Standardized death rate (SDR) for the four leading non-communicable diseases – causes of death in the Federation of BiH

Standardized death rate (SDR) for cardiovascular diseases in 2021 was 336.7 and slightly decreased compared to 348 in 2020. Malignant neoplasms follow with an SDR of 152.4 in 2021, and they are in a slight decline compared to 159.2 in 2020.

The third are chronic respiratory diseases with an SDR of 45.2 in 2021, which is also a slight fall compared to SDR of 47.3 in 2020. The fourth value of the SDR is 39.9 and refers to diabetes mellitus for 2021, which is almost identical to the previous year 2020.

Figure 7: SDR per 100,000 population for cardiovascular diseases, malignant neoplasms, diabetes mellitus and chronic respiratory diseases in the Federation of BiH, comparatively 2019–2021



The leading disease causing death of the population of the Federation of Bosnia and Herzegovina in 2021 was COVID-19 (U07.1 virus confirmed) with a rate of 271.8/100,000 population, and as a cause of death it appears for the first time in 2020 with a mortality rate of 122/100,000 population.

The second leading cause of death of the population of the Federation of BiH in 2021 was acute myocardial infarction (I21) with a rate of 123.7/100,000 which is somewhat higher compared to 119.7/100,000 in 2020.

The third leading cause of death in 2021 is stroke (I63) with a rate of 94.9/100,000 population, which is lower compared to 110.1/100,000 population in 2020.

The fourth cause of death of the population of the Federation of BiH in 2021 was essential /primary hypertension (I10) with a rate of 69.7/100,000 population, which is a decrease compared to the rate of 78.8/100,000 population in 2020.

The fifth leading cause of death of the population of the Federation of BiH was chronic ischemic heart disease (I25) with a rate of 54.8/100,000 population, which is higher compared to 52.5/100,000 in 2020.

Figure 8: Five leading diseases causing death in the Federation of BiH, rate per 100,000 population, 2019–2021



2.2.2 Specific mortality

The leading cause of death for women in 2021 was COVID-19 (U07.1 virus confirmed) with a rate of 238.4 per 100,000 women - for the first time it was registered among the five leading causes of death for women in 2020, when the rate was 87.2 per 100,000 women.

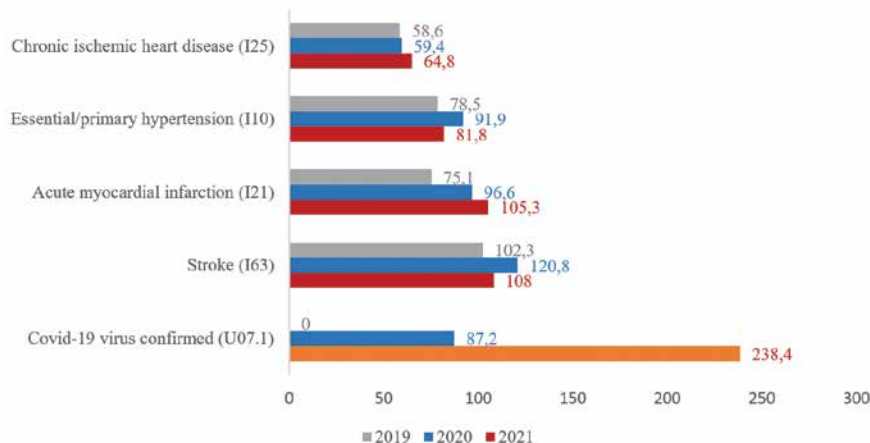
The second in 2021 is stroke (I63), with a rate of 108 per 100,000 women, significantly lower than in 2020 when the female mortality rate was 120.8 per 100,000 women.

Acute myocardial infarction (I21) is also among the five leading causes of death of women in the Federation of BiH, with a rate of 105.3/100,000 women and an increase compared to its value in 2020, when it was 97.5/100,000 women.

Essential/primary hypertension (I10) comes fourth with a rate of 81.8/100,000 women, which is a decrease compared to the rate of 93/100,000 women in 2020.

The fifth leading cause of female mortality in 2021 was chronic ischemic heart disease (I25) with a rate of 64.8/100,000 women, which is slightly higher than the rate of 59.4/100,000 women from the previous year 2020.

Figure 9: Five leading diseases causing death of women in the Federation of BiH 2019–2021, rate per 100,000 population



The leading cause of death for men in 2021 was COVID-19 (U07.1 virus confirmed) with a rate of 306.5 per 100,000 men, which is a significantly higher death rate in relation to 158 per 100,000 men in 2020.

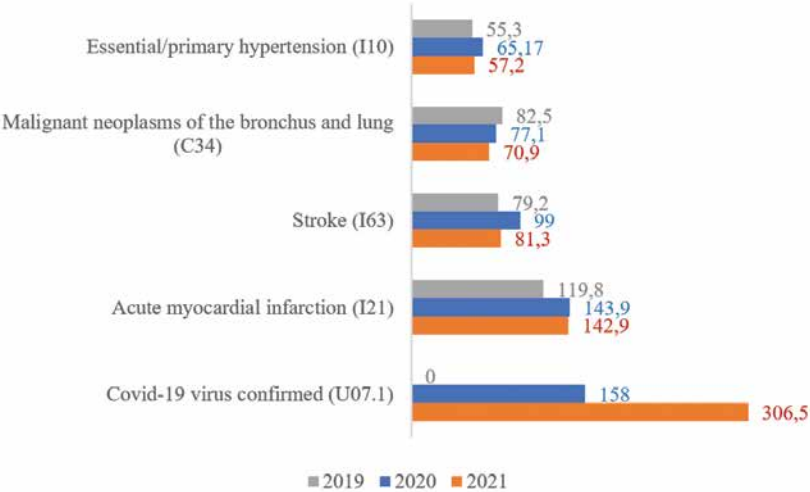
In 2021, acute myocardial infarction (I21) was the second most common cause of death in men, with a rate of 142.9 per 100,000 men, slightly lower than the previous year, when it was 143.6 per 100,000 men.

The third leading cause of death for men in the Federation of BiH in 2021 was stroke (I63), with a rate of 81.3/100,000 men, which is significantly less compared to 2020, when the rate was 99 per 100,000 men.

The fourth most common cause of death of men in 2021 was malignant neoplasms of the lung and bronchus (C34) with a rate of 70.9 per 100,000, which is less compared to the rate of 77.1 per 100,000 population the year before (2020).

Essential/primary hypertension is the fifth leading cause of death of men in 2021, with a rate of 57.2/100,000 men, while in 2020 this rate was significantly higher and stood at 65.17 per 100,000 men.

Figure 10: Five leading diseases causing death of men in the Federation of BiH 2019–2021, rate per 100,000 population



2.2.3 Mortality from cardiovascular diseases (CVD)

Cardiovascular diseases are the leading cause of death of the population of the Federation of BiH with a mortality rate of 522/100,000 population.

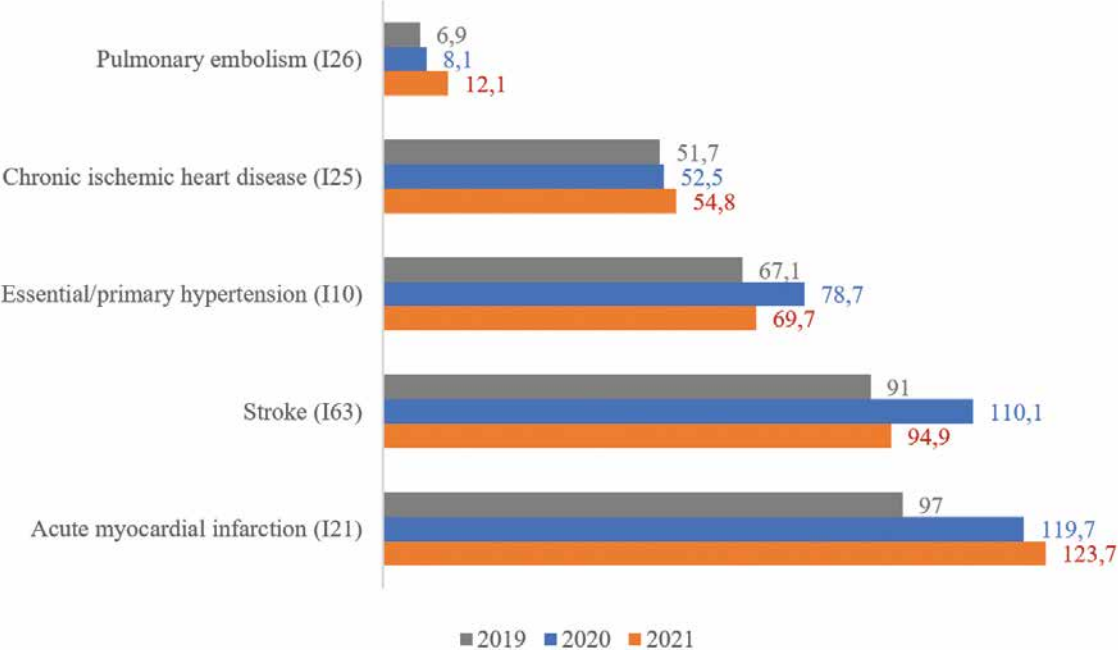
Regarding cardiovascular diseases (CVD), in the Federation of Bosnia and Herzegovina in 2021, the most common cause of death was acute myocardial infarction (I21), with a rate of 123.7 per 100,000 population, which represents an increase compared to 2020, when this rate was 119.7/100,000 population.

The second ranked in 2021 is stroke (I63), with a rate of 94.9/100,000 and showing a downward trend compared to 2020, when the rate was 110.1/100,000.

The third leading cause of CVD death is essential/primary hypertension (I10) with a rate of 69.7/100,000 population in 2021, a significantly lower rate compared to 2020, when the rate was 78.8/100,000 population.

Chronic ischemic heart disease (I25) with a mortality rate of 54.8/100,000 population is the fourth cause of death from the CVD group in 2021, while the fifth leading cause of death from this group is pulmonary embolism (I26), with a rate of 12.1/100,000 population.

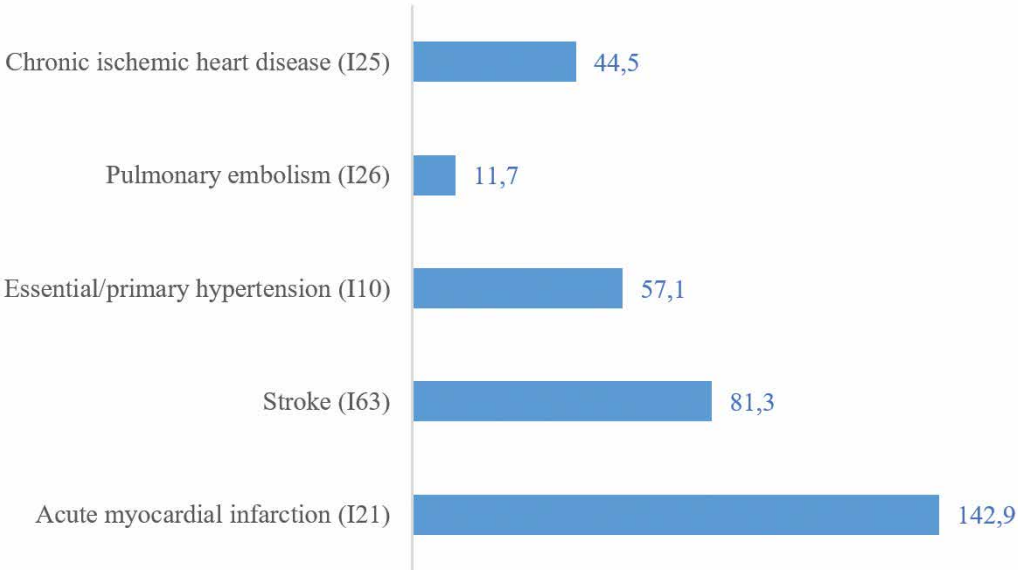
Figure 11: Mortality from cardiovascular diseases in the Federation of BiH, 2019–2021, rate per 100,000 population



According to gender, from the group of cardiovascular diseases in 2021, men most often died from acute myocardial infarction (rate 142.9/100,000); then from stroke (rate 81.3/100,000); followed by essential/primary hypertension (rate 57.1/100,000).

The fourth cause of death of men in the Federation of BiH, from the group of cardiovascular diseases, is chronic ischemic heart disease with a mortality rate of 44.5/100,000 men, followed by pulmonary embolism with a mortality rate of 11.7/100,000 men.

Figure 12: Mortality from cardiovascular diseases in the Federation of BiH in 2021, rate per 100,000 men

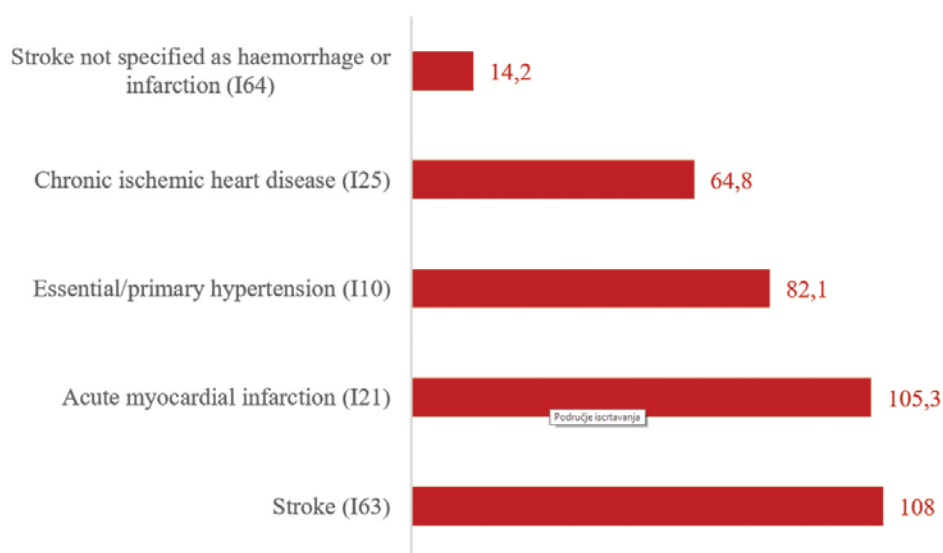


From the group of cardiovascular diseases in 2021, women in the Federation of BiH most often died of stroke, 108/100,000 women, which is a significantly lower rate compared to the previous year's rate of 120.8/100,000, while mortality of women from acute myocardial infarction was 105.3/100,000, which shows slightly higher values compared to the rate of 96.6/100,000 women in 2020.

The third most common cause of death of women in the Federation of BiH from the group of cardiovascular diseases is essential/primary hypertension (I10) (82.1/100,000).

The fourth cause in terms of frequency of death of women from CVD in the Federation of BiH are chronic ischemic heart diseases with the rate of 64.8/100,000 women, while the fifth cause is stroke not specified as haemorrhage or infarction (I64) with a rate of 14.2/100,000 women.

Figure 13: Mortality from cardiovascular diseases in the Federation of BiH in 2021, rate per 100,000 women



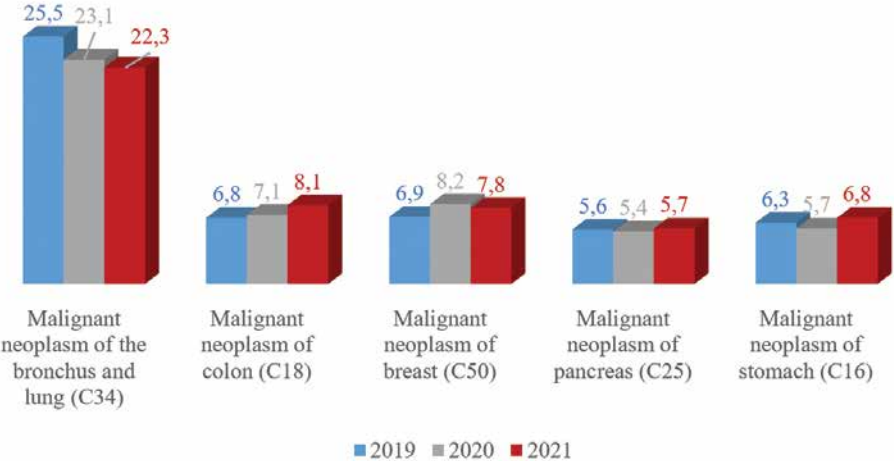
As in previous years, in 2021, in this group of diseases, the leading cause of death in men was acute myocardial infarction, and in women, stroke.

2.2.4 Mortality from malignant neoplasms

Malignant neoplasms (C00-C94) are the second leading cause of death by disease groups, with 4,577 deaths and a rate of 211.1/100,000 population.

Malignant neoplasms of the bronchus and lung (C34) are the leading malignant diseases that cause death in the population of the Federation of BiH, with a mortality rate of 47.2/100,000 population. Men die significantly more than women with a mortality ratio of 3:1, although a slight increase in the mortality of women from malignant lung neoplasms has been registered over the years.

Figure 14: Mortality from malignant neoplasms (top five) in the Federation of BiH, 2019–2021, structure index



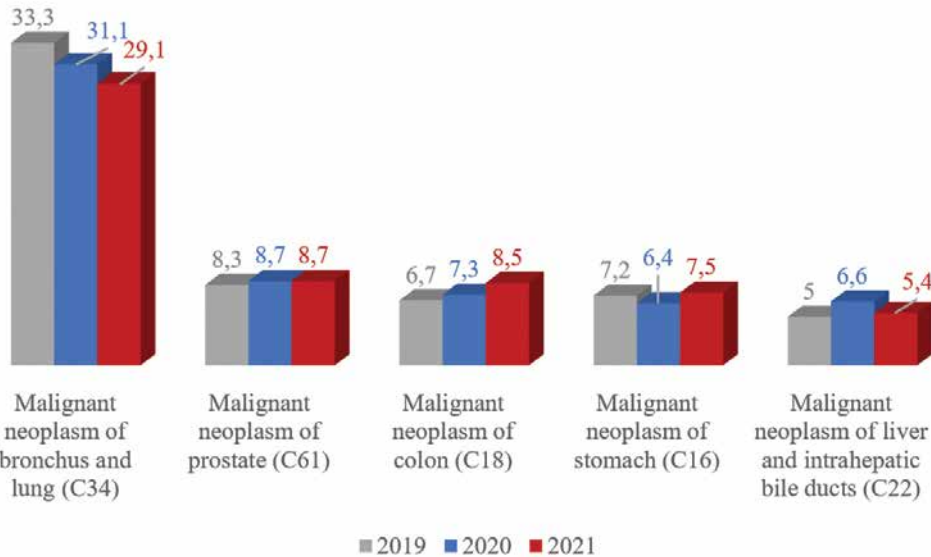
Among the causes of death from malignant neoplasms in men in 2021, the leading one was malignant neoplasm of bronchus and lung (C34), with a share of 29.2%, turning slightly downwards compared to 2020. It is followed by malignant neoplasm of prostate (C61), with a share of 8.8%, showing the same values as in 2020.

The third most common malignant neoplasm that caused the death of men in the Federation of BiH in 2021 is malignant neoplasm of colon (C18), with a share of 8.5%, which went up compared to 2020, when this share was 7.3 %.

The fourth one in 2021 is malignant neoplasm of stomach (C16), with a share of 7.5%, which is slightly higher than in 2020, when the share of this neoplasm in the death of men was 6.4%.

The fifth malignant neoplasm that caused the death of men in the Federation of BiH in 2021 is malignant neoplasm of liver and intrahepatic bile ducts (C22), with a share of 5.4%, which is slightly less than in 2020, when the share of this neoplasm in the death of men was 6.6%.

Figure 15: Mortality from malignant neoplasms in men in the Federation of BiH, 2019–2021, structure index



The most common malignant neoplasm that caused the death of women in the Federation of Bosnia and Herzegovina in 2021 is malignant neoplasm of breast (C50), with a share of 17.4% in the total mortality of women in the Federation of BiH, slightly lower compared to 2020, when the share of this malignant neoplasm in the total mortality of women from malignant neoplasms was 18.4%.

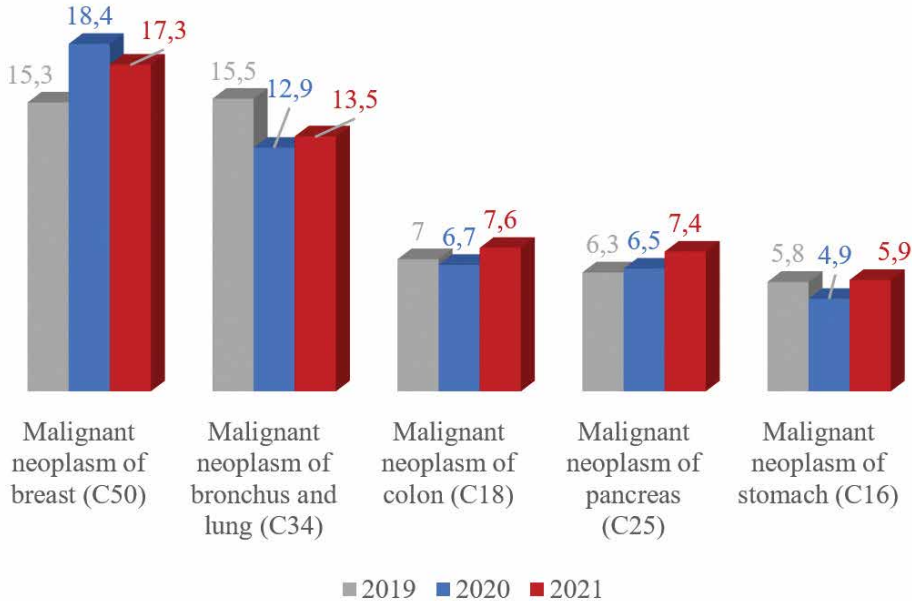
The second most common malignant neoplasm that caused the death of women in the Federation of BiH in 2021 is malignant neoplasm of bronchus and lung (C34), with a share of 13.5%, which went upwards compared to 2020, when the share of this malignant neoplasm in the total mortality of women was 12.9 %.

The third most common malignant neoplasm that caused the death of women in 2021 is malignant neoplasm of colon (C18), with a share of 7.6%, which slightly went up compared to 2020, when this share was 6.7%.

The fourth most common malignant neoplasm that caused the death of women in the Federation of BiH in 2021 is malignant neoplasm of pancreas (C25), with a share of 7.4 %, which is a slight increase compared to 2020, when this share was 6.5%.

The fifth in frequency in 2021 was malignant neoplasm of stomach (C16) with a share of 5.9%, while in 2020 the share of this neoplasm in the death of women was 4.9%, and it was not among the five leading malignant neoplasms that cause death in women.

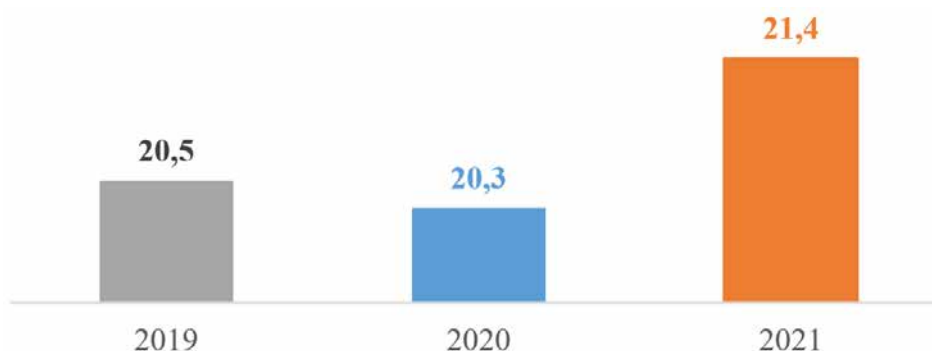
Figure 16: Mortality from malignant neoplasms in women in the Federation of BiH, 2019–2021, structure index



2.2.5 Injuries as a cause of death

The death rate from injuries, poisonings and other consequences of external causes of death per 100,000 population in the Federation of BiH in 2021 was 21.4/100,000 and recorded a slightly higher value than in 2020, when it was 20.3/100,000.

Figure 17: Injuries, poisonings and other consequences of external causes of death in the Federation of BiH 2019–2021, rate per 100,000 population

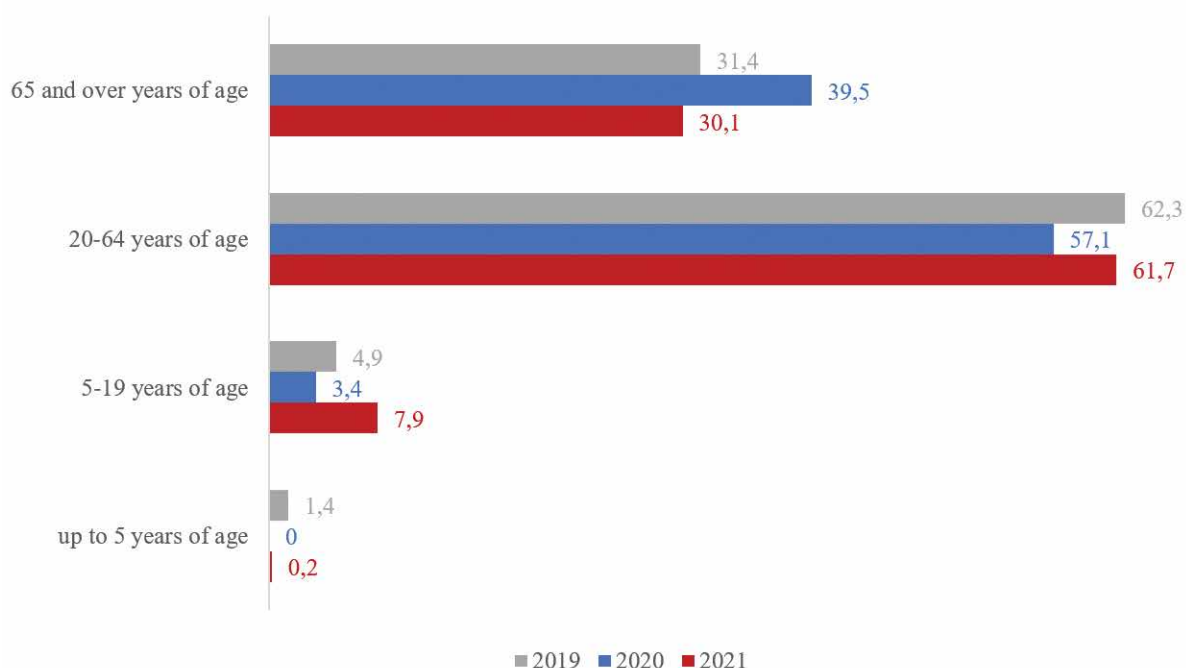


The share of injuries in mortality in 2021 was 1.6% turning slightly downwards compared to 2020, when it was 1.7%. In the age group from 5 to 19 years, the share of injuries in mortality for 2021 is 7.9%, and is significantly higher than in 2020, when this share was 3.4%.

There is an increase in the share of injuries, poisonings and other consequences of external causes of death in 2021 in the age group 20-64 years, namely 61.7% compared to 2020, when this percentage was 57.1%.

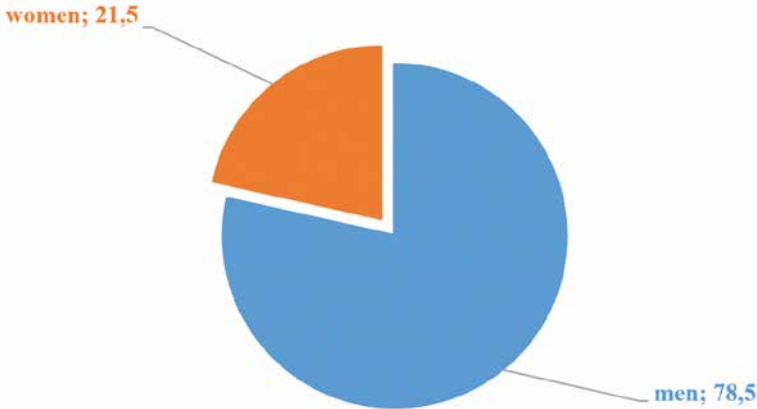
In the age group 65+, the share of injuries is decreasing in 2021, recording a value of 30.1%, which is less compared to the share of 39.5% in 2020.

Figure 18: Injuries, poisonings and other consequences of external causes of death in the Federation of BiH 2019–2021, structure index



In 2021, by gender, men die from injuries three times more often than women – men 78.5% and women 21.5%.

Figure 19: Percentage share of mortality from injuries for women and men in the Federation of BiH, 2021



2.2.6 Infant mortality

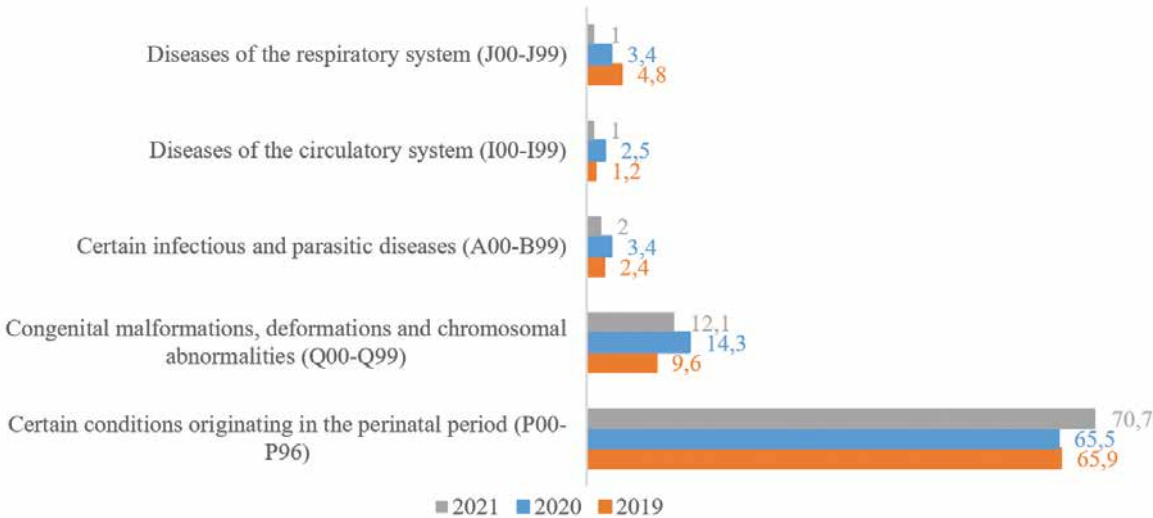
Leading causes of infant mortality in the Federation of BiH, 2019–2021

In 2021, the leading cause of infant mortality in the Federation of Bosnia and Herzegovina were certain conditions originating in the perinatal period (P00-P96), with a share of 70.7%, which is slightly higher compared to 2020, when this share was 65.5%. They are followed by congenital malformations, deformities, and chromosomal abnormalities (Q00–Q99), with the share of 12.1%, which is slightly less compared to 14.3% in 2020.

The third leading cause of infant mortality in 2021 are certain infectious and parasitic diseases (A00–B99), with a share of 2%, which is less than 3.4% in 2020.

The frequency of diseases of the circulatory system (I00–I99), diseases of the respiratory system (J00–J99) and diseases of the blood and blood-forming organs (D50–D89) in infant mortality is identical and amounts to 1%.

Figure 20: Leading causes of infant mortality in the Federation of BiH 2019–2021, structure index



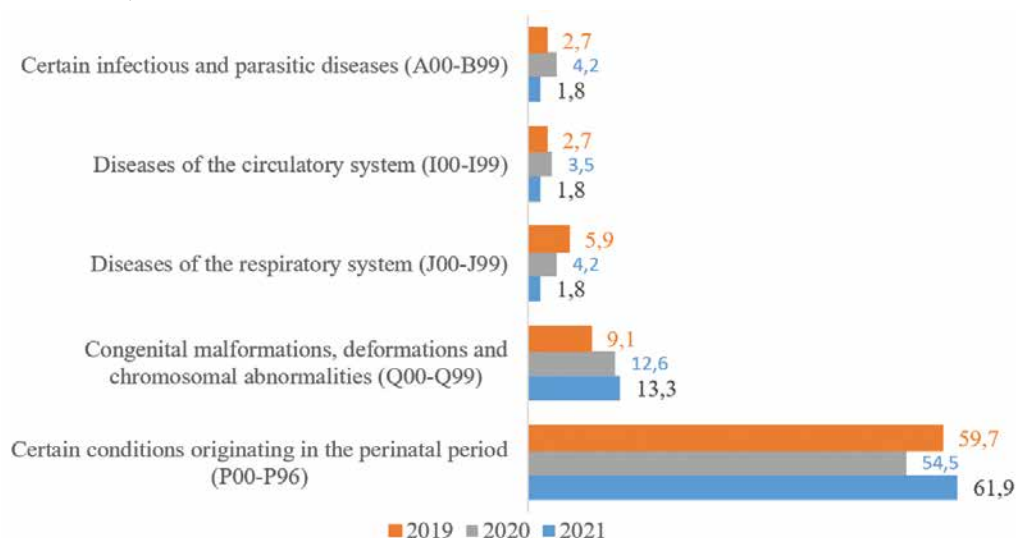
Leading causes of death in children up to 5 years of age in the Federation of BiH, 2019–2021

In 2021, the leading cause of death in children up to 5 years of age in the Federation of BiH were certain conditions originating in the perinatal period (P00-P96), with a share of 61.9%, which is an increase compared to the structure index of 54.5% in 2020.

The next group of diseases that caused the death of children up to five years of age in 2021 were congenital malformations, deformities and chromosomal abnormalities (Q00–Q99), with a share of 13.3%, which is an increase compared to the share of 12.6% in 2020.

The third most common cause of death in children up to 5 years of age in the Federation of BiH in 2021 were diseases of the respiratory system (J00–J99), with significantly lower share of 1.8% compared to the share of 4.4% in 2020. Diseases of the circulatory system (I00–I99), as well as certain infectious and parasitic diseases (A00–B99), had a share of 1.8% in the mortality of children aged up to 5 years in the Federation of BiH in 2021.

Figure 21: Leading causes of death in children up to 5 years of age in the Federation of BiH, 2019–2021, structure index



2.3 Morbidity

There are many factors that, in addition to genetics and environmental factors, affect the health of the individual, and thus the population as a whole.

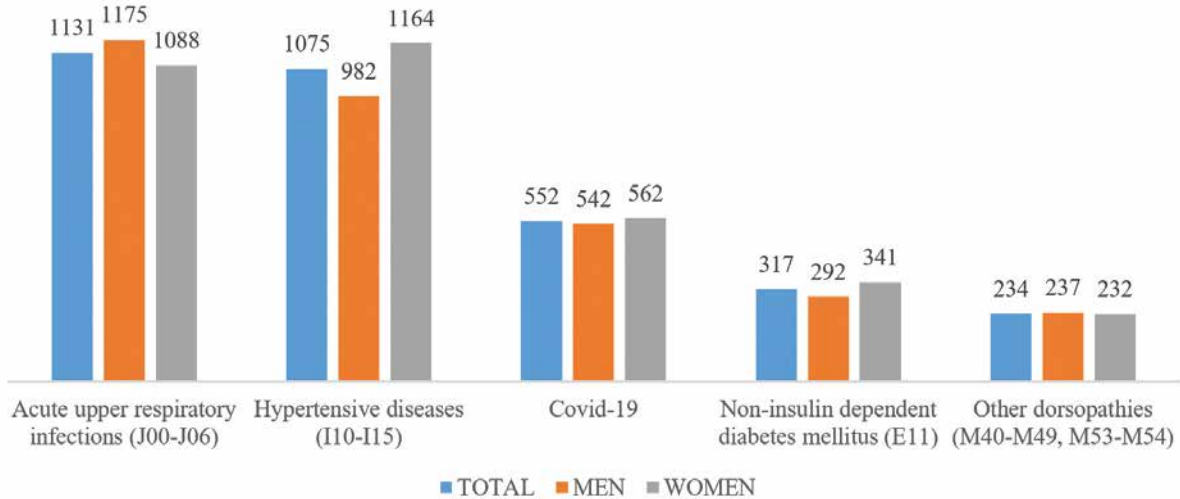
Social status, level of education, type of work, income, housing conditions, nutrition, healthy lifestyles (adopted or not), all of this affects the health, or even more so, the illness of each person.

In 2021, the health of the population of the Federation of BiH was threatened by the COVID-19 pandemic, which was registered both in the indicators of morbidity and in the causes of mortality of the population.

In 2021, the population of the Federation of BiH most often suffered from hypertensive diseases (I10–I15); the rate was 1,164 per 10,000 population, followed by acute upper respiratory tract infections (J00–J06), with a rate of 1,088, and the third was COVID-19, with a rate of 562 per 10,000 population.

The fourth most common cause of morbidity in the population of the Federation of BiH in 2021 was non-insulin-dependent diabetes (E11) with a rate of 341, while the fifth most common cause of morbidity are other dorsopathies (M40–M49, M53–M54), with a rate of 232 per 10,000 population.

Figure 22: Leading diseases of the population of the Federation of BiH, 2021, total and by gender, rate per 10,000



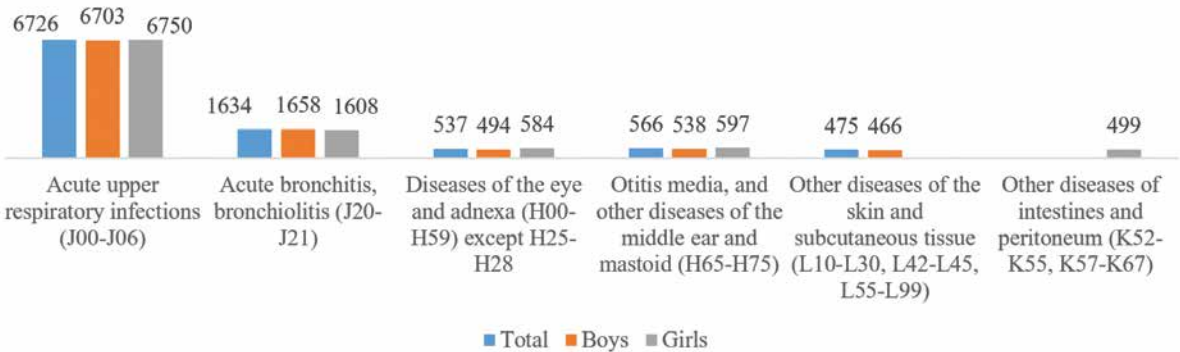
2.3.1 Morbidity of individual population groups

Morbidity of children aged 0–4 years

In 2021, 139,794 diseases and conditions of children up to 4 years of age were recorded, which is significantly more than in 2020 (91,829), or slightly less than in 2019 (140,174).

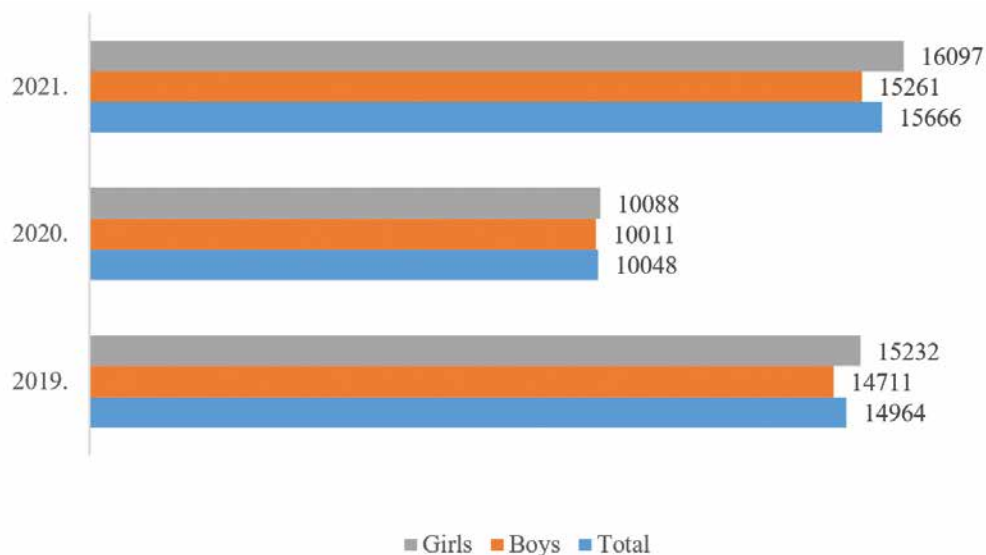
The leading diseases in 2021 were: acute upper respiratory tract infections; acute bronchitis, bronchiolitis; otitis media and other diseases of the middle ear and mastoid; diseases of the eye and adnexa; other diseases of intestines and peritoneum; other diseases of skin and subcutaneous tissue. Boys and girls were equally affected: the incidence rates were very similar.

Figure 23: Leading diseases of children aged 0–4 years in the Federation of BiH in 2021, total and by gender, rate per 10,000 children



The incidence rate per 10,000 children aged 0–4 years, in the period 2019–2021, is the highest in 2021; followed by 2019; while it is the lowest in 2020. There are no significant differences in relation to the gender of the patients.

Figure 24: Morbidity of children aged 0–4 years in the Federation of BiH 2019–2021, total and by gender, rate per 10,000 children



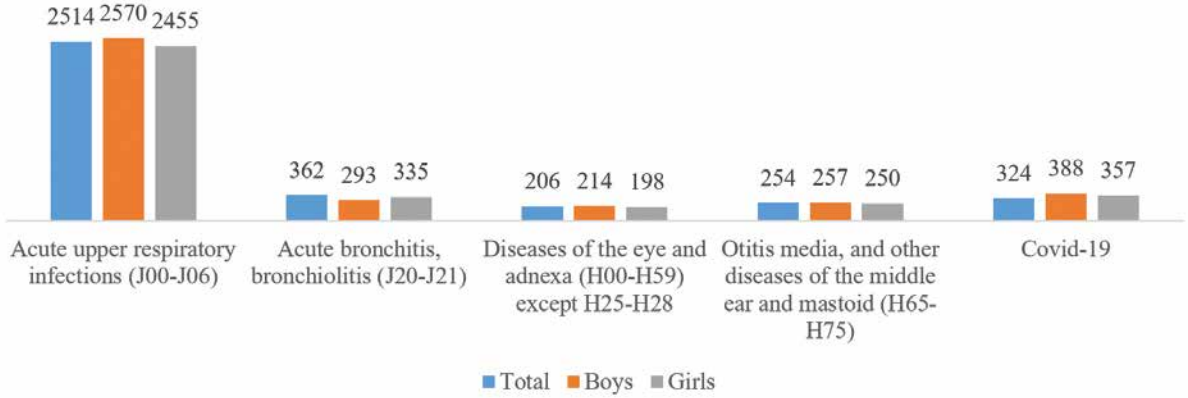
According to the data of the Health Care Service for School Children and Youth for the period 2019–2021, the largest total number of systematic health check-ups of preschool children (from systematic health check-ups of infants in the counselling centre to systematic health check-ups of children when enrolling in school) was in 2019 (110,952), then in 2021 (109,620), and the lowest in 2020 (79,475).

The highest total number of control health examinations, after systematic check-ups, was in 2019 (33,243), then in 2021 (29,412), and the lowest in 2020 (22,625).

Morbidity of children and adolescents aged 5–19 years

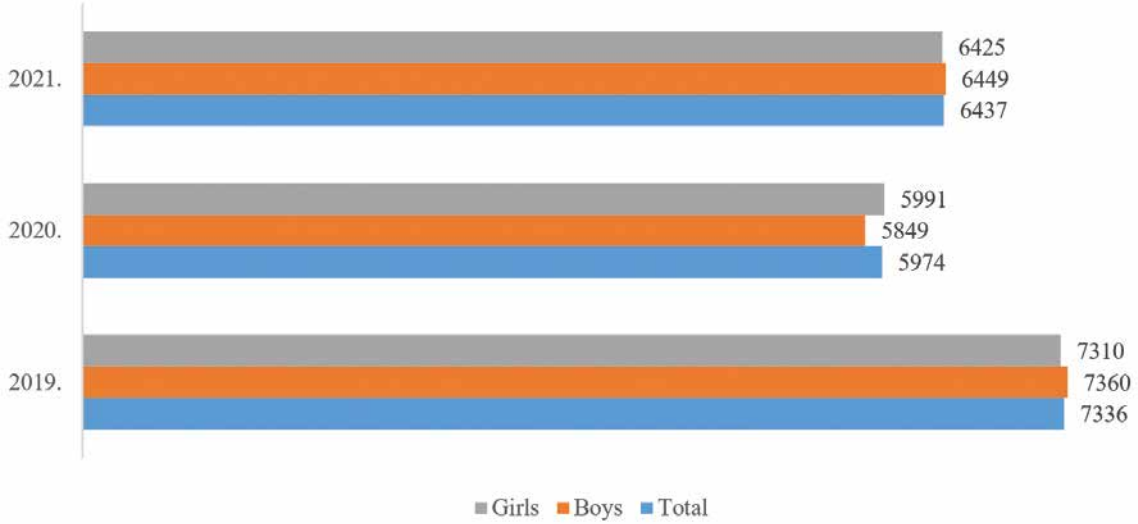
The total number of diseases and conditions (without injuries) in the age group 5–19 years in 2021 is 215,406, which is less compared to 2019 (254,758), i.e., more compared to 2020 (203,727). According to the frequency of occurrence, acute upper respiratory tract infections are dominant; they are followed by acute bronchitis, bronchiolitis; COVID-19; otitis media and other diseases of the middle ear and mastoid; diseases of the eye and adnexa. Boys and girls were equally affected: the incidence rates were similar.

Figure 25: Leading diseases in children and adolescents aged 5–19 years in the Federation of BiH in 2021, total and by gender, rate per 10,000 children and adolescents



The age group 5–19 years, in the category of diseases and conditions (without injuries), in the period from 2019 to 2021, is characterized by the following: the rate of diseases and registered conditions was the highest in 2019 (7,336), then in 2021 (6,437), and the lowest in 2020 (5,974). No significant difference was observed in relation to gender.

Figure 26: Morbidity of children and adolescents aged 5–19 years in the Federation of BiH, 2019-2021, total and by gender, rate per 10,000

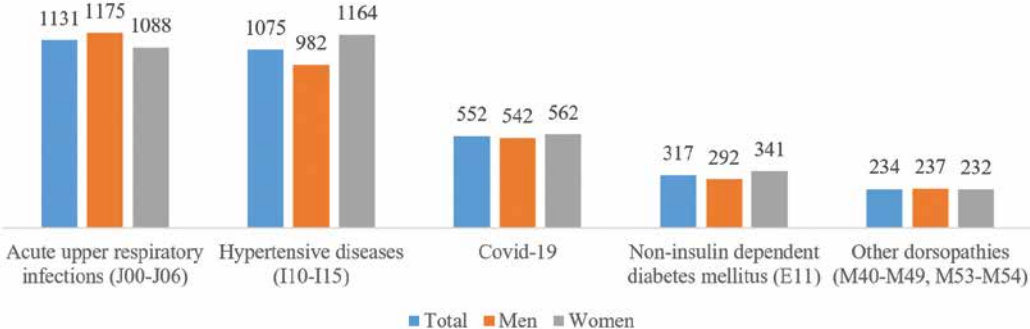


Morbidity of the population aged 20–64 years

In this age group, 818,729 diseases and conditions (without injuries) were registered in 2021, which is slightly less compared to 2020, when that number was 844,949.

The leading diseases in this age group are similar to previous years, and they are: hypertensive diseases (more common in women than men); followed by acute upper respiratory tract infections, also more common in women than men; then COVID–19; dorsopathies, that equally affected both women and men; and non-insulin-dependent diabetes which was more common among women.

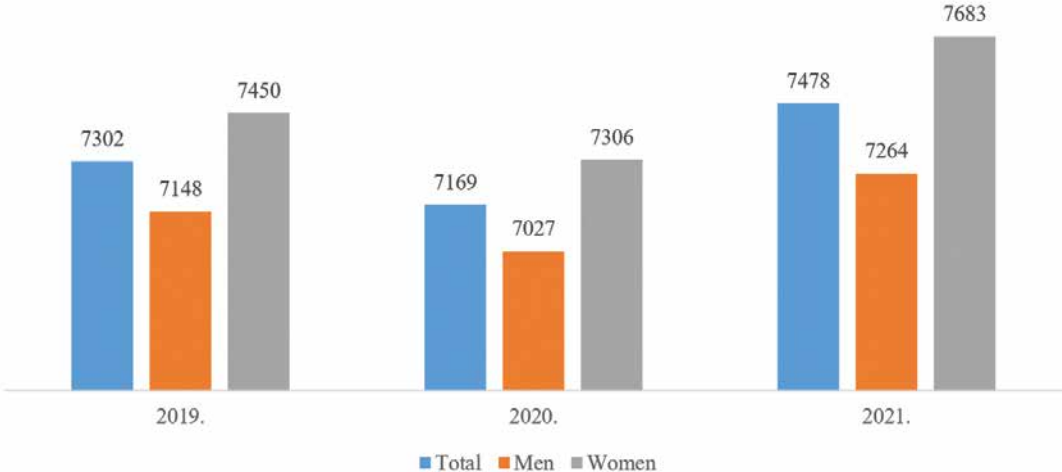
Figure 27: Leading diseases of the population in the Federation of BiH in 2021, total and by gender, rate per 10,000 population



In 2021, there were 1,621,637 diseases and conditions (without injuries) registered in this age group.

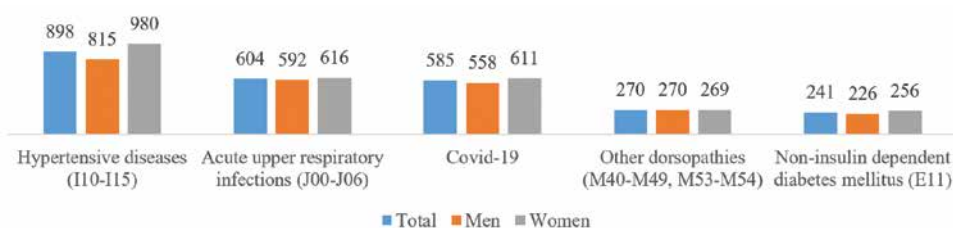
The leading diseases in this age group are similar to previous years, with the exception of COVID-19, namely: acute upper respiratory tract infections, slightly more common in men than in women; then hypertensive diseases, more common in women than in men; then COVID-19, with slightly more frequent occurrence in women than in men; followed by non-insulin-dependent diabetes, which was more frequent among women; and fifth in terms of disease frequency in both women and men are dorsopathies, with fairly equal frequency of occurrence in both males and females.

Figure 28: Diseases and conditions without injuries in the Federation of BiH 2019–2021, total and by gender, rate per 10,000



In the previous Figure, the frequency of morbidity of the total population is presented, comparatively by gender for the last three years, which indicates that the rate of morbidity observed in total increased from 7,302, which was in 2019, to 7,478 in 2021. The situation is almost the same regarding the incidence of morbidity in the general population according to gender.

Figure 29: Diseases and conditions in the Federation of BiH in 2021, age group 20–64, rate per 10,000 population



As for the incidence of diseases in the age group 20-64 years, we see that both women and men most often suffered from acute hypertension, more often women.

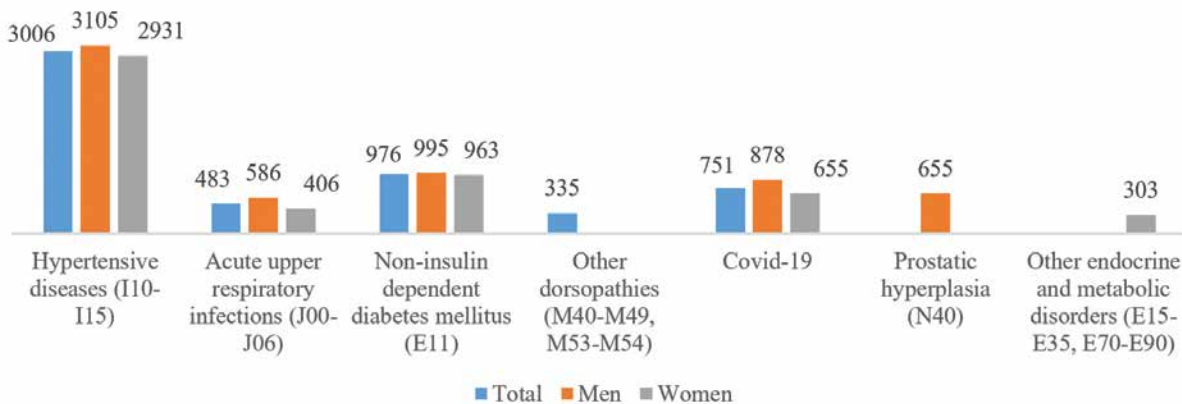
The second most frequent disease in this age group was acute upper respiratory tract infections, again more common in women than in men.

The third most common disease in the population of the Federation of BiH in 2021 was COVID-19, which affected women more often than men.

Dorsopathies are the fourth most common, and men are more likely to suffer from them than women.

Fifth in order is non-insulin-dependent diabetes, which is somewhat more common in women than in men in the Federation of BiH.

Figure 30: Diseases and conditions in the Federation of BiH in 2021, age group 65+, rate per 10,000



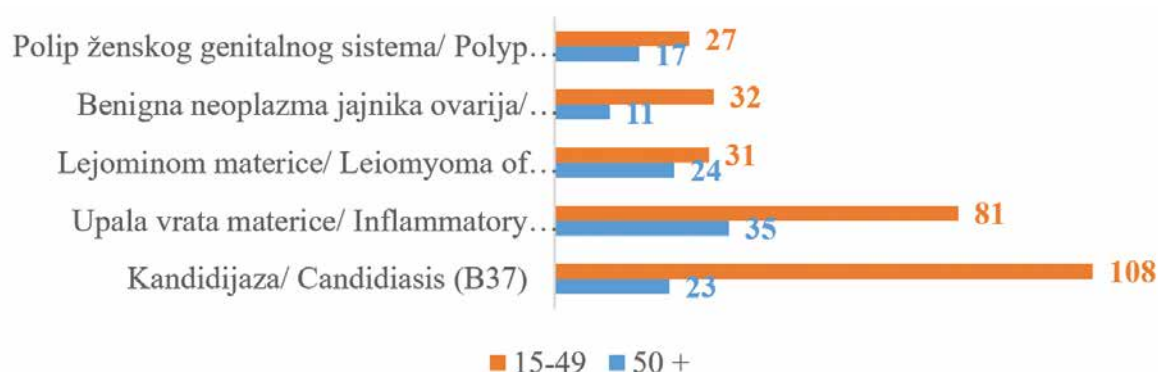
As for morbidity in the population over 65 years of age, hypertensive diseases are most frequent with higher incidence among men. The second most common disease was non-insulin-dependent diabetes, which was also more common in men of this age group.

The third most common disease among the population over 65 years of age is COVID-19, which again affected men more often.

The fourth most common disease is acute upper respiratory tract infection, which is more common in men over 65 years of age.

2.3.2 WOMEN'S REPRODUCTIVE HEALTH

Figure 31: Leading diseases and conditions registered in the Service for women's reproductive health care in the Federation of BiH, 2021 (rate per 10,000)



As for the leading diseases and conditions registered in the Service for Women's Reproductive Health Care in the Federation of BiH, women in the age group 15-49 most often suffered from candidiasis B37 (108/10,000), while women over 50 years of age most often suffering from inflammatory disease of cervix uteri N72 (35/10,000).

The second most common disease in women aged 15-49 years is inflammatory disease of cervix uteri N72 (81/10,000), while for women over 50, the second most common cause is leiomyoma of uterus D25 (24/10,000).

The third most common disease in women aged 15 to 49 is benign neoplasm of ovary D27 (32/10,000), while the third most common disease in women over 50 is candidiasis B37 (23/10,000).

For women aged 15 to 49, the fourth most common disease is leiomyoma of uterus D25 (31/10,000), while for women over 50, the fourth most common disease is polyp of female genital tract N84 (17/10,000).

The fifth most common disease in women aged 15 to 49 was polyp of female genital tract N84 (27/10,000), while in women over 50 the fifth most frequent disease was benign neoplasm of ovary D27 (11/10,000).

2.3.3 Mental health

The importance of the role of mental health in achieving the global development goals is increasing, which is illustrated by the inclusion of mental health-related objectives in the sustainable development goals. Depression is one of the leading causes of disability, while suicide is the second leading cause of death among the younger population aged 15 to 29. People with severe mental disorders die prematurely – as much as two decades earlier – due to preventable physical conditions/problems.

Many mental health problems can be effectively treated at relatively low cost, but the gap between people who need care and those who have access to care remains wide. Effective treatment coverage remains extremely low.

COVID-19 has disproportionately affected people in already vulnerable situations, including people with psychosocial challenges. The right to health and access to health care is a basic human right; nevertheless, COVID-19 has exposed the existing inequalities.

People with psychosocial disabilities usually have difficult access to appropriate support and care services, which has been further exacerbated by the pandemic. Lack of trust within communities towards mental health care services can be attributed to wider issues of access to care, including poor patient experiences, social stigma around mental health, financial factors, language barriers and concerns about being subjected to coercive treatment. This makes marginalized groups less likely to seek help. Delays in interventions can also prompt increased incidence of preventable yet serious mental and wider health outcomes.

This unprecedented time has highlighted the urgency of accessible, appropriate and affordable mental health care. It is also evident that the need for such care is considered important and interconnected with physical health. Without applying an intersectoral approach, it is not possible to build a more equal and equitable health care system, nor a fairer and healthier world.

World Mental Health Day 2021

Mental health in an unequal world - IPH FBiH Intersectoral collaboration represents one of the basic prerequisites for the promotion, prevention and protection of mental health, and is a key prerequisite for successful psychosocial rehabilitation.

The inclusion of mental health in other policies, namely the policies of education, social protection, economy, security, sports, culture and others - is a prerequisite for creating a better environment for the protection of the mental health of the population. The basic prerequisite for good intersectoral action is the education of other sectors about the concept of mental health and its importance for society, the establishment of efficient cooperation mechanisms, the determination of clear roles and responsibilities of different sectors in the field of mental health.

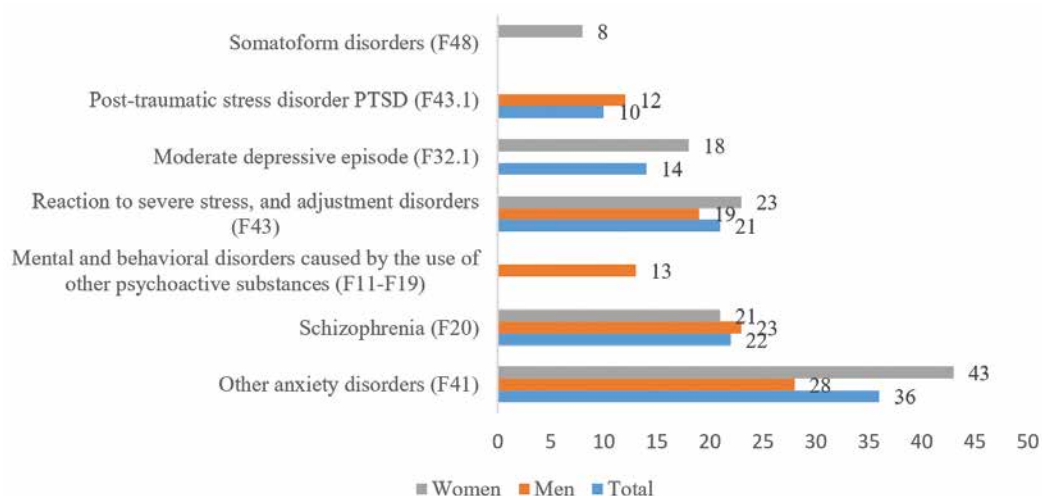
In creating programmes for vulnerable groups, it is especially important to include intersectoral action in programmes such as those for autism, alcoholism, violence, problems of the elderly, etc.

Cooperation with the education sector, both school and preschool, is particularly important, with an emphasis on prevention and early detection of developmental and behavioural disorders, abuse of psychoactive substances and peer violence. Also, cooperation with the social and economic sectors with an emphasis on vocational rehabilitation and social inclusion of people with mental health problems and disorders is extremely important.

The total number of registered cases of mental and behavioural disorders in 2021 is 40,827.

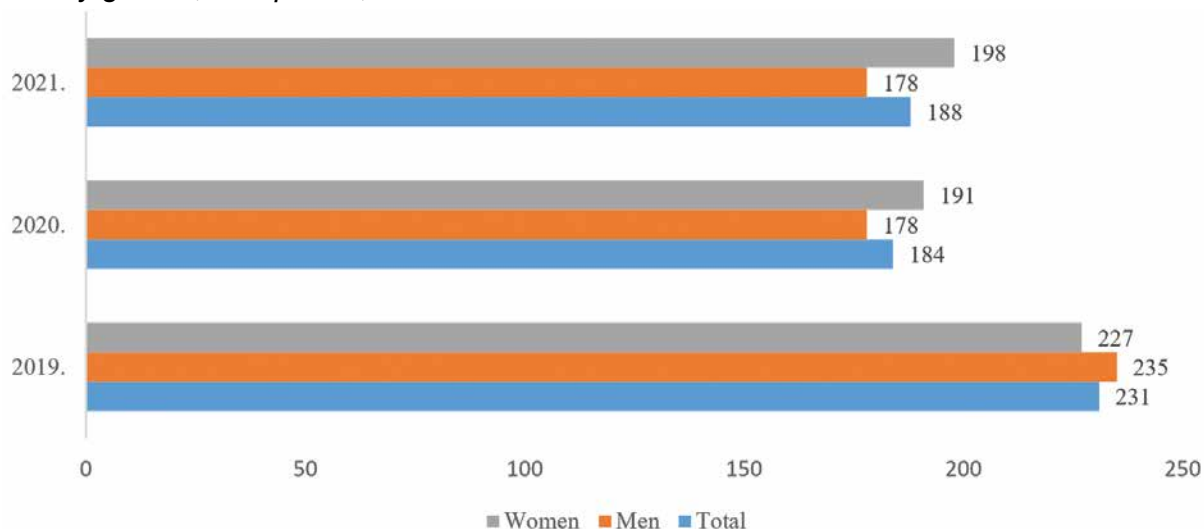
The leading mental disorders in 2021 are other anxiety disorders, the second is schizophrenia, followed by reactions to severe stress and adjustment disorders, then moderate depressive episodes, and the fifth one is post-traumatic stress disorder. There is a noticeable higher incidence of other anxiety disorders in women.

Figure 32: Leading mental and behavioural disorders in the Federation of BiH 2021, total population and by gender



By comparing data related to mental and behavioural disorders, in the period from 2019 to 2021, it is noticeable that the highest number of recorded mental illnesses was in 2019, and the lowest in 2020, with a slightly larger gender difference in 2021 and 2020 (higher incidence among women).

Figure 33: Mental and behavioural disorders in the Federation of BiH 2019–2021, total and by gender, rate per 10,000

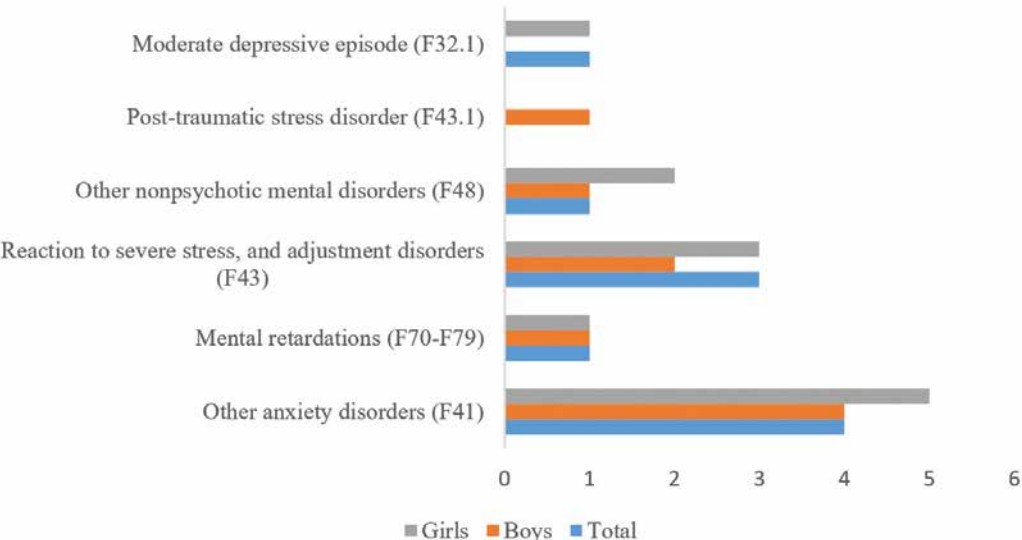


In the age group 0-19 years, the total number of cases of mental and behavioural disorders is 658.

The leading mental disorders for 2021 are other anxiety disorders; followed by reactions to severe stress and adjustment disorders; the third is mental retardation; then other neurotic disorders; while the fifth in frequency are moderate depressive episodes.

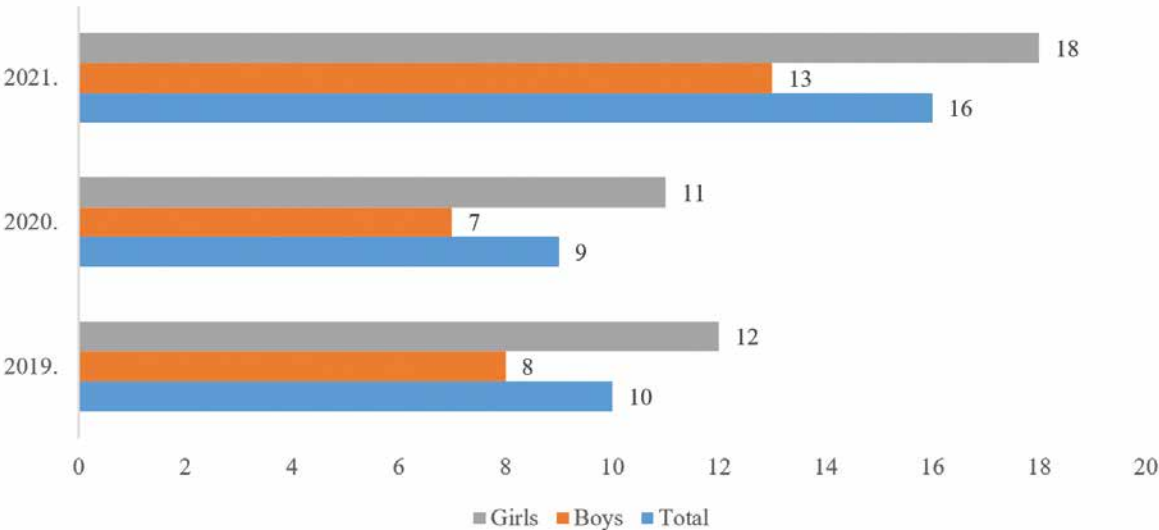
When it comes to other neurotic disorders, reaction to severe stress and adjustment disorder and other anxiety disorders, there is a noticeable higher incidence among women.

Figure 34: Leading mental and behavioural disorders in the Federation of BiH 2021, age group 0–19



In the period from 2019 to 2021, in the age group 0-19 years, the highest number of mental disorders and behavioural disorders was recorded in 2021, and the lowest in 2020. For each of the mentioned years, a greater number of female patients than males were registered.

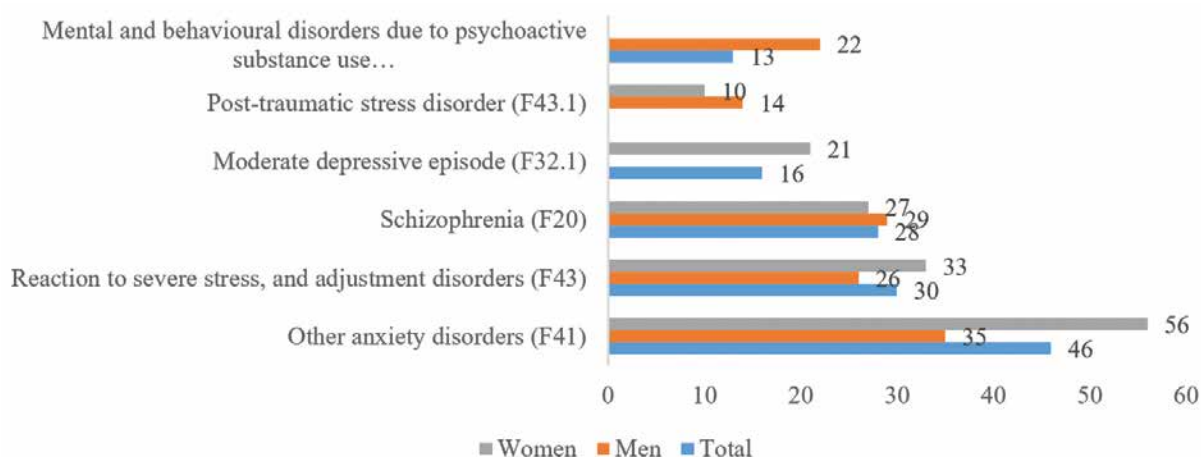
Figure 35: Mental and behavioural disorders in the Federation of BiH 2019–2021, age group 0–19, rate per 10,000 population



In 2021, in the age group 20-60, a total of 28,014 people with mental and behavioural disorders were registered, the leading ones being other anxiety disorders, followed by cases of reactions to severe stress and adjustment disorders, schizophrenia, moderate depressive episodes, while fifth are mental and behavioural disorders caused by the use of other psychoactive substances.

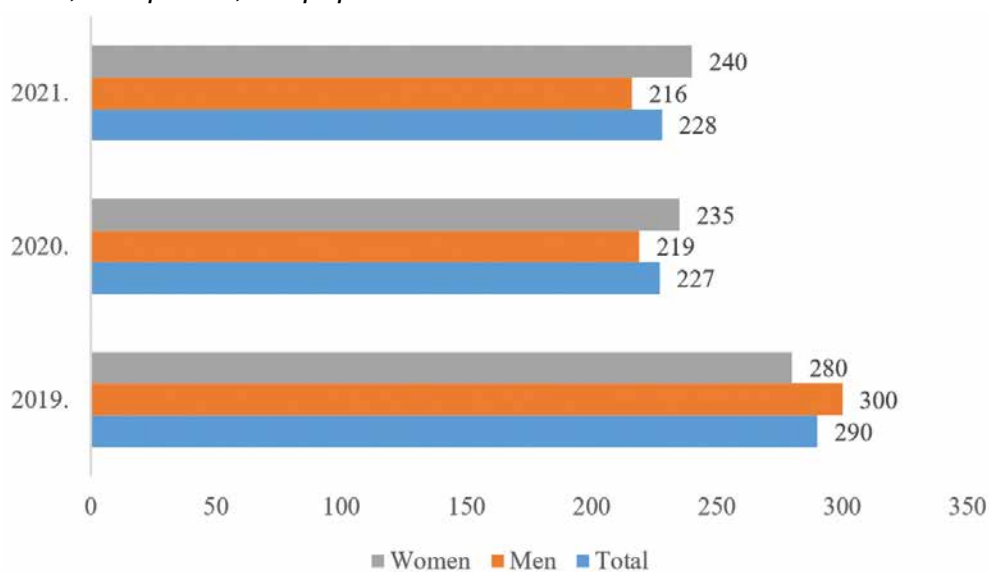
In the group of mental and behavioural disorders caused by the use of other psychoactive substances, PTSD and schizophrenia, a higher number of male cases is noticeable, compared to other groups of mental and behavioural disorders, which were predominately registered in women.

Figure 36: Leading mental and behavioural disorders in the Federation of BiH 2021, age group 20–60



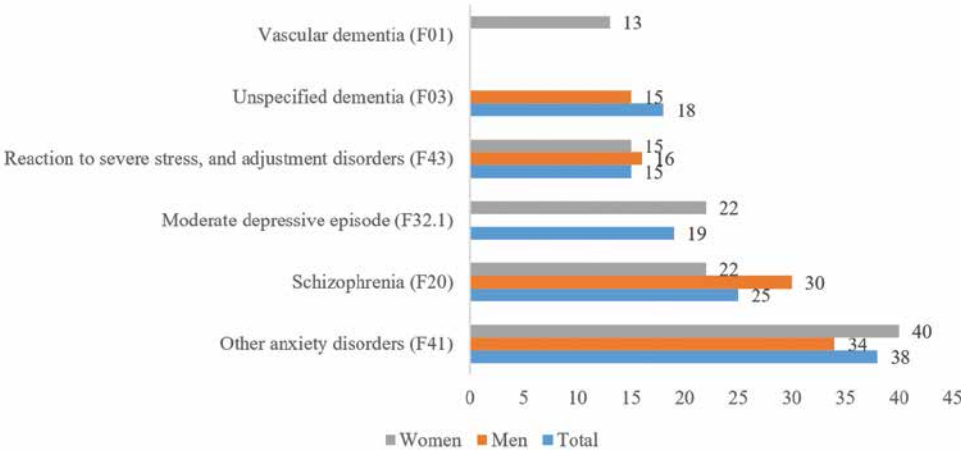
By comparing the data in the period from 2019 to 2021, in the age group 20-60, the highest number of mental illnesses was found in 2019, and the lowest in 2020 (insignificant difference between 2020 and 2021), where, unlike 2019, in 2020 and 2021 there are more affected women.

Figure 37: Mental and behavioural disorders in the Federation of BiH 2019–2021, age group 20–60, rate per 10,000 population



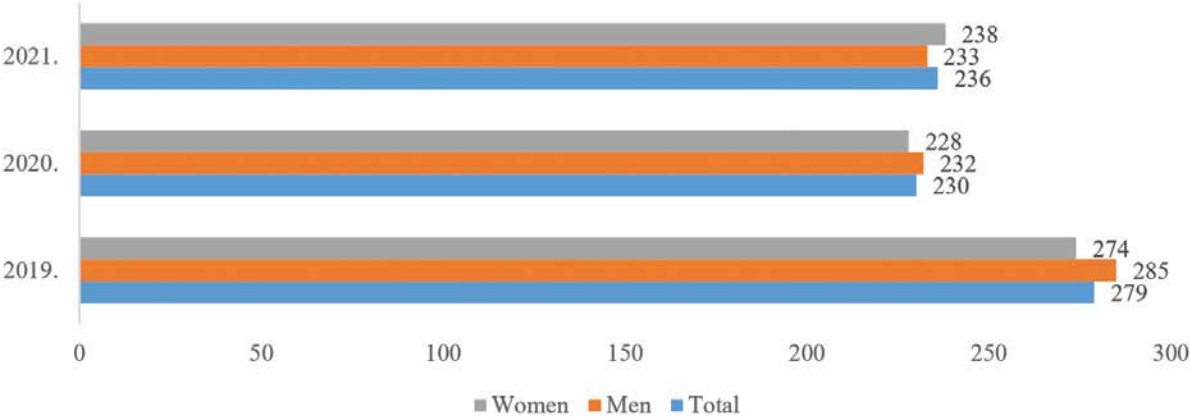
In 2021, in the age group 60+, a total of 12,155 people with mental and behavioural disorders were registered, the leading ones being other anxiety disorders, then cases of schizophrenia, moderate depressive episodes, followed by non-specific dementias and finally, the fifth one is reaction to severe stress and adjustment disorders. In the group of other anxiety disorders, a larger number of female patients is noticeable, in contrast to schizophrenia, where men predominate.

Figure 38: Leading mental and behavioural disorders in the Federation of BiH 2021, age group 60+



By comparing the data in the period from 2019 to 2021, in the age group 60+, the highest number of mental illnesses was found in 2019, and the lowest in 2020, with a more evident share of men in 2019.

Figure 39: Mental and behavioural disorders in the Federation of BiH 2019–2021, age group 60+, rate per 10,000 population



Prevention programme

In the period January 2021–September 2022, the Institute for Public Health in cooperation with mental health care centres in the Federation of BiH is implementing a prevention programme in the field of mental health called “Cooperation between mental health care centres and family medicine services aimed at timely detection of depression and anxiety in the adult population”.

Based on the positive effects and importance of programmes aimed at the prevention of depressive disorders, the implementation of programmes aimed at timely detection and treatment of depression will provide support and assistance to people suffering from depressive disorders in order to improve their mental, physical, and social health.

At the same time, the implementation of the prevention programme will enhance inter-institutional cooperation, strengthening the capacities of all stakeholders involved in terms of planning and implementation of prevention programmes in the field of mental health.

Brief description of project activities

Direct implementation of the programme by the IPH expert team in the first step involves preparing teams of selected mental health care centres to train family medicine teams on the risks and vulnerable groups for the development of depressive disorder and the application of standardized instruments to determine the presence of depression and fear of Covid-19.

After the training, the MHC teams, selected for the implementation of the programme, will train family medicine teams in the application of standardized screening instruments and initial psycho-education of patients at risk of developing a depressive disorder, as well as an increased fear of Sars-CoV-2 and in agreement with them, define a detailed timeline for the timely screening of depression and fear of COVID-19.

Persons who, based on the threshold values of the screening instrument, are diagnosed with depressive symptoms will be referred to a mental health care centre in order to receive appropriate treatment and have their health monitored.

Also, persons who are found to have an increased fear of the COVID-19 virus will be referred to the MHC to have their anxiety level assessed and to receive appropriate treatment.

In June 2021, the Institute for Public Health of the Federation of BiH carried out professional training of teams from 10 selected mental health care centres, who further trained 30 family medicine teams, and the screening of depression and anxiety among the adult population in the Federation of BiH began.

2.3.4 Infectious diseases and immunization

Public health surveillance and response to COVID-19 is the result of close cooperation between the IPH of the Federation of BiH, cantonal public health institutes and health care institutions, which was crucial in the fight against the spread and impact of COVID-19. In the past year, the third wave of the COVID-19 epidemic in the Federation of BiH reached its peak in the last week of March 2021, when the alpha variant of SARS-CoV-2 was prevalent, while the fourth wave began in September/October 2021 and lasted until the end of 2021, and then the delta variant was prevalent. Vaccination against COVID-19 was carried out throughout 2021. More than 500,000 residents of the Federation of BiH were vaccinated with the primary series. Thanks to this result, during the fourth wave, there was less pressure on the health system and the number of deaths decreased by 40%, although the delta variant was more infectious and caused a more serious clinical picture.

When it comes to the mandatory immunization programme, we can once again state that the presented data speak of a worryingly low coverage, which is a consequence of the secondary effects of the pandemic, and which threatens with the re-emergence of epidemics of vaccine-preventable diseases unless additional activities are undertaken to make up for missed vaccinations.

As every year, this report is organized in two parts. The first part contains an overview of the situation with 84 infectious diseases in the Federation of BiH in 2021, which form part of the mandatory surveillance system with a special emphasis on COVID-19. The second part contains an overview of the implementation of the mandatory immunization programme against ten infectious diseases, as well as the immunization programme against COVID-19. Although after two years of the pandemic and a significant number of people vaccinated against COVID, an extended period of continuously controlled impact of COVID-19 on the

population can be expected in the coming period as well, emphasis should be placed on strengthening surveillance, health care systems and preparedness for the pandemic.

Overview of registered infectious diseases in the Federation of BiH in 2021, according to indicators

In 2021, a total of 129,410 cases of infectious diseases were reported to the Institute of Public Health of the Federation of Bosnia and Herzegovina (I 5,923.5/100,000), in contrast to 2020, when 99,857 cases were reported (I 4,516.3/100,000). A significantly higher total incidence of infectious diseases was recorded in 2020 and 2021, during the COVID-19 pandemic.

Table 3: Registered cases of infectious diseases by cantons, the Federation of BiH 2017–2021

Year	2017		2018		2019		2020		2021	
Canton	Number of cases	I/100,000	Number of cases	I/100,000	Number of cases	I/100,000	Number of cases	I/100,000	Number of cases	I/100,000
Una-Sana	3,970	1,468.7	3,577	1323.3	3,039	1134.4	5,201	1,912.1	5,361	2,011.4
Posavina	108	256.8	132	313.9	140	338.6	871	2,035.8	2,015	4,919.6
Tuzla	11,218	2,538.5	9,142	2068.7	10,140	2310.7	16,800	3,782.1	24,106	5,508.6
Zenica-Doboj	8,375	2,325.7	8,092	2247.2	6,964	1943.6	10,494	2,898.5	92,00	2,575.0
Bosnian Po-drinje	500	2,140.4	445	1904.9	780	3385.2	1,576	6,676.2	1,310	5,751.2
Central Bosnia	2,337	929.4	2,405	956.5	1,853	741.5	4,253	1,682.7	5,744	2,306.3
Herzegovina-Neretva	2,802	1,282.5	3,290	1505.9	3,301	1521.4	18,006	8,177.3	24,181	11,182.1
West Herzegovina	3,731	3,982.0	4,160	4439.8	3,229	3457.7	7,439	7,896.5	9,100	9,762.6
Sarajevo	15,752	3,763.3	14,720	3516.9	15,576	3704.2	31,899	7,660.0	45,063	10,689.7
Canton 10	387	475.7	215	264.2	406	507.4	3,318	4,007.6	3,330	4,191.4
Total FBiH	49,180	2,234.2	46,178	2097.8	45,428	2074.2	99,857	4,516.3	12,9410	5,923.5

The lowest total incidence of infectious diseases was registered in the Una-Sana Canton, with 5,361 cases and I 2,011.4/100,000, and the highest in the Herzegovina-Neretva Canton, where 24,181 cases were registered (I 11,182.1/100,000).

In the five-year period, 2017–2021, the highest total incidence of infectious diseases was registered in Herzegovina-Neretva Canton in 2021 (I 11,182.1/100,000), and the lowest in Posavina Canton in 2017 (I 256.8/100,000).

In contrast to previous years, when the overall incidence of infectious diseases was most affected by influenza-like illness (ILI), in 2021 the highest impact is due to COVID-19, which accounts for 87.5% of all registered cases of infectious diseases (monitoring the progression of infectious diseases during the calendar year).

In the structure of the leading infectious diseases in 2021, no significant changes were recorded compared to the previous year, and COVID-19 is still the leading disease. Among other diseases, the leading places in the structure of infectious diseases in the Federation of BiH are influenza-like diseases (ILI), varicella, acute enterocolitis and herpes zoster. Although a decrease in the incidence of tuberculosis has been registered in recent years, it is still on the list of top ten infectious diseases in the Federation of BiH.

Table 4: Top ten infectious diseases in the Federation of BiH, 2021 and 2020

2021				2020			
Rank	Disease	Regis-tered no. of cases	I/100,000	Rank	Disease	Regis-tered no. of cases	I/100,000
1	COVID-19	115,770	5,299.2	1	COVID-19	72,188	3,264.9
2	ILI/influenza	8,572	392.4	2	ILI/influenza	21,346	965.4
3	Varicellae	1,820	83.3	3	Varicellae	2,937	132.8
4	Enterocolitis acuta	1,355	62.0	4	Enterocolitis acuta	1,105	49.9
5	Herpes zoster	450	20.6	5	Herpes zoster	466	21.0
6	Scabies	322	14.7	6	Angina streptococcica	412	18.6
7	*TBC resp.system	215	9.8	7	Scabies	356	16.1
8	Angina streptococcica	213	9.7	8	*TBC resp. system	288	13.0
9	Toxiinfectio aliment.	199	9.1	9	Toxiinfectio aliment.	140	6.3
10	Mononucleosis infectiva	75	3.4	10	Scarlatina	139	6.2

*Passive surveillance

In 2021, a higher number of deaths from infectious diseases was registered (5,173) compared to the previous year (2,378), caused by the COVID-19 pandemic. In the last five years, the highest number of deaths from infectious diseases was registered in 2021 (5,173 deaths, mortality rate 236.8/100,000), and the lowest number of deaths from infectious diseases in 2017 (37 deaths; mortality rate 1.6 /100,000).

Table 5: Incidence/mortality rates of infectious diseases, Federation of BiH, 2017–2021

Year	Number of cases	I/100,000	Number of deaths	Mt/100,000
2021	129,410	5,923.5	5,173	236.8
2020	99,857	4,516.3	2,378	107.5
2019	45,428	2,074.2	41	1.8
2018	46,178	2,097.8	47	2.1
2017	49,180	2,234.2	37	1.6

Vaccine-preventable diseases

in the Federation of BiH, vaccination is carried out against ten infectious diseases. In 2021, 12 cases of parotitis, 2 cases of measles, 1 case of pertussis were registered in the group of vaccine-preventable diseases. All age groups were affected, predominantly those unvaccinated and/or with unknown immunization status.

Table 6: Vaccine-preventable diseases (I/100,000) in the Federation of BiH, 2021 and 2020

Disease	2021		2020	
	Number of cases	I/100,000	Number of cases	I/100,000
HIB	0	0	0	0
Pneumococcosis infection	0	0	0	0
Morbili	2	0.1	2	0.1
Parotitis epidemica	12	0.6	13	0.6
Pertussis	1	0.1	8	0.3
Rubella	1	0.1	0	0
Tetanus	0	0	0	0

The highest incidence from this group of diseases was registered in the Zenica-Doboj, Central Bosnia, Herzegovina-Neretva and Sarajevo Cantons.

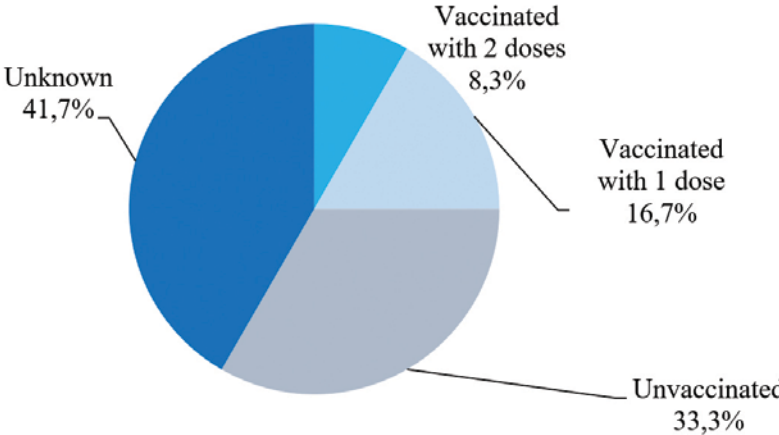
Table 7: Vaccine-preventable diseases (I/100,000) by cantons, the Federation of BiH, 2021 and 2020

Canton	Number of cases 2021	I/100,000 2021	Number of cases 2020	I/100,000 2020
Una-Sana	0	0	3	1.1
Posavina	0	0	0	0
Tuzla	0	0	0	0
Zenica-Doboj	6	1.7	5	1.3
Bosnian Podrinje	0	0	0	0
Central Bosnia	4	1.6	2	0.7
Herzegovina-Neretva	2	0.9	3	1.3
West Herzegovina	0	0	0	0
Sarajevo	4	0.9	10	2.4
Canton 10	0	0	0	0
Federation of BiH	16	0.7	23	1.0

Mumps [parotitis epidemica]

In 2021, parotitis occurs in the Federation of BiH 2021 as the most common vaccine-preventable disease, with an incidence of 0.5/100,000, i.e., 12 cases in total and a share of 80% in the overall structure of this group of diseases. The largest number of cases is registered in the age group from 5 to 9 years, and in the age groups <1, 15–19, 20–29 not a single case of the disease was registered. Males are more often affected (83.3%).

Figure 40: Cases of mumps by vaccination status, the Federation of BiH, 2021



Surveillance of acute flaccid paralysis (AFP)

In the Federation of BiH, poliomyelitis (polio) caused by wild poliovirus has not been registered for almost half a century.

In 2021, a total of 56 cases were registered in Afghanistan and Pakistan, less than the previous year (140 cases) (Table 6).

Also, reinfections have been reported in 28 countries that declared eradication. In 2019, the World Health Organization (WHO) adopted the *Polio Endgame Strategy 2019–2023*, a plan which aims to interrupt the transmission of all types of wild poliovirus and the circulation of vaccine-derived poliovirus within 120 days of its onset, and to achieve complete eradication of poliovirus.

According to the GPEI (Global Polio Eradication Initiative), all WHO members are obliged to conduct surveillance of acute flaccid paralysis (AFP), which, along with high coverage with the polio vaccine, represents the gold standard of this programme.

Table 8: Registered cases of polio worldwide, wild poliovirus (WPV1), 2021 and 2020

Country	2021	2020
Pakistan	9	84
Afghanistan	47	56
Total	56	140

In 2021, there were 2 cases of AFP registered in the Federation of BiH. The surveillance rate is below 1, which does not meet the surveillance criteria. Other indicators are satisfactory, both cases were investigated according to WHO criteria.

Table 9: AFP surveillance quality indicators in 2021

Number of AFP reporting units	Completeness of reporting ^a to State level (%)	Timeliness of reporting ^b to State level	Total number of non-polio AFP reported	Non-polio AFP rate	% of total AFP with adequate specimens ^c	Non-polio AFP index
10	100 %	100 %	2	0.3/100 000	100 %	1

Stool samples, analyzed in an accredited WHO polio laboratory (Rome), were negative for polioviruses, and AFP cases were dismissed as poliomyelitis by the Expert Commission for Ultimate Case Classification (which works at the Ministry of Civil Affairs of BiH).

Suboptimal polio vaccine coverage, including vulnerable groups, and suboptimal AFP surveillance, hinders the achievement of the goals of the Strategic Plan of the Global Polio Eradication Initiative. Improving AFP surveillance quality indicators, as well as maintaining high immunization coverage (>90%), by conducting continuous and supplementary immunization in areas where the desired immunization coverage has not been achieved, are key measures to prevent virus transmission after a possible “import” of wild poliovirus.

Immunization

Immunization coverage is an important indicator of the level of protection of the population against vaccine-preventable diseases, as well as a measure of implementation of the immunization programme. It is important to point out that the coverage rates do not take into account the timeliness in administering vaccines (a factor of essential importance for the prevention of vaccine-preventable diseases).

In the Federation of BiH in 2019, a slightly lower coverage of children with vaccines from the mandatory immunization programme was registered, except for the vaccine against tuberculosis, where a slightly higher coverage was recorded (95%) compared to the previous year. The lower coverage is caused in part by the coronavirus pandemic. Coverage with three doses of hepatitis B vaccine was 67.2% and with three doses of vaccine containing DTaP components and polio coverage was 62.6%. The coverage of the third dose of the pentavalent vaccine is significantly lower compared to the previous year.

At the level of the Federation of BiH, in 2020 there was a significant decrease in the coverage of DTP vaccine compared to the previous year. Vaccination coverage in the primary vaccination with three doses of vaccine against diphtheria, tetanus, pertussis and poliomyelitis was 80.2%, i.e., out of the planned 18,540 infants, 14,872 of them were vaccinated.

Coverage of the first dose of measles, rubella and mumps vaccine in the Federation of BiH in 2020, was a worrying 52.3%, i.e., out of the planned 18,273, only 9,560 infants were vaccinated. Coverage of over 95% was recorded in Posavina Canton (98.6%). In the past year, 1,709 children were vaccinated with the first dose of MMR vaccine at the age over 24 months.

Table 10: Vaccination coverage according to the immunization programme in the Federation of BiH, 2017 –2020

Vaccine	2021	2020	2019	2018	2017
BCG	93.1	95	92.7	95.2	97.7
Hep B 3	71.3	67.2	81.6	79.5	72.0
DTP 3	66.5	62.6	80.2	72.8	68.7
POLIO 3	66.5	62.6	80.2	72.8	68.7
MMR 1	55.1	52.3	79.0	68.4	62.6

Interventions to increase immunization coverage, conducted by the Epidemiology Service, include informational and educational materials for parents, development of a mobile application with basic information about vaccines and vaccinations, as well as opportunities for regular maintenance of child immunization calendars and vaccination reminder systems.

Also, the website of the FBiH Institute for Public Health is part of the Vaccine Safety Net, by which the World Health Organization tries to establish standards for the quality of information on health issues, namely information on vaccines. In 2020, the campaign on the importance of immunization, conducted during the European Immunization Week 2020, can also be highlighted.

Pursuant to the Law on the Protection of the Population from Infectious Diseases, i.e., the Order on the Mandatory Immunization Programme of the Population against Infectious Diseases in 2020, in order to improve immunization coverage, it is still necessary to check the immunization status of children and perform catch-up vaccinations for those who missed them. Refusal and delay of vaccination leaves children susceptible to diseases that can be prevented by vaccination, which poses a risk of contracting these diseases at the earliest age, when it can cause serious consequences.

Education and raising awareness about the importance of immunization and adherence to the recommended schedule is the joint social responsibility of several key actors: the education system, health workers, all levels of government, the media and non-governmental organizations.

COVID-19

COVID-19 is an infectious disease caused by the SARS-CoV-2 virus. The first known case was identified in Wuhan, China, in December 2019. Since then, the disease has spread around the world, leading to an ongoing pandemic. Surveillance of COVID-19 in the Federation of Bosnia and Herzegovina has been improved by creating a web database for real-time monitoring, which combines virological and epidemiological data. It started working on 27 March 2020. The first case of COVID-19 disease was recorded in Zenica on 9 March 2020. In 2021, in the Federation of BiH, there were 115,770 laboratory-confirmed cases of COVID-19 and 5,162 deaths related to COVID-19. The highest cumulative incidence was recorded in the Herzegovina-Neretva Canton (10,692.4/100,000) and Sarajevo Canton (9,919.9/100,000). The highest mortality rate was recorded in Sarajevo (303.2/100,000) and Zenica-Doboj Canton (286.9/100,000), while the highest lethality was in Zenica-Doboj Canton (14.0%) and Una-Sana Canton (9.1%) (when interpreting lethality, take into account the low testing rate and the proportion of asymptomatic cases).

Table 11: Incidence and mortality of COVID-19 cases, by cantons in the Federation of BiH, 2021

Canton	Population	Number of cases	Incidence /100,000	Number of deaths	Mt / 100,000
USC	266,535	4,406	1,653.1	399	149.7
POS	40,959	1,960	4,785.3	72	175.8
TUZ	437,607	20,071	4,586.5	1,064	243.1
ZDC	357,275	7,303	2,044.1	1,025	286.9
BPC	22,778	1,244	5,461.4	65	285.4
CBC	249,062	5,114	2,053.3	428	171.8
HNC	216,248	23,122	10,692.4	486	224.7
WHC	93,213	7,470	8,013.9	231	247.8
SAR	421,555	41,818	9,919.9	1,278	303.2
C10	79,448	3,262	4,105.8	114	143.5
F/BiH	2,184,680	115,770	5,299.2	5,162	236.3

The epidemic in the Federation of Bosnia and Herzegovina in 2021 was marked by the emergence of new variants of the SARS-CoV-2 virus, alpha and delta, which were declared variants of concern.

Influenza (flu), season 2020/2021

Overview of the surveillance system

In the Federation of BiH, in addition to universal influenza surveillance in which 79 health centre participate, sentinel surveillance over ILI/SARI has been established since the 2013/2014 flu season. This surveillance consists of one sentinel ILI site in HCC Novi Grad Sarajevo and one sentinel SARI site in UCC Sarajevo. In the past four years, piloting of SARI sites has been carried out in UCC Tuzla, UCH Mostar and CH Zenica. Due to the COVID-19 pandemic, the sentinel influenza surveillance programme was not implemented in these institutions.

Epidemiological surveillance

In the 2020/2021 flu season, a total of 5,989 cases with flu-like symptoms were reported, and no influenza virus was detected. A significantly lower number of cases was recorded, in contrast to 27,811 cases in the 2019/2020 season. The highest incidence rate of ILI was recorded at week 15 and was 19.7/100,000, while the lowest incidence rate was 1.1/100,000 and was recorded at week 20. In contrast to the 2019/2020 season, in the 2020/2021 season, the ILI activity was of low intensity.

No influenza virus was detected in the 2020/2021 flu season. Table 13 shows the data of the surveillance results at the SARI site.

Table 12: Influenza viruses detected in samples taken at the sentinel SARI site of UCC Sarajevo, the Federation of BiH, season 2020/2021

Virus type and subtype	Current week		Season 2019/20	
	Number	%	Number	%
Influenza A	0		0	
A(H1N1)09	0		0	
A(H3N2)	0		0	
A without subtyping	0		0	
Influenza B	0		0	
B/Victoria lineage	0		0	
B/Yamagata lineage	0		0	
Unknown lineage	0		0	
Total detected (tested)	0 (0)		0 (52)	

Epidemiology of HIV infection and AIDS in the Federation of Bosnia and Herzegovina

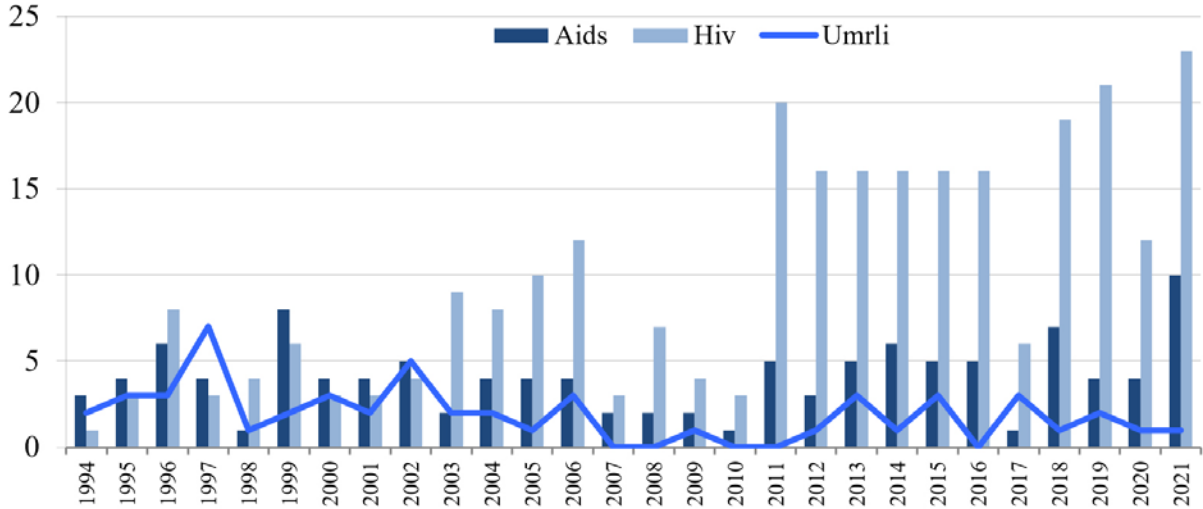
In the period from 1992 to the end of 2021, there were 272 persons diagnosed with HIV infection registered in the Federation of BiH. Among them are 115 cases of AIDS.

In the same period, 53 infected people died. Among infected persons, 88.2% are male. The largest number of HIV cases is registered in the age group 20-29 years (Figure 16). In the last five years, an average of 14 new cases of HIV infection have been registered in the Federation of BiH, which is a rate of 6 cases per million population, i.e., it represents a

low prevalence of the HIV epidemic. The recorded increase in newly diagnosed cases of HIV infection in recent years is associated with more testing, as a result of the operation of centres for voluntary, free and confidential counselling and testing.

In 2021, 23 new cases of HIV infection were reported in the Federation of BiH (one of which is a migrant from Afghanistan currently residing in the area of the migrant centre in the Una-Sana Canton), among which 10 cases of AIDS.

Figure 41: Number of registered cases of HIV infection and AIDS, the Federation of BiH, 1992–2021

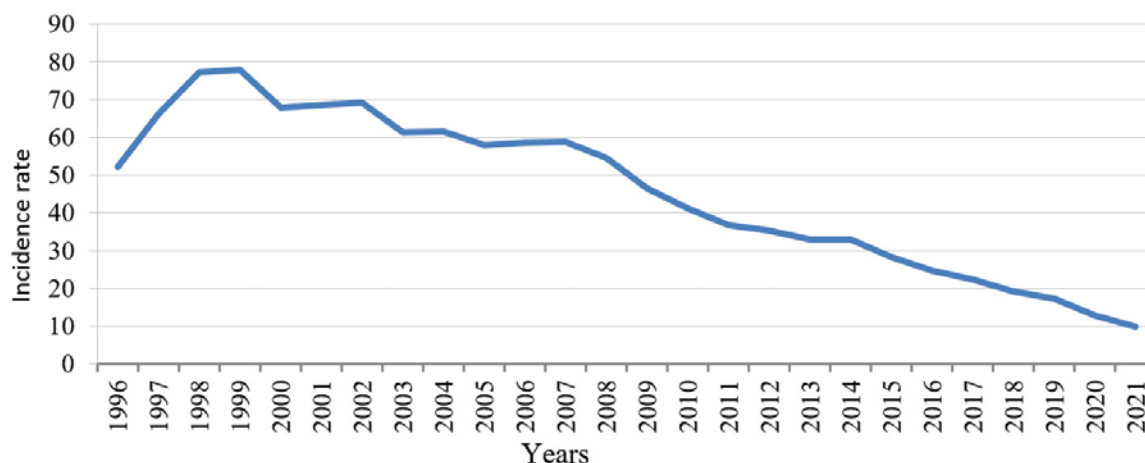


According to the mode of transmission in the total number of cases, the dominant mode of HIV infection was unprotected sexual intercourse, namely homosexual (men who have sex with men – MSM) with 53.7% and heterosexual (HETERO) with 37.5%. In the last few years, there has been an increase in HIV infection among the MSM population, with the highest number of cases recorded in 2019 and 2021 (19 cases) (Figure 18). The largest number of HETERO cases was recorded in 2011 (13 cases). For 5.9% of the cases, the method of HIV infection was through injection drug use (non-sterile equipment). The remaining 2.9% belong to other/unspecified modes of transmission. In 2021, the dominant mode of transmission was MSM (19 cases) out of a total of 23 reported cases.

Tuberculosis (TB)

According to data submitted to the Institute for Public Health of the Federation of BiH, there were 215 cases of tuberculosis reported in 2021, i.e., the incidence rate is 9.8/100,000 population.

Figure 42: Trends in the incidence of TB, the Federation of BiH, period 1996- 2021



The largest number of tuberculosis cases was in the age group 25–49 years, while not a single case of the disease was registered in the age group 0–6. Men were somewhat more often represented (124 cases, or 57.7%) compared to women (91 cases, or 42.3%).

In 2021, the highest TB incidence rate was in USC (14.6), followed by BPC (13.2) and CBC (13.2), and the incidence rate in the Federation of BiH in 2021 was 9.8/100,000 inhabitants, which falls into the low incidence category. The lowest incidence rates are in WHC (4.3) and C10, where there were no recorded cases of TB.

Zoonoses

In the group of zoonoses, 132 cases were recorded in 2021 (I 6.0/100,000), more than in 2020 when 108 cases were recorded (I 11.6/100,000). The most prevalent in this group of diseases is haemorrhagic fever [febris haemorrhagica] with 73 patients (I 3.3/100,000). In second place in 2021 is brucellosis with 57 patients (I 2.6/100,000).

Table 13: Zoonoses (I/100,000) in the Federation of BiH, period 2020–2021

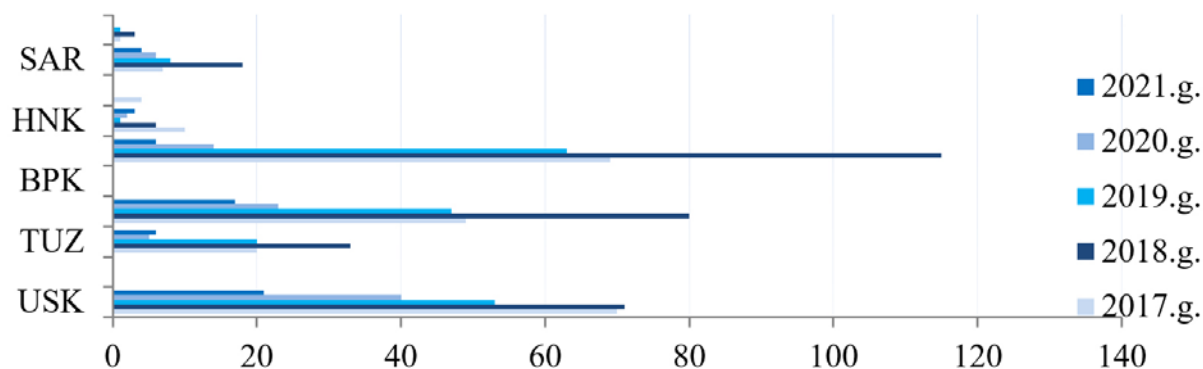
Disease	2021		2020	
	Number of cases	I/100,000	Number of cases	I/100,000
<i>Brucellosis</i>	57	2.6	90	4.0
<i>Febris haemorrhagica</i>	73	3.3	1	0.05
<i>Q febris</i>	1	0.05	10	0.4
<i>Echinococcosis</i>	1	0.05	7	0.3
<i>Leishmaniasis</i>	0	0	0	0
<i>West Nile febris</i>	0	0	0	0
<i>Anthrax</i>	0	0	0	0

In 2021, except in the Posavina and West Herzegovina cantons, these diseases were registered in all other cantons of the Federation of BiH. The highest incidence was registered in Central Bosnia Canton - I 24.1/100,000 and Bosnian Podrinje Canton - I 8.8/100,000, then Una-Sana Canton - I 7.9/100,000 and Zenica-Doboj Canton - I 5.9/ 100,000.

Brucellosis

Brucellosis is the most frequently registered zoonosis in the Federation of BiH. It has been present in BiH for many years, in greater or lesser numbers. During 2021, significantly fewer patients were reported (57 patients), than the year before (90 cases). During 2021, the disease was not registered in Posavina, Bosnian Podrinje, West Herzegovina and Canton 10.

Figure 43: Registered cases of brucellosis by cantons, period 2017–2021, the Federation of BiH



The disease is registered in all age groups, except for the age group 0–6, and in both genders. Most of the patients, 45.6%, were registered in the groups of the working age population 25-49 and 50-64, and more often in men.

In the five-year period (2017–2021), the disease was registered in 8 cantons of the Federation of BiH (the disease was not registered in the Posavina and Bosnian Podrinje cantons).

Epidemics of infectious diseases

In 2021, one epidemic was registered in the Federation of BiH, namely COVID-19 with 115,770 confirmed cases of the disease.

Table 14: Epidemics of infectious diseases according to the route of transmission, the Federation of BiH, 2017–2021

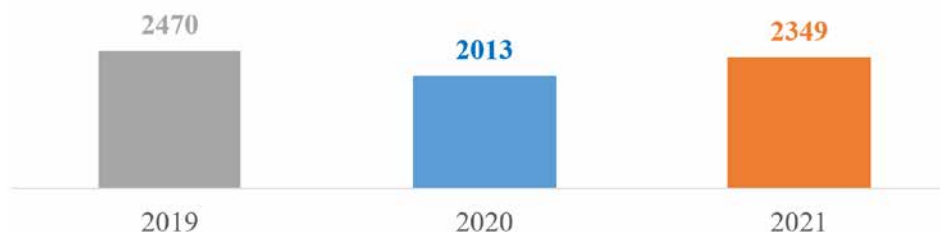
Year	Number of epidemics/cases	Epidemics	
		Droplet	Alimentary
2017	Number of epidemics	0	3
	Number of cases	0	156
2018	Number of epidemics	0	1
	Number of cases	0	17
2019	Number of epidemics	0	6
	Number of cases	0	376
2020	Number of epidemics	1	0
	Number of cases	72188	0
2021	Number of epidemics	1	0
	Number of cases	115770	0

In the last five-year period (2017–2021), the highest number of epidemics was reported in 2019 - 6 epidemics.

2.3.5 Oral and dental health

In 2021, there were 509,401 diseases, conditions and injuries registered in the public dental health care sector at the PHC level, which is 13.7% more than in 2020 (439,718), so the disease rates are higher.

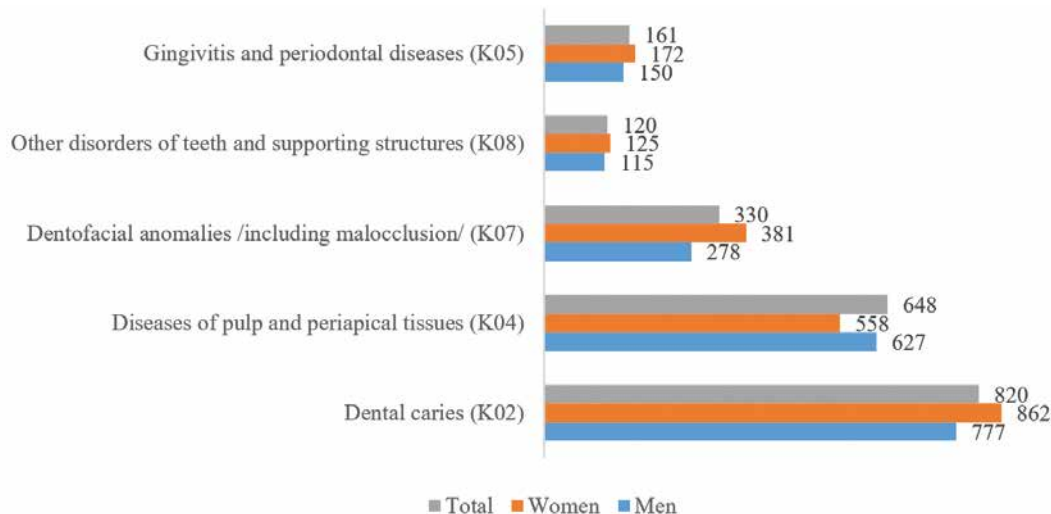
Figure 44: Morbidity in dental care in the Federation of BiH, period 2019-2021, rate per 10,000 population



Among the registered diseases, conditions and injuries in dental care, in 2021, in the public sector, as in all previous years, dental caries is the leading one among the total population of the Federation of BiH (34.9% share of all diseases and conditions; rate of 821/10,000 population), as well as by gender (men: 46.5% and rate 777/10,000; women: 53.5% and rate 862/10,000).

As in previous years, the second among the registered diseases are diseases of the pulp and periapical tissues (K04) (structure index: 27.6%; rate of 648/10,000 population).

Figure 45: Leading diseases and conditions in dental care in 2021, total and by gender, rate per 10,000 population



In all observed age subgroups, dental caries and diseases of the pulp and periapical tissue were the leading diseases, while dentofacial anomalies including malocclusions (K07) are ranked highly in the age group 5–19.

Figure 46: Leading diseases in dental care in 2021, age group 0–4, rate per 10,000

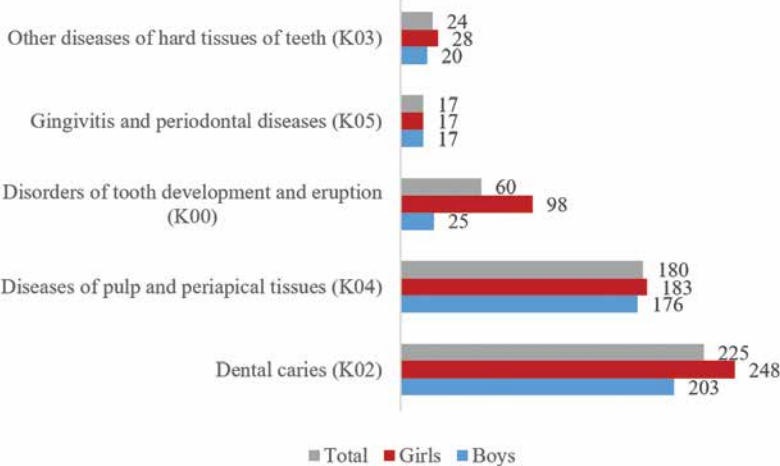


Figure 47: Leading diseases in dental care in 2021, age group 5–19, rate per 10,000

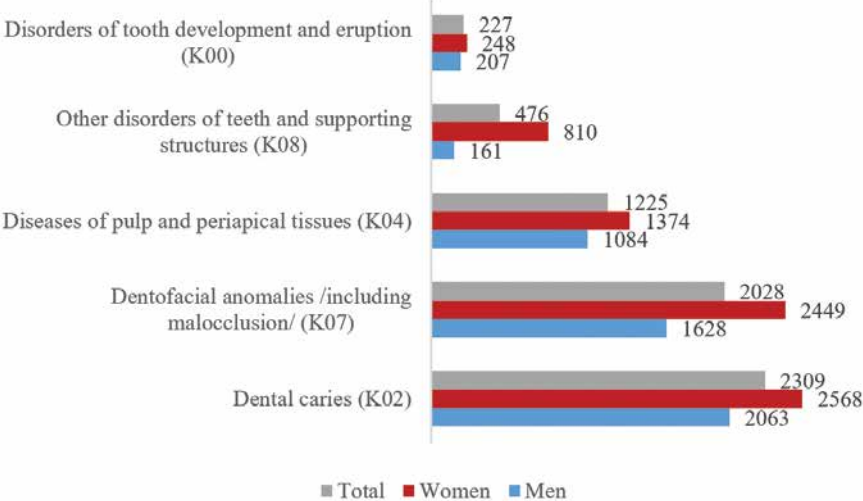


Figure 48: Leading diseases in dental care in 2021, age group 20–59, rate per 10,000

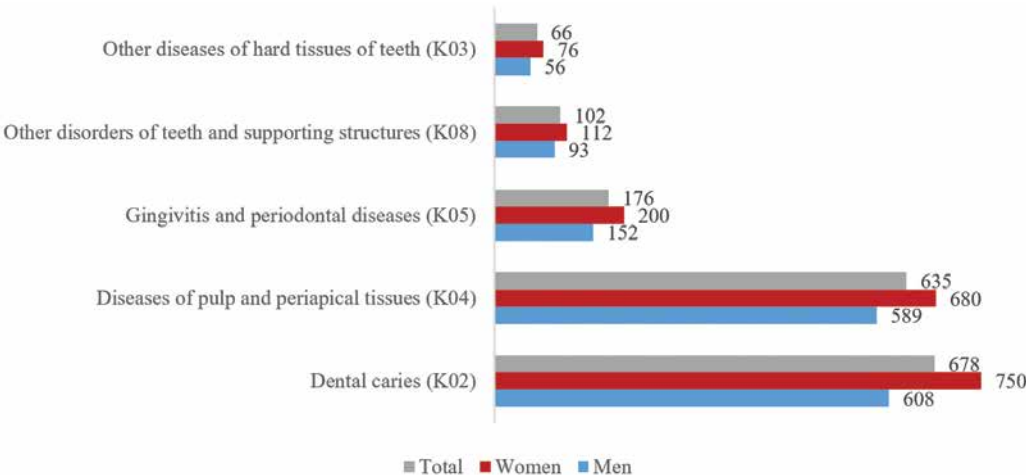
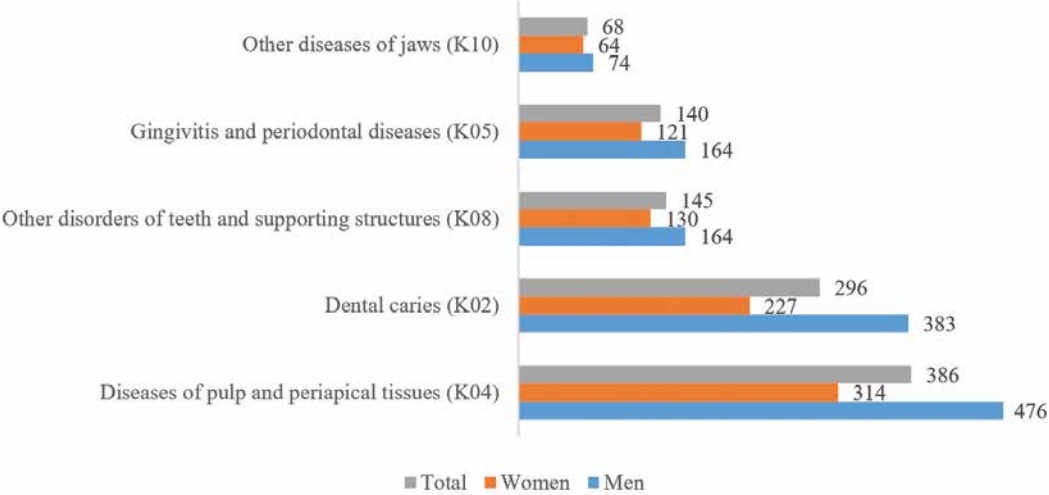


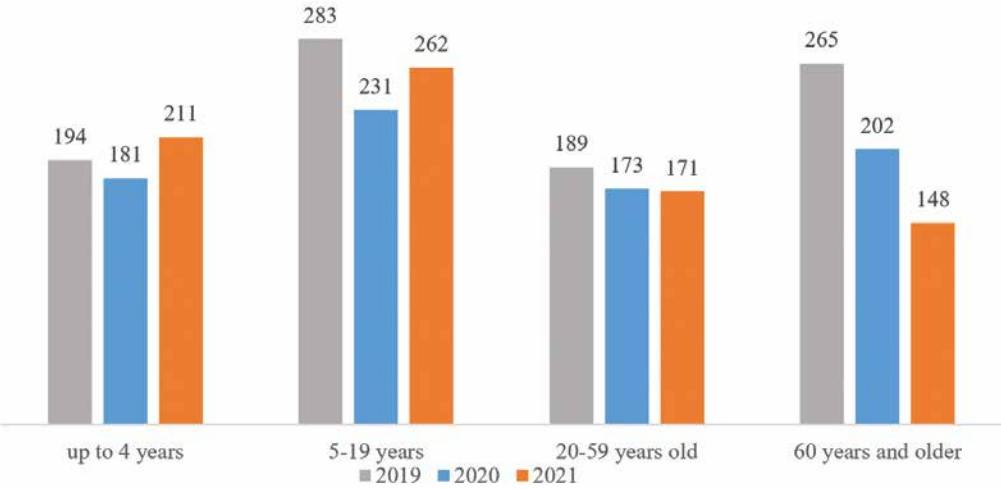
Figure 49: Leading diseases in dental care in 2021, age group 60+, rate per 10,000



2.3.6 Injuries

There were 39,287 injuries recorded in primary health care in 2021, which is less than in 2020 (41,275), so the injury rate in 2021 was 181/10,000 population.

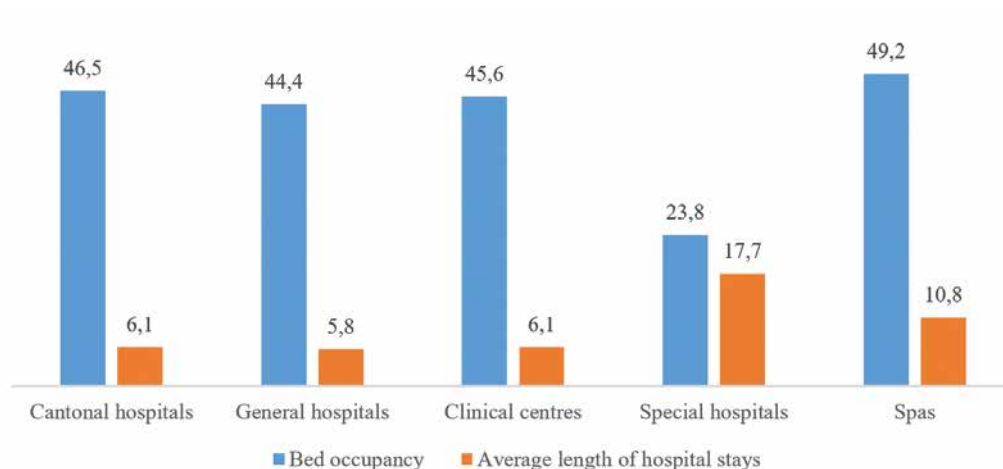
Figure 50: Injuries, poisonings and other consequences of external causes of morbidity in the Federation of BiH, 2019–2021, by age group, rate per 10,000



2.3.7 Hospital morbidity

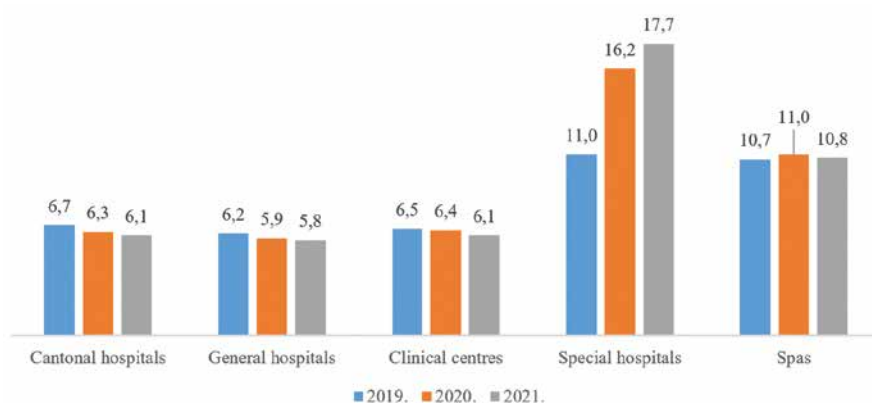
In the Federation of BiH in 2021, beds were occupied the longest time in spas, then in cantonal hospitals, then clinical centres, general hospitals and special hospitals.

Figure 51: Occupancy of beds and length of stay by level of hospitals in the Federation of BiH, 2021



The average length of hospital stays was the longest in special hospitals, and the shortest in general hospitals.

Figure 52: Average length of stay by level of hospitals in the Federation of BiH, 2019–2021



In 2021, the highest average length of stay was in special hospitals and shows a slight but continuous growth, compared to the two previous years; then in spas, where that number is slightly reduced compared to 2020, but still somewhat higher if we compare it to 2019.

In third place according to the average length of stay in 2021 are clinical centres and cantonal hospitals, which show a trend of a slight decrease in length of stay compared to the two previous years. General hospitals record the lowest number of days of hospital stays in 2021, with a slight decreasing trend compared to the two previous years.

2.4 Non-communicable diseases

2.4.1 Cardiovascular diseases

Since cardiovascular diseases have been the leading cause of death in the population of the Federation of BiH for many years, their public health importance is great, and special attention should be paid to the prevention of CVD.

The share of cardiovascular diseases in the total morbidity in 2021 was 19.6% and is slightly less compared to 2020, and yet higher compared to 2019, when they accounted for 17.9% of morbidity in PHC.

There are numerous risk factors that contribute to CVD, such as tobacco and alcohol consumption, obesity and improper diet, irregular and insufficient physical activity, which are present in a large percentage in almost all age groups, especially among young people and the working age population.

Prevention programmes, as well as campaigns aimed at familiarizing the general population with the risks brought by tobacco and alcohol consumption, obesity and improper nutrition, insufficient and irregular physical activity, are the best way to prevent risks. If we add actions to control blood pressure, cholesterol and blood sugar values, which would be available on a daily basis, then it is certain that all this would contribute to reducing the number of CVD patients in the Federation of BiH.

2.4.2 Diabetes

Diabetes, the plague of the modern era, as it is also called, is becoming one of the major public health problems in the world, including in our country. According to the International Diabetes Federation (IDF), the number of adults living with diabetes has more than tripled over the last twenty years. The IDF estimates that 9.3% of adults aged 20-79 and 1.1 million children and adolescents under the age of 20 live with diabetes, and that by 2030, there will be 578 million adults worldwide living with diabetes.

In 2021, there were 68,754 cases registered at the PHC level in the Federation of BiH, which is less compared to 2020, when that number was 72,797, but yet more compared to the number of 64,594 in 2019.

Early detection of diabetes as well as timely and adequate treatment of prediabetes, as well as insulin resistance, are advances that, with a little effort from the health care sector, but also from individuals, especially from groups with risk factors, such as obesity, physical inactivity, improper diet and hereditary factors can largely contribute to reducing the number of people suffering from diabetes mellitus type 2 (E11).

2.4.3 Chronic obstructive pulmonary diseases

In the period 2019–2021, a decrease in the number of patients with chronic obstructive pulmonary diseases (J40–J46) was recorded: from 34,634 patients or 158/10,000 population in 2019 to 30,205 patients or 139/10,000 population in 2021.

In the records of the number of cases of chronic obstructive pulmonary diseases (J45–J46, J40–J44) in PHC, in the Federation of BiH in 2021, in the elderly population (65-80+), there is a higher number of men suffering from chronic bronchitis, emphysema and other chronic obstructive pulmonary diseases in all age groups compared to women.

In the records of the number of cases of chronic obstructive pulmonary diseases (J45–J46, J40–J44) in PHC, in the Federation of BiH in 2021, in the working age population (20–64), there is a higher number of men suffering from chronic bronchitis, emphysema and other chronic obstructive pulmonary diseases in all age groups compared to women.

2.4.4 Trend of malignant neoplasms

The Cancer Register in the Federation of BiH was established in 2004 as a special activity for collecting, researching, and interpreting data on each new cancer case in the FBiH, over a given period of time.

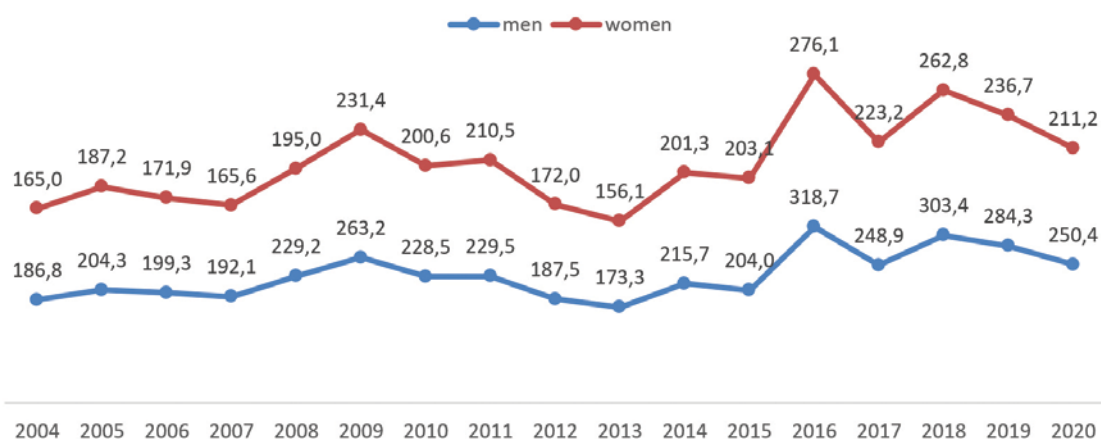
The goal of the report is to present data on morbidity and deaths due to cancer in the FBiH in the period from 2004 to 2020, then the incidence of malignant neoplasms; geographical distribution; gender and age structure of patients.

The report used data from the Cancer Register regarding people diagnosed with cancer (without skin cancer) in the period from 2004 to 2020.

Due to the numerous sources related to the collection of data on malignant neoplasms, their publication is a rather lengthy process (not only in our country, but also in the world, and it usually takes two to three years).

The average incidence rate of cancer in the period 2004-2020 in men is 230.5/100,000, and in women 204.1/100,000.

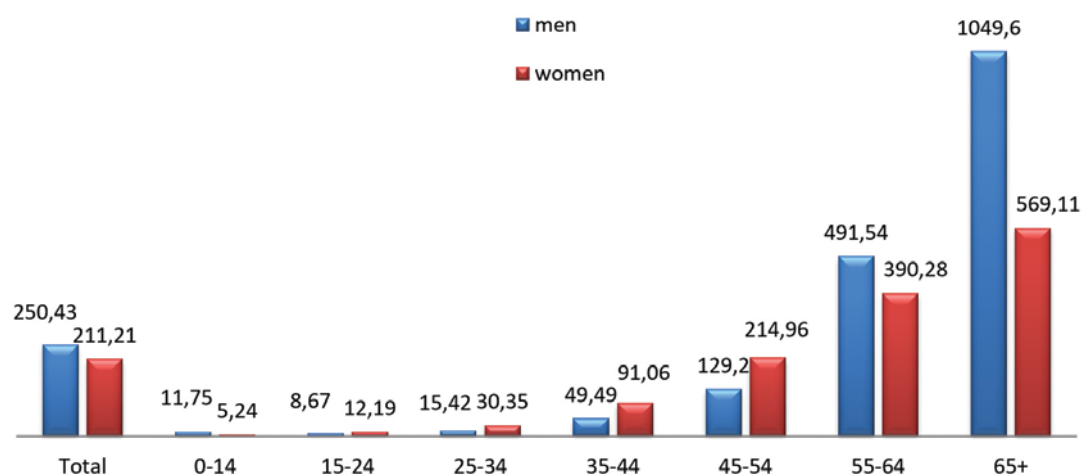
Figure 53: Trends in cancer incidence (excluding skin cancer), by gender, in the Federation of BiH, 2004–2020



The number of registered malignant neoplasms in 2020 is 5,035, of which 2,686 are men and 2,349 are women. The cancer incidence rate for men in 2020 is 250.4/100,000, and for women 211.2/100,000.

The average age of registered patients is 63 years (64 in men and 62 in women).

Figure 54: Incidence of cancer by gender and age groups in the Federation of BiH 2020



The lowest rate of cancer incidence was registered in the age group 0 - 34. Other incidences increase with age and reach the highest rate in the age group 65+. In the age group 25 - 54, there is a noticeably higher incidence rate among women compared to men.

Figure 55: Incidence of cancer in men by cantons in the Federation of BiH, 2020, rate/100,000

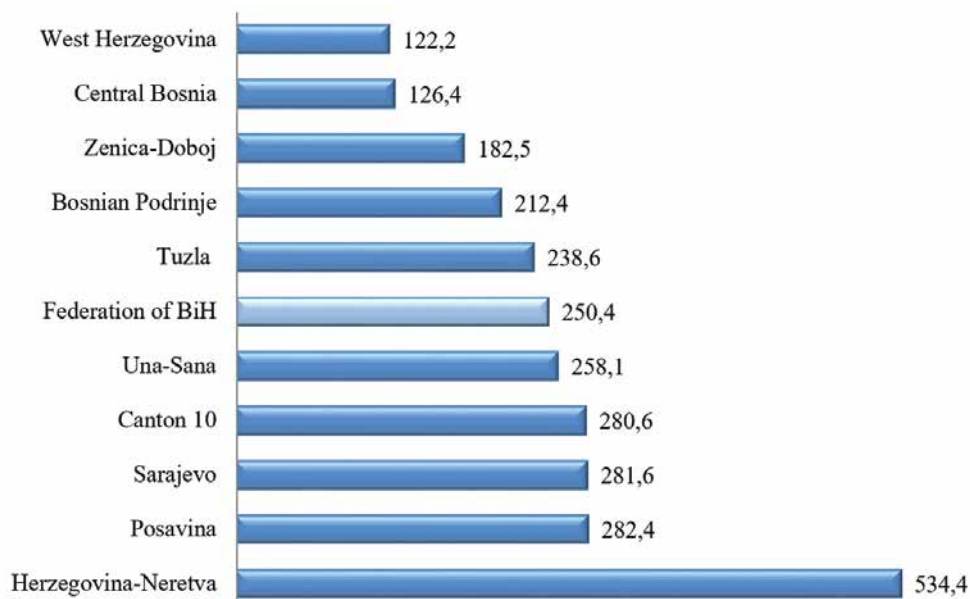
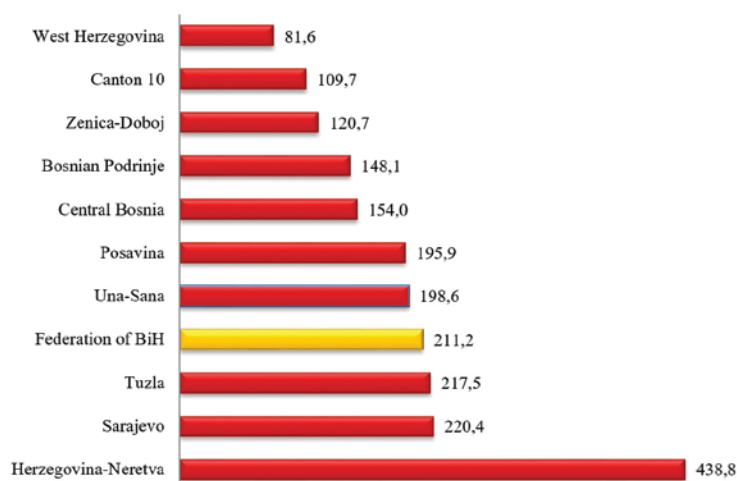


Figure 56: Incidence of cancer in women by cantons in the Federation of BiH, 2020, rate/100,000



Regarding the geographical distribution of registered malignant neoplasms, the highest rate in both men and women is in Herzegovina-Neretva Canton. The rate in men is 534.4/100,000, and in women it is 438.8/100,000.

The lowest rate for both men and women is in the West Herzegovina Canton. In men it is 122.2/100,000, and in women it is 83.6/100,000.

Table 14: The most common cancer sites in men in the Federation of BiH, 2020

Rank	MKB-10	Localization	Number of registered cases	Structure Index	Mb/100,000
1	C33–34	Lung bronchus, trachea	625	23.3	58.3
2	C61	Prostate	372	13.8	34.7
3	C67	Bladder	247	9.2	23.0
4	C18	Colon	162	6.0	15.7
5	C19–20	Rectum	155	5.8	14.5
6	C16	Stomach	116	4.3	10.8
7	C64	Kidney	100	3.7	9.3
8	C22	Liver	85	3.2	7.9
9	C25	Pancreas	76	2.8	7.1
10	C32	Larynx	60	2.2	5.6
Other (without skin cancer)			688	25.7	63.6
Total (without skin cancer)			2686	100.0	250.4

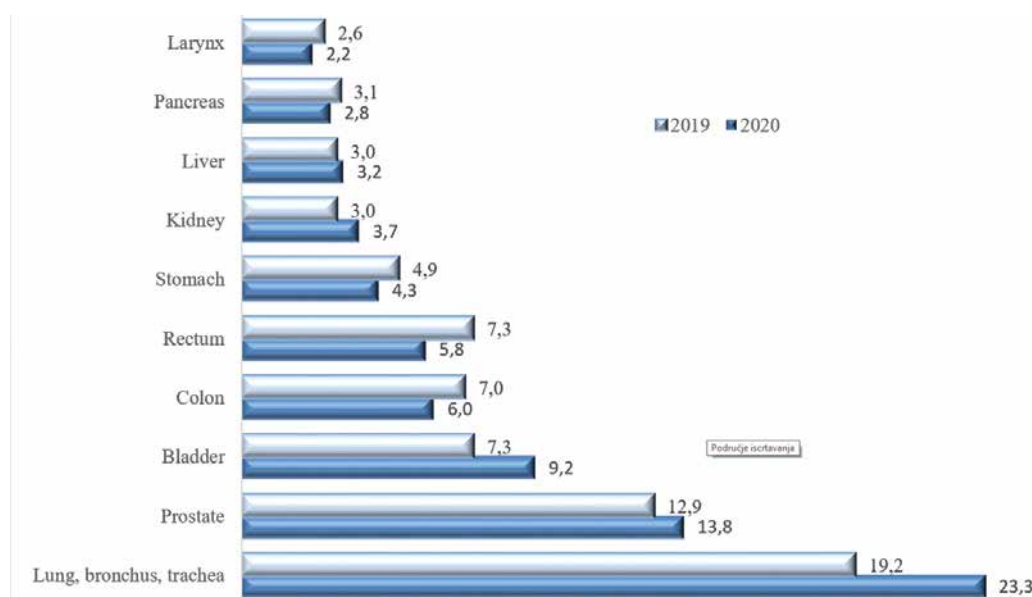
The ten most common sites of cancer in men in the Federation of BiH in 2020 account for 74.3% of all registered cases of cancer in men. Of all newly diagnosed neoplasms in men, the leading ones, according to localization, are: cancer of the respiratory system (lungs, bronchus, trachea), which account for 23.3%; then prostate cancer (13.8%); and bladder cancer (9.2%).

Table 15: The most common cancer sites in women in the Federation of BiH, 2020

Rank	MKB-10	Localization	Number of registered cases	Structure Index	Mb/100,000
1	C50	Breast	540	23.0	48.6
2	C33-34	Lung bronchus, trachea	212	9.0	19.1
3	C54	Corpus uteri	160	6.8	14.4
4	C18	Colon	141	6.0	12.7
5	C53	Cervix uteri	111	4.7	10.0
6	C19-20	Rectum	108	4.6	9.7
7	C56	Ovary	103	4.4	9.3
8	C16	Stomach	89	3.8	8.0
9	C25	Pancreas	82	3.5	7.4
10	C64	Liver	64	2.7	5.8
Other (without skin cancer)			739	31.5	66.4
Total (without skin cancer)			2349	100.0	211.2

The ten most common sites of cancer in women in the Federation of BiH in 2020 account for 68.5% of all registered cases of cancer in women. Of all newly diagnosed neoplasms in women, the leading ones, according to localization, are: breast cancer (23.0%); followed by cancer of the respiratory system (lungs, bronchus, trachea), which account for 9%; and uterine body cancer (corpus uteri) (6.8 %).

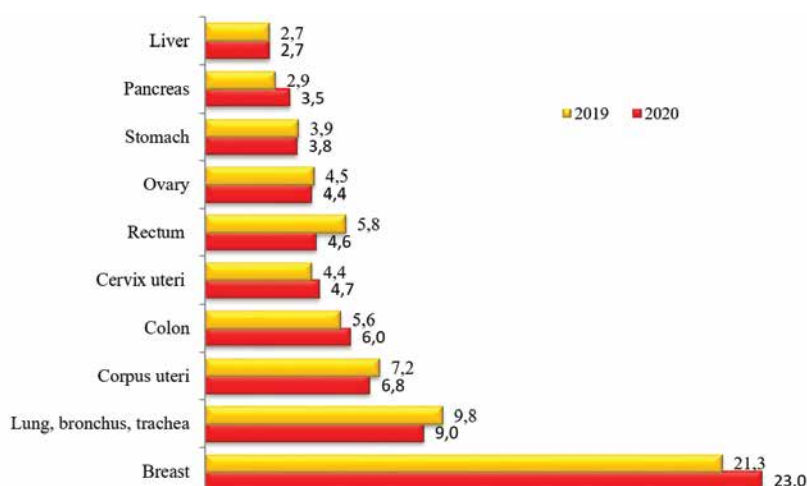
Figure 57: Leading cancer sites in men in the Federation of BiH, comparison 2020 and 2019



The structure of the leading cancer sites in men in the Federation of BiH in 2020 was slightly changed compared to 2019.

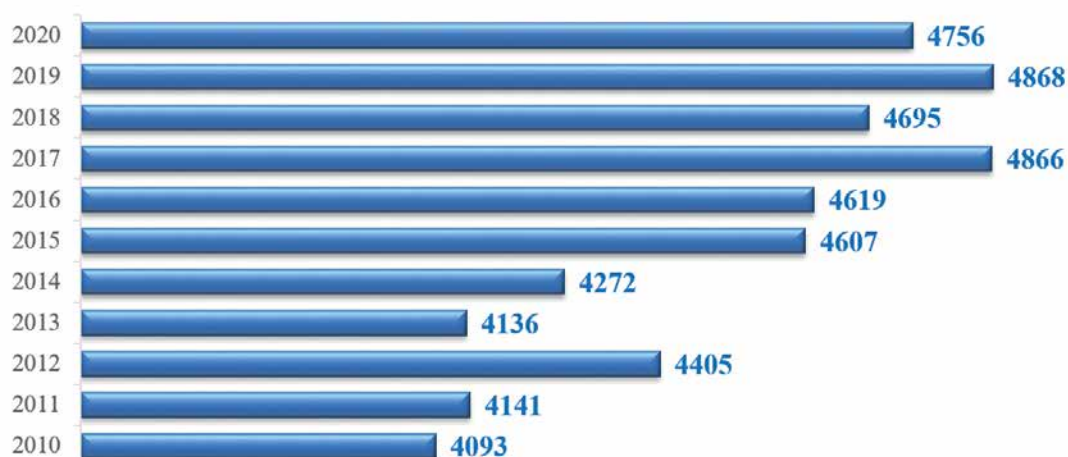
Colon cancer is fourth (in 2019 it was fifth), and in 2020 among the leading sites of cancer is kidney cancer, which occupied sixth place (in 2019 it was in seventh place). The leading ones, according to site, are: cancer of respiratory tract (trachea, bronchus, lungs); then prostate; bladder; colon and rectum.

Figure 58: Leading cancer sites in women in the Federation of BiH, comparison 2020 and 2019a



The structure of the leading cancer sites in women in the Federation of BiH in 2020 has slightly changed compared to 2019. Rectal cancer is sixth (in 2019, it was fourth); cervical cancer has increased and is now fifth (in 2019 it was seventh). Breast cancer is still by far the most common cancer site in women.

Figure 59: Number of cancer deaths in the Federation of BiH, 2010–2020



The specific mortality from cancer was increasing continuously until 2013, while in 2013 the total number of deaths dropped to 4,136. After 2013, there was again a continuous increase in the number of deaths in the Federation of BiH. In 2014, the number of deaths increased to 4,272, and in 2017 it was significantly higher than the previous year and amounted to 4,866. In 2019, the total number of deaths from cancer reached the maximum for this period and amounted to 4,868 deaths, before falling to 4,756 in 2020.

Table 16: Share of cancer mortality in total mortality in the Federation of BiH, 2010–2020

Godina	MUŠKARCI			ŽENE			UKUPNO		
	Ukupan broj umrlih	Broj umrlih od raka	Udio u ukupnom mortalitetu	Ukupan broj umrlih	Broj umrlih od raka	Udio u ukupnom mortalitetu	Ukupan broj umrlih	Broj umrlih od raka	Udio u ukupnom mortalitetu
2010	10220	2361	23,1	10036	1732	17,3	20256	4093	20,2
2011	10234	2468	24,1	9745	1673	17,2	19979	4141	20,7
2012	10591	2546	24,0	10010	1859	18,6	20601	4405	21,4
2013	10237	2354	23,0	10019	1782	17,8	20246	4136	20,4
2014	10176	2502	24,6	9840	1770	18,0	20016	4272	21,6
2015	10855	2619	24,1	10848	1988	18,3	21703	4607	21,2
2016	10538	2617	24,6	10567	2002	18,9	21105	4619	21,8
2017	11123	2745	24,7	10819	2121	19,6	21942	4866	22,2
2018	10903	2725	25,0	10788	1970	18,3	21691	4695	21,6
2019	11140	2732	24,5	10884	2136	19,6	22024	4868	22,1
2020	13525	2669	19,7	12501	2087	16,7	26026	4756	18,3
2010-2020	119542	28338	23,8	116057	21120	18,2	235589	49458	21,0

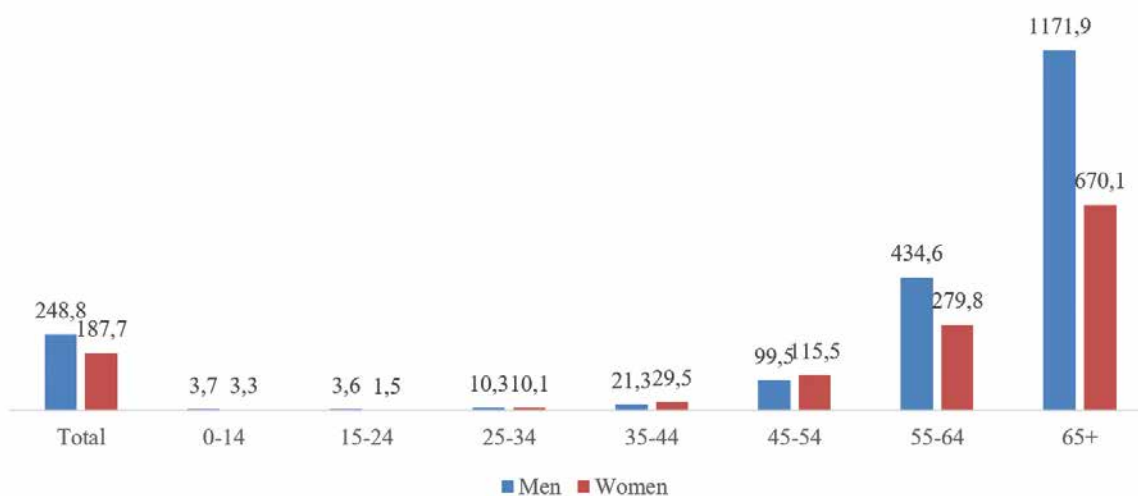
Source: FBiH Institute for Statistics

According to the FBiH Institute for Statistics, the share of cancer mortality in total mortality in 2020 was 18.3%, and ranks second, just behind diseases of the circulatory system.

In the past period 2010-2020, the share of cancer mortality in total mortality has been continuously increasing from 20.2% (2010) to 22.1% (2019).

In 2020, the share in total mortality was reduced to 18.3%, which is the lowest share of cancer mortality in the eleven-year period so far.

Figure 60: Cancer mortality in the Federation of BiH in 2020, by age groups and gender, rate/100,000



The number of registered mortality cases in 2020 is regularly higher in men than in women. The average age of registered mortality cases is 63 years (64 years for men and 62 years for women).

The lowest cancer mortality rate was registered in the age group 0-44, and the highest in the age group 65+.

In 2020, more men (56%) than women (44%) died from cancer.

Table 17: Ten leading causes of cancer deaths in men in the Federation of, 2020 and 2019

Localization	2020			2019		
	Rank	No. of deaths	%	Rank	No. of deaths	%
Lung, bronchus and trachea (C33–C34)	1	830	31.1	1	887	32.5
Prostate (C61)	2	233	8.7	2	221	8.1
Colon (C18)	3	196	7.3	4	178	6.5
Rectum (C19-20)	4	178	6.7	7	121	4.4
Liver (C22)	5	176	6.6	5	134	4.9
Stomach (C16)	6	171	6.4	3	192	7.0
Pancreas (C25)	7	120	4.5	6	134	4.9
Bladder (C67)	8	108	4.0	8	107	3.9
Brain, nervous system (C70–72)	9	105	3.9	9	88	3.2
Larynx (C 32)	10	63	2.4	10	76	2.8
Other		489	18.4		594	21.8
TOTAL (without skin cancer)		2669	100.0		2732	100.0

The order of the leading causes of cancer deaths in men has been slightly changed compared to 2019. Rectal cancer as a cause of death (ranked fourth in 2020) in 2019 had a lower rank (seventh). The cause of death from respiratory cancer (trachea, bronchus, lung) remains the leading cause of death in men in 2020.

Figure 61: Ten leading causes of cancer deaths in men in the Federation of BiH, 2020 and 2019, structure index

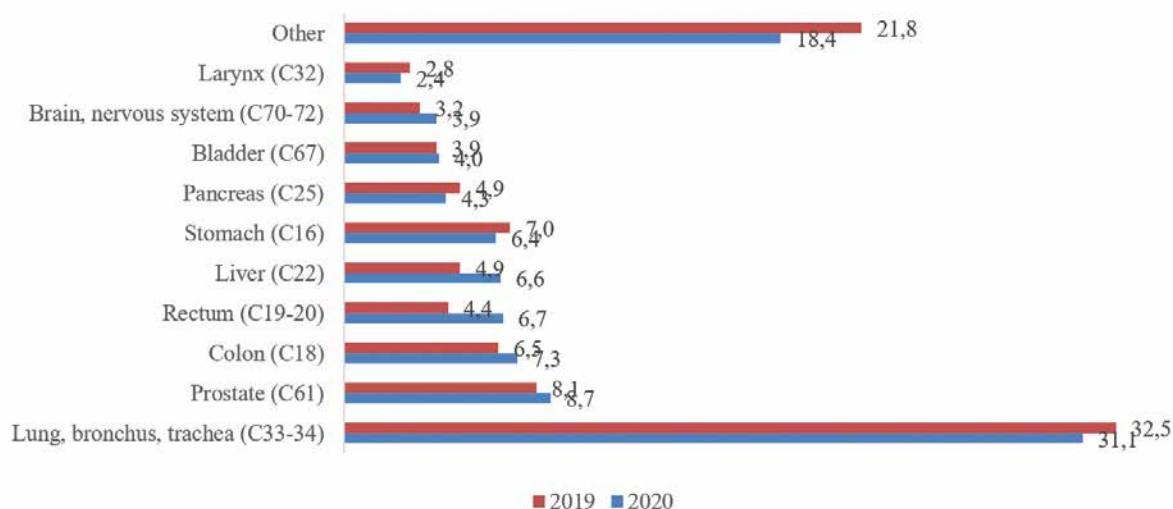
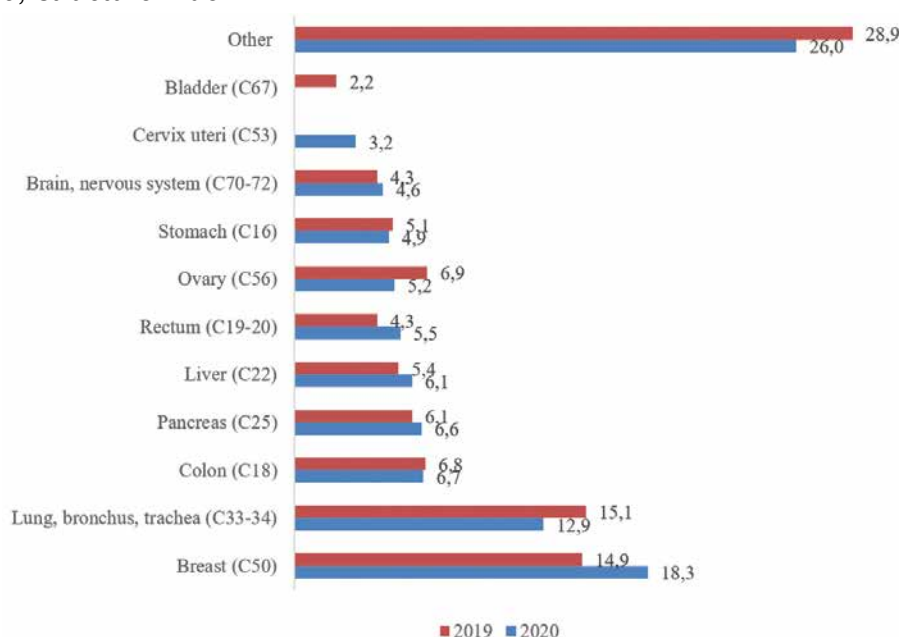


Table 18: Ten leading causes of cancer deaths in women in the Federation of BiH, 2020 and 2019

Localization	2020			2019		
	Rank	No. of deaths	%	Rank	No. of deaths	%
Breast (C50)	1	382	18.3	2	318	14.9
Lung, bronchus and trachea (C33-C34)	2	270	12.9	1	323	15.1
Colon (C18)	3	140	6.7	4	146	6.8
Pancreas (C25)	4	137	6.6	5	131	6.1
Liver (C22)	5	127	6.1	6	116	5.4
Rectum (C19-20)	6	115	5.5	8	92	4.3
Ovary (C56)	7	108	5.2	3	147	6.9
Stomach (C16)	8	102	4.9	7	108	5.1
Brain, nervous system (C70-72)	9	96	4.6	9	91	4.3
Cervix uteri (C53)	10	67	3.2			
Bladder (C67)				10	48	2.2
Other		543	26.0		616	28.9
TOTAL (without skin cancer)		2087	100.0		2136	100.0

The order of the leading causes of cancer deaths in women has been slightly changed compared to 2019. Colon cancer as a cause of death (ranked third in 2020) in 2019 had a lower rank (fourth). Breast and respiratory cancers (trachea, bronchus, lung) remain the leading causes of death in women in 2020.

Figure 62: Ten leading causes of cancer deaths in women in the Federation of BiH, 2020 and 2019, structure index



Data of the Population Cancer Register maintained by the FBiH Institute for Public Health are the result of an analysis of data submitted/collected from the field by health care institutions (mainly cantonal institutes for public health). It is important to emphasize that in 2020, thanks to good cooperation, coordination and engagement of all health care institutions in the Federation of Bosnia and Herzegovina, the number of registered malignant neoplasms is 5,035.

2.5 Health of persons occupationally exposed to ionizing radiation

Exposure of the population to ionizing radiation in Bosnia and Herzegovina originates from environmental sources (radiation from space, air and soil, as well as from food and water consumption) containing natural and artificial radionuclides, and from the use of ionizing radiation sources in health, industry, research (medical, patient exposure and occupationally exposed persons). Sources of ionizing radiation (radioactive substances and x-ray generators) are used intensively, primarily in health care institutions, but also in industry and research, and the number and type of sources used are constantly growing. Ionizing radiation, and radiation in general, has been identified as one of the environmental factors contributing to the disease burden of occupationally exposed individuals, and the population in general. Effects on human health, depending on the type and amount of radiation can be immediate (deterministic) or delayed (stochastic). There are no nuclear facilities on the territory of BiH, but there are nuclear power plants nearby (<1000 km), the closest ones being NPP Krško (Slovenia), NPP Kozloduy (Bulgaria) and NPP Paks (Hungary).

2.5.1 Control of occupational exposure to ionizing radiation

Persons occupationally exposed to ionizing radiation are a category that includes employees who perform their work tasks in radiation zones, which can be classified into control zones and zones under supervision. In order to protect occupationally exposed persons, regulations require control of the workplace, including control of sources of ionizing radiation and individual dosimetric and health monitoring of occupationally exposed persons.

Ionizing radiation source monitoring

Sources of ionizing radiation are devices that produce ionizing radiation or devices that contain radioactive substances. Source control is performed by assessing the radiation safety of the workplace in accordance with the Rulebook on radiation protection in occupational exposure and exposure of the population (Official Gazette of BiH, 102/11).

Table 19: Number of controlled sources of ionizing radiation in 2021

Activity	Number of controlled devices containing radioactive substance		Number of controlled devices producing ionizing radiation	
	Inspected	Not satisfactory	Inspected	Not satisfactory
Diagnostic and interventional radiology	0	0	122	0
Radiotherapy	0	0	0	0
Nuclear medicine	0	0	0	0
Dental medicine	0	0	123	0
Veterinary medicine	0	0	1	0
Industry	2	0	11	0
Transport	0	0	0	0
Research	0	0	0	0
Other	2	0	23	0
TOTAL	4	0	280	0

Table 20: Overview of controlled sources of ionizing radiation 2019–2021

	Diagnostic and interventional radiology	Radiotherapy	Nuclear medicine	Dental medicine	Veterinary medicine	Industry	Transport	Research	Other
2019	200	0	0	0	3	49	0	0	0
2020	118	0	0	83	0	11	0	0	18
2021	122	0	0	123	1	11	0	0	23

In 2021, 280 sources of ionizing radiation were controlled in the Federation of BiH. The largest number of devices, 201 (87.9%), is used in healthcare. Devices that produce ionizing radiation (x-ray devices) make up the largest number of inspected sources of ionizing radiation, 276 (98.6%). The four examined radioactive sources, which contain a radioactive substance, are radioactive sources used in industry and radioactive lightning rods. The inspected sources of ionizing radiation meet radiation safety criteria and are safe for use from the point of view of protection against ionizing radiation for occupationally exposed persons and the population. The total number of controlled sources of ionizing radiation is approximately the same for the previous 3 years (252, 263, 280).

2.5.2 Health monitoring of persons occupationally exposed to ionizing radiation

Occupationally exposed persons are subject to medical examination in accordance with the applicable regulations of BiH, Rulebook on health surveillance of persons professionally exposed to ionizing radiation (Official Gazette of BiH, 68/15). The Rulebook prescribes a preliminary medical examination for all persons who start working with sources of ionizing radiation, and only persons of category “A” are subject to regular (periodic) medical examinations.

Table 21: Overview of health control of occupationally exposed persons for the period 2019–2021

	Total	Capable	Limited capability	Temporarily incapacitated	Not assessed
2019	281	239	32	3	7
2020	193	164	24	3	2
2021	249	217	29	0	3

In 2021, of the total number of employees who underwent the health examination at the IPH FBiH (249), 87.14% were in the category of capable for work (while in the previous year 2020 it was 84.97%); 11.64% were in the category of limited capability (in the previous year 12.43%); 0% were temporarily incapacitated (in the previous year 1.55%); while for 1.20% of examined persons, working capacity was not assessed, considering that they did not access all the mandatory elements of the health examination defined by the regulations. For persons in the category of limited capability, during the assessment of working capacity due to health condition, a recommendation was given for further health check-ups and work with sources of ionizing radiation under certain conditions as defined by regulations. Persons who were declared temporarily incapacitated for working in the ionizing radiation zone had medical contraindications that were not acceptable for work, but were not necessarily a consequence of working in the ionizing radiation zone. In general, the results of health assessments of occupationally exposed persons show that their health

condition is satisfactory, which indicates a good application of protective measures when working with ionizing radiation sources. We note that in 2021 there was a relatively small number of annual health examinations compared to the pre-pandemic period. However, during the second year of the COVID-19 pandemic, compared to the annual examinations in 2020, an expected increase of 22.50% was recorded, which can be interpreted as a consequence of the adaptation of the health care system to the onset of the pandemic. It should also be noted that until the time of compiling the report, due to the lack of aggregated data for the Federation of BiH, which are submitted to the State Regulatory Agency for Radiation and Nuclear Safety (DARNS), as a source of data for the overview of the health status of persons occupationally exposed to ionizing radiation in the Federation of BiH, incomplete data was used in the possession of the Institute for Public Health of the Federation of BiH.

2.5.3 Dosimetric monitoring of persons occupationally exposed to ionizing radiation

Occupationally exposed persons, in accordance with the categorization, are under personal dosimetric control in accordance with the Rulebook on radiation protection in occupational exposure and exposure of the population (Official Gazette of BiH, 102/11). The results of dosimetric monitoring of occupationally exposed persons are shown in the following tables.

Table 22: Overview of dosimetric data for occupationally exposed persons by activity for 2021

Activity	Number of workers	Collective dose (reference person-mSv)	Effective dose, mean value (mSv)
Diagnostic and interventional radiology	719	162.32	0.23
Radiotherapy	21	3.44	0.16
Nuclear medicine	27	7.61	0.28
Industry	26	4.47	0.17
Veterinary medicine	16	0.89	0.06
Transport	-	-	-
Dental medicine	167	14.95	0.09
Research	-	-	-
Other	85	15.82	0.19
Total	1061	209.50	0.20

The largest number of professionally employed persons is in health care, namely in diagnostic and interventional radiology (67.8%). The average personal dose is from 0.06 mSv/year to 0.28 mSv/year for individual activities, while the average dose for all activities is 0.20 mSv/year and is significantly below the prescribed limit value.

Table 23: Overview of dosimetric data for occupationally exposed persons by activity and dose intervals for 2021

Activity	< 1.00 mSv	1.00–5.99 mSv	6.00–9.99 mSv	10.00–14.99 mSv	15.00–20.00 mSv	> 20 mSv
Diagnostic and interventional radiology	706	11	1	1	0	0
Radiotherapy	21	0	0	0	0	0
Nuclear medicine	27	0	0	0	0	0
Industry	26	0	0	0	0	0
Veterinary medicine	16	0	0	0	0	0
Transport	5	0	0	0	0	0
Dental medicine	166	1	0	0	0	0
Research	0	0	0	0	0	0
Other	80	0	0	0	0	0
Total	1047	12	1	1	0	0
%	98.7 %	1.1 %	0.1 %	0.1 %	0.0 %	0.0 %

Dosimetric data show that the exposure of a considerable majority of occupationally exposed persons (98.7%) was at the ambient level (< 1 mSv/year) and that 99.8% of occupationally exposed persons received a dose lower than 6 mSv/year. Two occupationally exposed persons had increased exposure, and although the limit value was not exceeded, it is recommended to investigate the cause and optimize radiation protection. Dosimetric data show continuous good protection against radiation, that is, a satisfactory degree of protection against ionizing radiation, and are the basis for revising the categorization of occupationally exposed persons.

Table 24: Distribution of average effective doses by activity for the period 2019–2021

Activity	Effective dose (mSv/year)		
	2019	2020	2021
Diagnostic and interventional radiology	0.24	0.23	0.23
Radiotherapy	0.18	0.27	0.16
Nuclear medicine	0.25	0.38	0.28
Industry	0.29	0.16	0.17
Veterinary medicine	0.28	0.13	0.06
Transport	0.77	0.09	0.04
Dental medicine	0.19	0.14	0.09
Research	-	-	-
Other	0.12	0.09	0.19

Data on the distribution of doses by activities show low exposure and individual variations are below the prescribed limit values and test level values.

2.5.4 Medical exposure control

Medical exposure and patient protection in radio diagnostics are treated separately in relation to occupational exposure. Clinically sound practice to achieve diagnostic requirements should be conducted in a manner that ensures the least possible patient exposure. The balance between patient dose and image quality is the result of optimization. Medical exposure assessment is a prerequisite for establishing quality control criteria and applying the principles of justification and optimization in diagnostic procedures. The need for the introduction of patient dosimetry is defined by the Rulebook on radiation protection in

medical exposure (Official Gazette of BiH, 13/11) and the Rulebook on radiation protection in occupational exposure and exposure of the population (Official Gazette of BiH, 102/11).

Medical exposure monitoring

In 2021, a total of 206 medical exposure assessments were performed in the Federation of BiH. The results indicate a significant variation, which can be attributed to different technical characteristics of the X-ray devices and different work protocols.

Table 25: Medical exposure monitoring in 2021

Type of diagnostic test	Number of measurements and analyses	Deviations from the reference level
Mammography	39	0
Computed tomography	26	2 (7.69 %)
Luminescence and interventional radiology	18	0
Intraoral dental equipment	85	0
Extraoral dental equipment	38	0
TOTAL	206	2 (0.97 %)

Table 26: Medical exposure monitoring in the period 2019-2021

	Mammography	Computed tomography	Luminescence and interventional radiology	Intraoral dental equipment	Extraoral dental equipment
2019	-	-	-	-	-
2020	29	20	13	60	23
2021	39	26	18	85	38

The measurement results were compared with the diagnostic reference levels (DRL) for the corresponding tests, given in the Rulebook on radiation protection in medical exposure (Official Gazette of BiH, 13/11, Annex 1.1, Tables 3, 4, 5, 6). Exceeding diagnostic reference levels occur with computed tomography devices (8% of examined devices). The analysis of the measurement results shows that due to the parameters used in practice, the dose received by patients varies significantly for different CT devices, but in most cases it is below the diagnostic reference levels. It is necessary to revise practice and optimize clinical parameters. The goal is to ensure that doses are as low as reasonably possible, provided that adequate diagnostic information is obtained, for the benefit of the patient. In addition to the above, it is necessary to establish diagnostic reference levels (DRLs) at the national level, which would enable the optimization of patient doses and practices for performing diagnostic procedures.

2.5.5 Population exposure control

Monitoring of environmental radioactivity in the Federation of BiH

Systematic testing of environmental radioactivity was renewed in 2004 and was carried out according to the Programme for monitoring radioactivity in environmental samples on the territory of the Federation of Bosnia and Herzegovina. The testing programme is the result of the project "Environmental Radioactivity Monitoring" (2002) with the International Atomic Energy Agency (IAEA), which defines locations, media, sampling frequency, test methods and data processing. The goal of general monitoring of radioactivity is: (1) to control the values of ambient radioactivity in the environment, to assess the exposure of the population to ionizing radiation, and (2) to have laboratory facilities for radiometric measurement techniques and assessment of radioactive contamination in case of emergency radiological event in or

outside BiH with potential consequences in BiH. The monitoring programme in the Federation of Bosnia and Herzegovina is carried out by measuring the rate of ambient dose equivalent speed in air and measuring the radioactivity of aerosol samples in air, precipitation, waters (water supply – tap water, surface, underground), soil, grass and food.

The system for monitoring and early warning of the presence of radioactive air contamination in BiH performs automatic measurements of the ambient dose equivalent in the air at six locations in the Federation of BiH: Bihać, Jajce, Livno, Mostar, Sarajevo and Tuzla.

Table 27: Ambient dose equivalent speed, $H^*(10)$ on measuring points

		Sarajevo (nSv/h)	Mostar (nSv/h)	Tuzla (nSv/h)	Bihać (nSv/h)	Livno (nSv/h)	Jajce (nSv/h)
2019	min	104	77	93	80	75	87
	max	138	375	149	157	122	137
	mean	120	99	107	99	91	103
2020	min	104	out of function	85	78	76	85
	max	160	out of function	137	194	157	134
	mean	120	out of function	98	98	93	103
2021	min	100	84	out of function	78	76	85
	max	155	135	out of function	178	143	153
	mean	120	98	out of function	97	93	103

The mean values of the ambient dose equivalent rate $H^*(10)$ in the air for the Federation of BiH are from 93 nSv/h (Livno) to 120 nSv/h (Sarajevo). The measurement results show that a deviation of 20% from the average speed of the ambient dose equivalent was exceeded. The elevated values were short-lived even in the period of worsened weather conditions, which may result in an immediate increase in the value of the ambient gamma dose. Average values of the equivalent dose rate for the measurement period show that no radioactive contamination in the air was detected.

Tests of aerosol radioactivity in the air are conducted for one location, Sarajevo. Regular tests of aerosols from the air measured the values for natural radionuclides (^{232}Th , ^{226}Ra , ^{40}K , ^{210}Pb , ^7Be) and artificial ^{137}Cs .

Table 28: Radionuclide activity in aerosols, monthly

	^{226}Ra ($\mu\text{Bq}/\text{m}^3$)	^{232}Th ($\mu\text{Bq}/\text{m}^3$)	^{40}K ($\mu\text{Bq}/\text{m}^3$)	^7Be ($\mu\text{Bq}/\text{m}^3$)	^{137}Cs ($\mu\text{Bq}/\text{m}^3$)	^{210}Pb ($\mu\text{Bq}/\text{m}^3$)
2019	0.33–5.59	0.81–1.96	5.84–43.61	1902–7697	0.39–6.95	Not measured
2020	0.75–5.19	1.33–2.79	5.33–93.78	1719–7465	0.61–13.62	317.47–1013.00
2021	1.02–1.83	1.72–3.04	6.69–34.23	1077–5884	0.65–5.09	288.22–855.15

Table 29: Radionuclide activity in aerosols, weekly

x	^{226}Ra ($\mu\text{Bq}/\text{m}^3$)	^{232}Th ($\mu\text{Bq}/\text{m}^3$)	^{40}K ($\mu\text{Bq}/\text{m}^3$)	^7Be ($\mu\text{Bq}/\text{m}^3$)	^{137}Cs ($\mu\text{Bq}/\text{m}^3$)	^{210}Pb ($\mu\text{Bq}/\text{m}^3$)
2019	Not measured	Not measured	Not measured	Not measured	Not measured	Not measured
2020	0.24–7.60	6.40–18.24	8.00–153.57	992.60– 4649.40	1.22–14.52	87.22– 1372.72
2021	2.78–16.71	5.3–29.77	17.67–103.99	533.20– 5416.60	1.30–9.17	79.43– 1282.79

Precipitation radioactivity testing is carried out for one location, Sarajevo. Precipitation sampling is performed quarterly. Tests of radionuclides in precipitation do not show the presence of artificial radionuclides.

Table 30: Radionuclide activity in precipitation

	²³⁸ U (Bq/l)	²²⁶ Ra (Bq/l)	²³² Th (Bq/l)	⁴⁰ K (Bq/l)	¹³⁷ Cs (Bq/l)	²¹⁰ Pb (Bq/l)	⁷ Be (Bq/l)
2019	-	1.12–1.62	2.09–3.27	6.61–13.12	0.57–0.90	-	-
2020	9.24–14.81	1.66–2.65	2.60–4.54	10.87–19.01	0.82–1.32	-	-
2021	6.72–18.84	1.19–3.09	1.89–5.75	16.57–40.37	0.58–1.64	7.62–28.56	13.03–432.48

Testing of tap water (water supply) is carried out for 5 locations: Bihać, Livno, Mostar, Sarajevo, Tuzla.

Table 31: Radionuclide activity in tap water

	Alpha activity (mBq/l)	Beta activity (mBq/l)	⁹⁰ Sr (mBq/l)	²³⁸ U (mBq/l)	²³⁴ U (mBq/l)	²²⁶ Ra (mBq/l)
2019	0.019–0.042	0.011–0.044	0.700–3.200	1.82–12.40	3.270–14.800	0.146–7.058
2020	0.019–0.030	0.016–0.036	0.700–4.900	1.600–10.400	3.060–13.300	0.091–1.000
2021	0.016–0.046	0.010–0.043	0.400–2.000	1.321–11.657	2.980–15.768	0.058–1.179

The radioactivity level is low and within the permitted values.

Testing of surface waters: rivers Neretva and Bosna and sea water in Neum.

Table 32: Radionuclide activity in surface waters

	Alpha activity (mBq/l)	Beta activity (mBq/l)	⁹⁰ Sr (mBq/l)	²³⁸ U (mBq/l)	²³⁴ U (mBq/l)	²²⁶ Ra (mBq/l)
2019	0.015–1.651	0.013–11.190	0.900–18.400	0.626–3.260	0.586–4.520	0.295–1.672
2020	-	-	-	-	-	-
2021	0.016–4.837	0.008–11.254	1.100–15.90	0.724–3.209	1.489–4.057	0.047–0.122

The radioactivity level in surface waters is low and within the permitted values.

Testing of tap, spring and technical water is carried out at 8 locations in the Hadžići area.

Table 33: Monitoring of underground water radioactivity – Hadžići

	Alpha activity (mBq/l)	Beta activity (mBq/l)	²³⁸ U (mBq/l)	²³⁴ U (mBq/l)	²²⁶ Ra (mBq/l)
2019	0.020–0.042	0.015–0.082	0.96–10.20	1.82–14.70	0.75–10.41
2020	-	-	-	-	-
2021	0.030–0.058	0.015–0.071	1.49–13.47	2.64–17.44	0.42–3.03

The radioactivity level in underground waters in Hadžići is low and within the permitted values.

Soil and grass testing is carried out at 10 locations: Bihać, Livno, Mostar, Sarajevo, Tuzla, Zenica, Stolac, Gradačac, Jajce and Sanski Most.

Table 34: Mass activity of radionuclides in soil

	²³⁸ U (Bq/kg)	²²⁶ Ra (Bq/kg)	²³² Th (Bq/kg)	⁴⁰ K (Bq/kg)	¹³⁷ Cs (Bq/kg)
2019	12.33–58.66	12.73–148.98	10.47–72.74	122.07–693.56	5.49–222.92
2020	11.91–50.98	14.58–42.48	13.23–63.94	118.36–719.52	6.86–201.89
2021	11.81–77.43	7.13–213.96	16.08–94.77	108.10–724.24	7.64–287.55

Table 35: Mass activity of radionuclides in grass

	²³⁸ U (Bq/kg)	²²⁶ Ra (Bq/kg)	²³² Th (Bq/kg)	⁴⁰ K (Bq/kg)	¹³⁷ Cs (Bq/kg)
2019	-	0.31–3.42	0.48–3.43	58.96–1273.80	0.17–16.67
2020	-	0.37–5.00	0.47–5.33	176.96–895.65	0.19–1.52
2021	-	0.31–0.77	0.61–1.48	119.24–1303.50	0.19–2.09

The results of soil and grass radioactivity measurements are at the level of multi-year monitoring values.

Food radioactivity testing is carried out from the distribution network (stores, markets, etc.)

Table 36: Mass activity of radionuclides in food

	Type of food	²²⁶ Ra (Bq/kg)	²³² Th (Bq/kg)	⁴⁰ K (Bq/kg)	¹³⁷ Cs (Bq/kg)	⁹⁰ Sr (Bq/kg)
2019	Milk and dairy products	0.034–0.106	0.076–0.208	42.76–52.89	0.021–0.054	0.027–0.109
	Meat	0.237	0.432	130.130	0.135	0.322
	Fish	0.111	0.209	112.550	0.055	0.060
	Cereals	0.127	0.218	47.750	0.065	0.148
	Vegetables	0.034–0.111	0.076–0.224	45.66–233.32	0.022–0.064	0.031–0.123
2020	Tuberous vegetables	0.047	0.101	104.440	0.024	0.031–0.123
	Fruits	0.033–0.127	0.072–0.2018	37.34–115.64	0.020–0.065	0.070–0.159
	Milk and dairy products	0.038–0.102	0.082–0.165	37.41–54.75	0.024–0.076	0.019–0.216
	Meat	0.110	0.223	120.660	0.067	0.072
	Fish	-	-	-	-	-
2021	Cereals	0.061	0.114	30.340	0.030	0.061
	Vegetables	0.028–0.112	0.057–0.141	49.62–115.57	0.014–0.042	0.010–0.086
	Tuberous vegetables	0.050	0.102	96.010	0.028	0.038
	Fruits	0.029–0.089	0.060–0.173	30.34–108.73	0.014–0.048	0.018–0.077
	Milk and dairy products	0.208–0.863	0.031–0.093	33.22–52.93	0.032–0.071	0.025–0.044
2021	Meat	0.661	0.083	100.250	0.047	0.055
	Fish	0.596	0.098	65.580	0.078	0.105
	Cereals	1.200	0.074	52.540	0.036	0.057
	Vegetables	0.344–1.086	0.026–0.073	35.92–115.386	0.014–0.067	0.021–0.144
	Tuberous vegetables	1.140	0.059	142.960	0.034	0.036
2021	Fruits	0.244–1.470	0.030–0.089	38.32–126.12	0.016–0.045	0.019–0.072

The results of testing the radioactivity of food from the market show the content of natural radionuclides, as well as artificial ones, ^{90}Sr and ^{137}Cs . The content of artificial radionuclides is lower than the prescribed limits and is mainly the result of cross-border contamination after the Chernobyl nuclear accident in 1986.

The estimation of the effective dose for the population is carried out on the basis of radionuclide activity data measurement in environmental samples. The estimated annual effective dose for artificial radionuclides is shown in the following tables.

Table 37: Estimated effective dose for different age groups from intake ^{90}Sr

		Effective dose, ^{90}Sr (μSv)								
	Age group	Milk	Vegetables	Tuberous vegetables	Fruits	Meat	Fish	Cereals	Water	Total
2019	Adults	0.197	0.200	0.039	0.215	0.582	0.005	0.413	0.020	1.671
	Children 0-1	0.553	0.256	0.030	0.185	0.322	0.003	0.356	0.037	1.742
	Children 1-5	0.175	0.205	0.030	0.176	0.377	0.003	0.340	0.024	1.330
	Children 5-10	0.269	0.327	0.064	0.318	0.758	0.014	0.602	0.030	2.382
2020	Adults	0.190	0.114	0.065	0.068	0.130	0.003	0.175	0.025	0.770
	Children 0-1	0.534	0.146	0.049	0.059	0.072	0.001	0.151	0.046	1.058
	Children 1-5	0.169	0.117	0.049	0.056	0.084	0.002	0.144	0.030	0.651
	Children 5-10	0.260	0.186	0.106	0.101	0.169	0.007	0.255	0.038	1.122
2021	Adults	0.142	0.148	0.061	0.078	0.099	0.009	0.160	0.015	0.712
	Children 0-1	0.400	0.190	0.046	0.067	0.055	0.005	0.137	0.027	0.927
	Children 1-5	0.127	0.152	0.046	0.064	0.064	0.006	0.131	0.017	0.607
	Children 5-10	0.195	0.242	0.099	0.115	0.129	0.025	0.232	0.022	1.059

Table 38: Estimated effective dose for different age groups from intake ^{137}Cs

		Effective dose, ^{137}Cs (μSv)							
	Age group	Milk	Vegetables	Tuberous vegetables	Fruits	Meat	Fish	Cereals	Total
2019	Adults	0.071	0.032	0.019	0.038	0.113	0.002	0.084	0.330
	Children 0-1	0.071	0.015	0.005	0.012	0.022	0.0005	0.026	0.151
	Children 1-5	0.028	0.014	0.006	0.014	0.032	0.0007	0.031	0.126
	Children 5-10	0.035	0.019	0.011	0.020	0.053	0.002	0.044	0.184
2020	Adults	0.083	0.024	0.022	0.021	0.056	-	0.039	0.245
	Children 0-1	0.082	0.011	0.006	0.006	0.011	-	0.012	0.128
	Children 1-5	0.032	0.011	0.007	0.008	0.016	-	0.014	0.088
	Children 5-10	0.041	0.014	0.013	0.011	0.026	-	0.020	0.125
2021	Adults	0.120	0.024	0.022	0.021	0.056	0.0003	0.039	0.282
	Children 0-1	0.120	0.011	0.006	0.006	0.011	0.00006	0.012	0.166
	Children 1-5	0.050	0.011	0.007	0.007	0.016	0.00009	0.014	0.105
	Children 5-10	0.060	0.014	0.013	0.011	0.026	0.0003	0.020	0.144

Testing has shown that the contribution of ^{90}Sr is significantly higher than the contribution of ^{137}Cs . The limits of intake of artificial radionuclides ^{137}Cs and ^{90}Sr into the body, prescribed by the Rulebook on maximum permitted quantities for certain contaminants in food (Official Gazette of BiH, 68/14), were not exceeded.

2.5.6 Food and water safety, radioactivity parameter

Food and water safety tests were performed at the request of the client. In 2021, 34 food samples were tested for radioactivity, parameter mass activity $^{134/137}\text{Cs}$. Measured mass activity values of $^{134/137}\text{Cs}$ ranged from < 10.18 Bq/kg to 72.98 Bq/kg. Of the total number

of analysed samples, the content of ^{137}Cs was not above the limit value of 370 Bq/kg for milk, dairy products and baby food, or 600 Bq/kg for all other foods (Official Gazette of BiH, 68/14). Water tests for radioactivity are performed on the parameters total alpha and total beta activity, and specific tests are performed as needed. In 2021, 105 water samples were tested for total alpha and total beta activity. Results for total alpha activity ranged from < 0.004 Bq/l to 0.371 Bq/l. Results for total beta activity ranged from < 0.004 Bq/l to 0.640 Bq/l. From the total number of tested water samples, total alpha and total beta were below the limit values for total alpha activity (0.5 Bq/l) and total beta activity (1.0 Bq/l) (Official Gazette of BiH, 40/10 and 54/14).

Radioactivity parameter – building materials, soil and vegetation

Tests of the contents of $^{134/137}\text{Cs}$ were performed at the request of the client. In 2021, 11 samples of building materials were tested for radioactivity, parameter mass activity $^{134/137}\text{Cs}$. Measured mass activity values of $^{134/137}\text{Cs}$ ranged from 1.82 Bq/kg to < 16.78 Bq/kg. Two soil samples were also tested for radioactivity, the mass activity parameter $^{134/137}\text{Cs}$. Measured mass activity values of $^{134/137}\text{Cs}$ ranged from 9.01 Bq/kg to 11.31 Bq/kg and two samples of vegetation. Measured mass activity values of $^{134/137}\text{Cs}$ ranged from 11.14 Bq/kg to 15.82 Bq/kg.

2.5.7 State monitoring of environmental radioactivity

According to the Agreement on Radioactivity Measurement for 2021, 46 food samples and 12 drinking water samples were analysed for the State Regulatory Agency for Radiation and Nuclear Safety.

Table 39: Radioactivity monitoring in BiH, determination of total alpha and total beta activity in water

Sample type	Determination of total alpha activity (Bq/l)	Determination of total beta activity (Bq/l)
Drinking water	12 samples (from 0.020 to 0.055)	12 samples (from 0.010 to 0.079)

Table 40: Radioactivity monitoring in BiH, determination of $^{89/90}\text{Sr}$ concentration in water and food

Sample type	Determination of $^{89/90}\text{Sr}$ concentration (Bq/l or Bq/kg)
Milk	6 samples (0.021- 0.074)
Composite samples	16 samples (0.0104 – 0.0258)
Fruits, vegetables, meat, cereals	16 samples (0.020 – 0.112)
Drinking water	12 samples (0.0003 – 0.003)

Table 41: Radioactivity monitoring in BiH, determination of ^{137}Cs concentration in food

Sample type	Determination of concentration of ^{137}Cs (Bq/l or Bq/kg)
Milk	6 samples (0.023- 0.053)
Composite samples	20 samples (0.037- 0.076)
Fruits, vegetables, meat, cereals	20 samples (0.014 – 0.078)

Testing has shown that the limits of intake of artificial radionuclides ^{90}Sr and $^{134/137}\text{Cs}$ into the body, prescribed by the Rulebook on maximum permitted quantities for certain contaminants in food (Official Gazette of BiH, 68/14), were not exceeded.

2.5.8 Emergency radiological events and radioactive waste management

During 2021, no emergency radiological events were recorded in the Federation of BiH and no radioactive waste was stored. Control of the temporary central storage of radioactive waste was carried out regularly.

The values of the ambient dose equivalent in the control points are from 0.1 $\mu\text{Sv/h}$ to 20 $\mu\text{Sv/h}$. There is no increased exposure of the population from stored radioactive material according to the provisions of the Rulebook on radiation protection in occupational exposure and exposure of the population (Official Gazette of BiH, 102/11).

2.5.9 Occupational diseases in the Federation of BiH in 2021

The diseases recognised as occupational diseases in the Federation of BiH, are those that meet the established criteria for the occurrence of diseases that are on the List of Occupational Diseases in accordance with the Rulebook on the list of occupational diseases (Official Gazette of the Federation of BiH, 45/19) and the Rulebook on Amendments to the Rulebook on the list of occupational diseases (Official Gazette of the Federation of BiH, 92/20). These are diseases that were caused by hazards and efforts during longer direct effects of processes and working conditions at workplaces, i.e., jobs performed by the insured persons during the period of employee insurance. The basis for creating a list of occupational diseases and recognizing diseases covered by insurance is the Law on Pension and Disability Insurance of the Federation of BiH (Official Gazette of the Federation of BiH, 13/18). Additionally, the obligation of the Federation of BiH to take care of occupational safety and health protection of workers, as well as the obligations of employers, are emphasized in the new Law on Occupational Safety (Official Gazette of the Federation of BiH, 79/20). Namely, safety and health protection at work, in the sense of this law, is the provision of such conditions at work that prevent, to the greatest extent possible, the occurrence of injuries at work, occupational diseases and work-related diseases that create a prerequisite for full physical, psychological and social security of employees.

According to data from the International Labour Organization, almost 3 million workers die every year in the world from the harmful consequences of working conditions and processes, more precisely 2.78 million in 2020, which is more than 5% of the global causes of death on an annual basis. As stated, an additional 374 million employees in 2020 suffered from non-fatal consequences of newly registered work injuries and occupational diseases. Out of the total number of cases, 30-40% remain chronically ill, and around 10% are permanently disabled. Additionally, beside the incalculable human and social suffering, the calculated economic value of the damage from lost working days and business losses amounts to almost 4% of the total annual global gross domestic product (GDP). According to reports, due to less developed systems for safety and health protection at work, the costs in less developed countries are even higher and exceed 6% of the total GDP. According to the latest estimates of the International Labour Organization, globally, in 2021, there were around 2.89 million deaths, or as much as 2.95 million deaths if workers who died as a result of COVID-19 are added. Of the total number of deaths, 2.58 million cases are caused by occupational and work-related diseases in the world, of which 800 thousand deaths are caused by work-related tumours, 956 thousand by diseases of the circulatory system, and 793 thousand by diseases of the respiratory system. Out of the total number of work-related deaths, injuries at work were the cause in only 312,000 cases, i.e., about

11%. The data are even more disturbing considering that these diseases are preventable through the application of the occupational health risk management system and adequate occupational health protection measures. This includes steps from risk assessment at work and application of different levels of control to eliminate and reduce hazards, to health surveillance and early recognition of health effects.

In the Federation of BiH, based on the available data of the Institute for Public Health of the Federation of BiH (IPH FBiH) on the notification of occupational diseases in 2021, a total of 6 occupational diseases were registered. In 2020, there were no registered reports of occupational diseases. We note that the analysed data on reports of occupational diseases were obtained from the public health register of occupational diseases of the IPH FBiH, which represents the central register of data on reports of occupational diseases in the newly established system of records and monitoring of occupational diseases.

The reporting of occupational diseases refers to the legal obligation to record occupational diseases on prescribed individual reporting forms - reports on occupational diseases (Form No. 13-I-PB). Namely, one of the copies of the reporting form is submitted to the cantonal institute for public health within five days of the current month for the previous month from the day the occupational disease was determined.

The reports submitted to the institutes are then entered into a single online register of reports of occupational diseases.

Characteristics of occupational diseases in the Federation of BiH

A review of disease reports in the Register for 2021 shows that among the very small number of identified and registered cases of occupational diseases, infectious diseases related to the SARS-CoV-2 pandemic dominate.

Table 42: Occupational diseases classified according to ICD-10 and the list of occupational diseases (OD)

Diseases according to ICD-10	Diseases according to OD List	Name of disease	Number of OD cases
U07.1	41.a	COVID-19	4
A15	41.	Pulmonary TB	1
L23	50.	Allergic contact dermatitis	1
Total:	-	-	6

As can be seen from the table, out of a total of 6 reported cases of occupational diseases, 5 are related to the occurrence of infectious respiratory diseases.

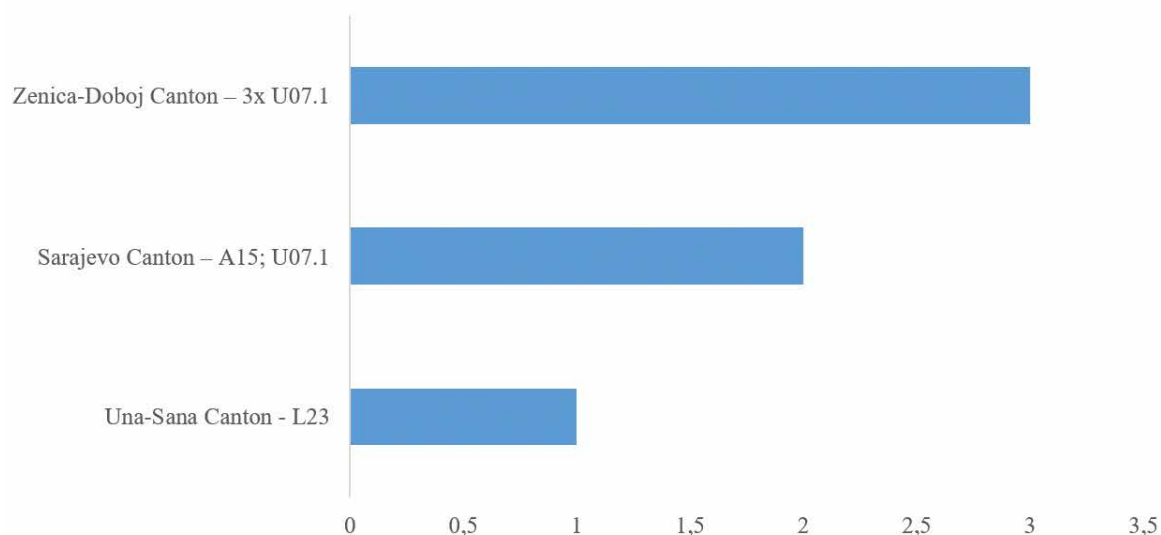
Of that number, 4 cases were related to a pandemic, i.e., infection with the SARS-CoV-2 virus, while one occupational infectious disease was related to a reported case of pulmonary tuberculosis.

Of the remaining occupational diseases, one case was reported - allergic contact dermatitis, i.e., a disease from the group of skin diseases.

Thus, the following were registered as causative factors for the occurrence of occupational diseases: biological, for 5 infectious diseases, and chemical, for the occurrence of one skin-allergic disease.

Based on the received individual reports of occupational diseases from the cantonal institutes for public health, there are no physical, mechanical or other causative factors for the occurrence of reported occupational diseases in the Register in 2021.

Figure 63: Geographical distribution of registered occupational diseases according to ICD-10



Also, according to the data from the Register, there were no reported cases with a fatal outcome, with the fact that in 4 individual reports of occupational diseases, i.e., in 2/3 of the cases, it is stated that the outcome of the treatment of the disease is unknown. For 1/3 of the cases (2), it is stated that they are capable of full-time work. As can be seen on Figure 63, of the total number of reported occupational diseases in the Register in 2021, according to geographical distribution, 3 diseases were registered in Zenica-Doboj Canton, 2 in Sarajevo Canton and 1 in Una-Sana Canton. In the other cantons, there were no registered cases, i.e., reports of occupational diseases to the cantonal institutes for public health.

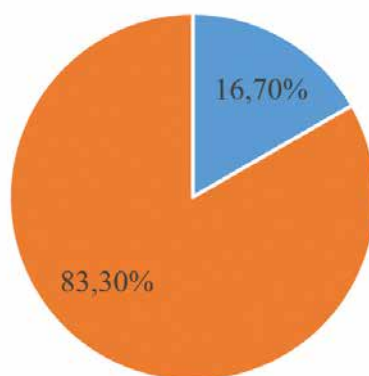
The analysis also found that the majority of patients were employed in health care and social protection activities (5 in total), while of all other activities, only one person was an employee in another activity - public administration and defence (activities classified according to NACE 2010 - National Classification of Activities). According to the gender structure, the number of patients is equal, i.e., 3 male (50%) and female (50%) employees. Considering that an equal ratio of the gender structure is not usual for jobs with an increased risk of disease, where we most often expect the occurrence of occupational diseases in men, this can be interpreted as a greater number of female employees in health care activities, which dominated among cases of morbidity (83.3%) during 2021.

According to professional qualifications, out of the total number of employees suffering from occupational diseases, there were 3 (50%) with a university degree, 2 (33.3%) with a secondary or higher qualification and 1 sick worker with a low or no qualification (16.7%). This can be partially explained by the number of reported cases of occupational diseases and the SARS-CoV-2 virus pandemic. The median age of those suffering from occupational diseases, at the time of diagnosis, was 52 years, with an average of 19.5 years of total

work experience. For the sake of comparison, according to the latest available data from the region, in 2020 in Croatia, the corrected average age of patients was 46 years, without diagnoses related to diseases caused by asbestos fibres (Source: Croatian Institute of Public Health, Occupational Health Service).

Given that according to the latest data of the Federation of BiH Institute of Statistics for the year 2021, the total number of employed persons in the Federation of BiH was 525,397, it can be concluded that the standardized incidence rate of newly registered occupational diseases in the Federation of BiH was 1.14 cases per 100,000 employees. For the sake of comparison, according to the latest publicly available data from the countries of the region, in Croatia in 2020, the mentioned incidence rate was 13.39, which is 11.7 times more than in the Federation of BiH. For other countries in the region, data on the number of occupational diseases are not publicly available. It is also worth noting that in Croatia, in the pre-pandemic year (2019), the incidence rate was 4.13 per 100,000 employees. Apart from BiH, a similar situation with a small number of registered reports of occupational diseases is also found in other countries of Southeast Europe, with the exception of the Republic of Croatia.

Figure 64: Occupational diseases, representation by activities. – NACE (%)



■ Public administration and defence (1) ■ Health care and social protection (5)

As according to the national classification of activities (NACE), the majority of occupational diseases in the Federation of BiH in 2021 were registered in health care and social protection activities (5/6), the calculated standard rate of registered occupational diseases per 100,000 employees in this sector was 13.65 cases per 100,000 employees, which is almost 12 times more than the average for all activities (1.14). The increase in reported cases of diseases in the health care sector is mainly a consequence of the pandemic and the increase in professional workload due to the immediate risk of infection with the SARS-CoV-2 virus. Although it is not completely comparable, for the same activity of health care and social protection, based on the available data for the year 2020, the standardized incidence rate of registered occupational diseases in Croatia was 128 cases per 100,000 employees, which is about 9.4 times higher than the incidence rate of newly diagnosed patients in the Federation of BiH in 2021.

Also, for the sake of comparison with other European countries, and according to available aggregate data for 2019, the average standardized incidence rate of occupational diseases in the European Community was 35 new cases per 100,000 employees (the range of

the rate varies from 0 to 400 disease reports per 100,000 employees). According to the data of the World Health Organization, Office for Europe, during 2019 on the European continent, an average of 22 cases of occupational diseases were registered per 100,000 employees. It goes without saying that national lists and definitions of occupational diseases, methodologies and disease registration practices differ between individual social protection systems, so incidence data are useful for comparison when assessing the situation in the Federation of BiH. This also means that the practice of identifying and reporting common or most common occupational diseases such as dermatosis, silicosis, occupational asthma, tumours, infections, poisoning by harmful substances, and other occupational diseases such as psychosocial, diseases caused by vibrations, excessive strain on the musculoskeletal system, diseases resulting from sources of noise in the working environment, were represented differently depending on the region or country.

Finally, it should be noted that the Ministry of Labour and Social Policy of the Federation of BiH, based on the provisions of the Law on Pension and Disability Insurance, adopted a new and amended Rulebook on the List of Occupational Diseases (Official Gazette of the Federation of BiH, 45/19 and 92/20) which prescribes which diseases are considered occupational in the Federation of BiH, the conditions under which these diseases are considered occupational, as well as the jobs in which these diseases occur. It is also noted that according to the Law on Record Keeping in the Health Care System (Official Gazette of the Federation of BiH, 37/12), records on occupational diseases are required to be kept by all health institutions and private practice holders who, as part of their activity, deal with the protection of people's health related to work place. Individual reporting form - Reports on occupational disease (Form No. 13-I-PB) is filled out by the competent doctor, specialist in occupational medicine, or specialist in occupational and sports medicine, at the end of the procedure for determining the diagnosis of an occupational disease in a health institution or private practice. In addition, in 2019, the IPH FBiH published "Instructions for filling out health-statistical forms" which are methodological instructions for filling out all legally binding reporting health-statistical forms, including the occupational disease notification form.

It can be concluded that additional joint efforts are needed in personnel, technical and organizational strengthening, and in the coordination and harmonization of the work of occupational medicine services in the public and private sectors in the Federation of BiH, in order to achieve better prevention of the occurrence of diseases and a more realistic insight into the incidence of occupational diseases. In a broader sense, in order to improve workers' health protection and increase economic profits, it is necessary to actively involve all other relevant federation and cantonal institutions, occupational safety inspections and social partners in the strategic decision-making process. In this way, it would be possible to increase the efficiency and improve the work of social protection systems and services for the specific health care of workers, in line with European achievements and trends.

3. HEALTH RISK FACTORS

3.1 Diet and physical activity

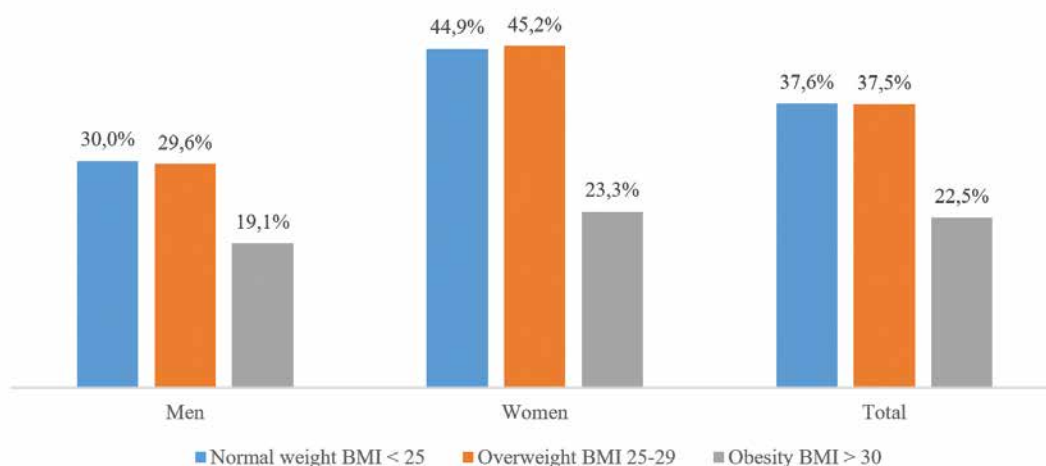
Among the risk factors of chronic non-communicable diseases, which are among the leading diseases affecting the population of the Federation of Bosnia and Herzegovina, unhealthy diet is listed as one of the most prominent.

3.1.1 Adults

Indicators of the nutritional status of the adult population in the Federation of Bosnia and Herzegovina point to widespread overweight and obesity, both among men and women, as well as in all age subgroups. A study on the health status of the adult population in the Federation of BiH, conducted in 2012 by the Institute for Public Health of the Federation of BiH, showed that only 37.5% of adults have a desirable state of nutrition (BMI 24.9-29.9).

The latest nutrition measurements carried out in the adult population of the Federation of BiH showed that the values of the body mass index are above normal in more than a third of the respondents, i.e., 37.5% of them are overweight (BMI \geq 25), with more overweight among men (45.2 %) than among women (29.6 %), while among the obese (BMI \geq 30) there are more women than men (23.3 % and 19.1 % respectively).

Figure 65: Body mass index categories in the adult population in the Federation of Bosnia and Herzegovina - distribution by gender



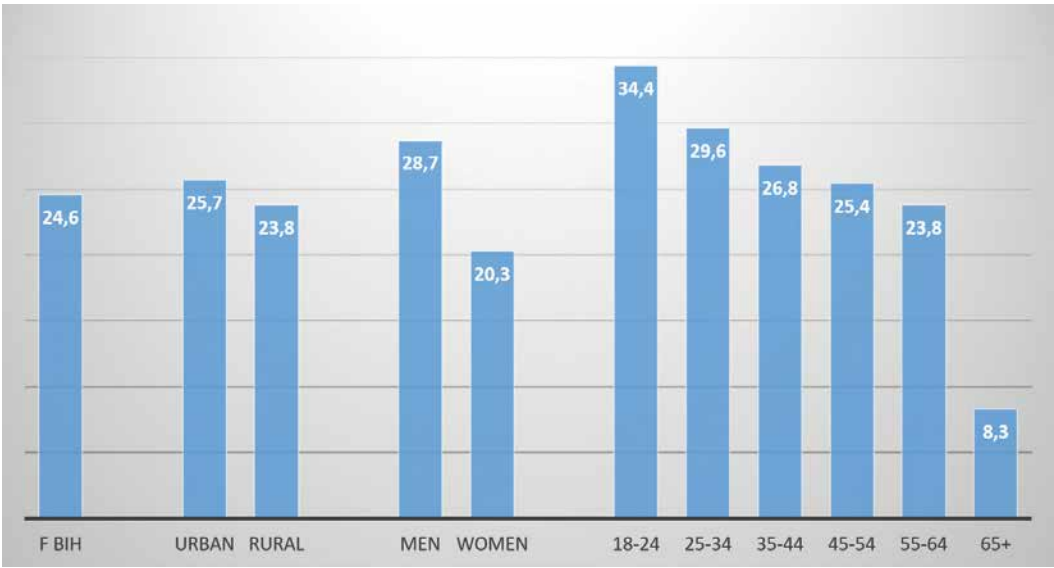
The majority of overweight people are in the 35-44 age group (42.7%) and the least in the 18-24 age group. Most of the obese are in the age group 55-64 - 36.7%.

Indicators related to eating habits obtained in the same study showed that only 27.9% of adults in the Federation of BiH consume vegetables every day, more men (26.4%) than women (23.3%), while fruits are consumed daily by slightly more than a third of adults, i.e., 35.5%, more women (38%) than men (33.1%). If we take into account the current guidelines on a healthy diet, which recommend daily consumption of around 400 grams or five servings of fruits and vegetables per day (excluding potatoes), it is clear that these data are disastrous.

In the Federation of Bosnia and Herzegovina, among the adult population, very few have a satisfactory level of physical activity (defined as 30 minutes of physical exercise leading to a mild increase in breathing rate or sweating, more than once a week). Over a third of respondents (38.3%) in the Federation of BiH belong to the category of physically inactive persons, with 4.3% of respondents who are not physically active due to illness/disability. There are more physically inactive women (44.0%) than men (32.7%), and the most physically inactive persons are in the age group of 65+ (61.3%).

When it comes to the physically active population of adults, the most physically active persons are in the 18-24 age group, then the percentage of physically active decreases with age, and the least physically active persons are in the 64 age group, only 8.3%.

Figure 66: Physical activity in the adult population, distribution by gender, age and place of residence



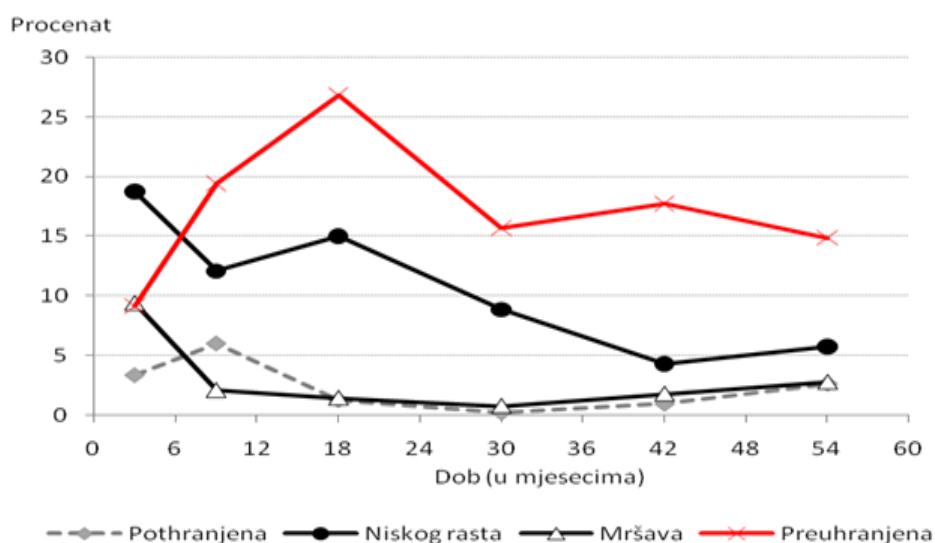
In the fight to improve physical activity among adults, it is necessary to follow the examples of good practice from the countries of the European region that have achieved significant success.

3.1.2 Children

The most recent data on children’s nutritional status showed that 2% of children were malnourished, of which 1.2% were severely malnourished (weight/age > 3SD). A total of 9.9% of children were stunted, of which 4.6% were severely stunted (height/age> 3SD), and 2.6% of children were wasting, of which 2.0% were severely wasted for their height (weight/height> 3SD). The nutritional status against these three indicators is worst in the age subgroup 0-11 months.

Unlike malnutrition, which is present in very small percentages, percentages of overweight and obesity are high. Namely, 17.7% of children aged 0-5 in FBiH are overweight. The largest number of overweight children is in the age group 12-23 months, as many as 26.9%.

Figure 67: Nutritional status of children aged 0–5; Multiple Indicator Cluster Survey in the Federation of BiH (MICS Survey, 2012)



Breastfeeding indicators show that only 51.5% of infants were breastfed for the first time within one hour after birth. Breastfeeding begins within one day after birth for 87.3% of infants in the Federation of Bosnia and Herzegovina.

A total of 95.2% of children last born in the two years prior to the survey were breastfed at least once.

15.1% of children up to 6 months are exclusively breastfed, more children in rural areas (19.1%).

Predominant breastfeeding means that children receive other liquids or food in addition to breast milk - 42% of children under the age of 6 months are predominantly breastfed, and 13.2% of children are still breastfed between the ages of 12 and 15 months.

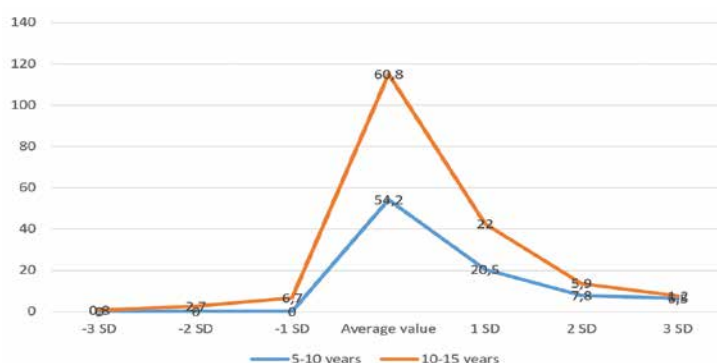
Percentage of children aged 6 - 23 months who were fed age-appropriately (in addition to breastfeeding the child receives solid, semi-solid or soft food) is 21.6%.

It was shown that malnutrition in all its forms is not a problem in this age group either - 3.2% of children aged 5-10 years and 3.5% of children aged 10-15 years are short for their age, 1.2% of children aged 5-10 years are malnourished, while 3.9% of children aged 5-10 years and 5.5% of children aged 10-15 years have a low body mass index (BMI) for their age.

However, in the age group of school children, overweight is widely present - in one third or 31.2% of children aged 5-10 years, of which obesity is present in 13.3% of children.

Among children aged 10–15 years, 22.3% of children are overweight, and obesity is present in 3.9% of them (BMI/age + 2SD).

Figure 68: Distribution of body mass index for children aged 5–15 years in the Federation of Bosnia and Herzegovina by age groups



The same research showed that the eating habits of school children are characterized by frequent consumption of energy-rich and nutritionally poor foods and an irregular meal schedule. Almost a third (31.3%) of children aged 5 - 15 consume sweets every day, and 16.9% of them have snacks and chips.

Surveys that would provide data on physical activity have not been conducted recently. On the other hand, it is assumed that long-term stay indoors, attending classes from home, and restrictions related to children being outside, had a negative impact on children's physical activity. Research to obtain data on nutritional status and physical activity, and based on them to guide preventive activities, is a priority step in further public health action.

3.2 Micronutrient deficiencies

3.2.1 Iodine deficiency

Activities related to the prevention of iodine deficiency disorders, derived from the Strategy for the Prevention of Iodine Deficiency Disorders, have been carried out under the leadership of the Federation of BiH Ministry of Health for many years. Due to these efforts, the prevalence of goitre in the territory of the Federation of BiH was changed from a moderate status, recorded in 2000, when it was 27.06%, to a mild degree, with a prevalence of goitre of 9.5% (found in a 2005 survey).

The most recent data that are available refer to the monitoring of iodine content in salt from the market carried out in 2018 by the Food Safety Agency.

Of the total number of samples analysed, 98 samples (38%) complied with the criteria of the relevant legislation, while 162 samples (62%) did not. Of the total number of non-compliant salt samples, 80 are of domestic production, while 82 samples are of imported origin. Of the total number of non-compliant samples, 78% were caused by incorrect labelling. In as many as 59 samples or 36%, the iodine content was inadequate. Of these, 58 samples had a lower iodine content than the reference values, while only one salt sample was hyper-iodinated. A total of 30 samples were not iodized at all.

Considering the importance of monitoring the iodine status of the population, which we have no insight in for a long time, it is necessary to re-conduct research to check the iodine status in the population, as well as monitor the iodine content in salt for human consumption on the market. Reaffirmation of the coordinating body for the implementation of the programme would help the realization of comprehensive activities.

3.2.2 Iron deficiency anaemia

The most recent data available for the Federation of BiH on the presence of iron deficiency anaemia refer to children aged from 6 months to 15 years and women of reproductive age (15-49 years). At the age of 6–59 months, anaemia was present in 18.4% of children, while at the age of 11–15 years, anaemia was present in 11.5% of children. According to the criteria of the World Health Organization for assessing the severity of anaemia at the population level, the prevalence of 5 to 19% represents a mild level, and the prevalence of 20.0 to 39.9% represents the presence of moderate anaemia. Among women aged 15 to 49, anaemia is present in 22.1% cases, at a moderate level, at the lower limit of the reference range.

Table 43: Prevalence of anaemia in children and women in the Federation of Bosnia and Herzegovina in 2012

Anaemia	Mild*	Severe (Hb <7g/dl)
Children 6-59 months	18.2	0,2
Children 11-14 years	11,3	0,2
Women 15-49 years	21,7	0,4

* Mild anaemia – children 6–59 months Hb 7–10.9 g/dl; children 5–11 years Hb 7–11.4 g/dl; children 12–15 years Hb 7–11.9 g/dl; women 15–49 years Hb 7–11.9 g/dl

Regardless of good results, it is necessary to continue preventive and promotional activities.

3.3 Addiction diseases

3.3.1 Tobacco consumption

Consumption of tobacco and tobacco products, as well as exposure to tobacco smoke or the so-called passive smoking, significantly contribute to morbidity, disability and premature death in all age groups, which is why, according to the ICD, smoking is classified as a disease under code F17.2 as “tobacco addiction syndrome”. Numerous consequences of the use of tobacco products have been scientifically proven, which can be seen through the effects on the health of the individual, the population and the community as a whole.

Smoking as an addiction disease in population groups in the Federation of BiH

Adults

Since 2012, no new population surveys have been conducted despite certain initiatives of the Institute for Public Health of the Federation of BiH towards WHO and potential international partners. In the future, the Institute will insist on providing funds for a new population-based study of risk factors for chronic diseases. Until then, data from the 2012 Study on the state of health of the adult population in the Federation of BiH will be used.

According to the results of that study, 44.1% of respondents among the adult population are regular smokers, of which 56.3% men and 31.6% women. (1)

According to the results of the same study, exposure to second-hand smoke at home is confirmed by over half of respondents in FBiH (54.1%), less than half of respondents in FBiH (44.4%) state that they are exposed to tobacco smoke by other smokers in the

workplace, and over half of respondents in the FBiH (52.7%) reported exposure to tobacco smoke by other smokers in public places.

School children and youth

Data from the latest research of the Institute for Public Health of the Federation of BiH from 2019 emphasize the importance of the smoking problem among children and youth in the Federation of BiH. The Global Youth Tobacco Survey (GYTS) was conducted in 2019 by the Institute for Public Health of the Federation of Bosnia and Herzegovina, with the support of the FBiH Ministry of Health.

5,484 students of the 8th and 9th grades of primary and 1st grade of secondary school (age 13–15) participated in the research. Survey results: 24.4% of school children (of which 27.7% are boys and 21.1% are girls) currently consume some tobacco products. According to the type of tobacco product, 13.8% of school children (of which 15.8% are boys and 11.7% are girls) currently smoke cigarettes; 16.1% of school children (17.7% of boys and 14.4% of girls) currently use hookah or shisha, and 10.9% of students (15.9% of boys and 5.9% of girls) currently uses e-cigarettes. (2)

Smoking among health care professionals

According to the results of a survey conducted by the Institute for Public Health of the Federation of BiH in 2017 on a sample of 920 doctors and nurses in family medicine teams in the Federation of BiH, 35% of smokers are recorded among health care professionals, of which 28% smoke every day and 7% occasionally. It is significant that a very small percentage (10%) of health care professionals state that they are ready to quit smoking immediately, 47% of them state that they are thinking about quitting smoking, and 43% are neither ready to quit smoking nor are they think about it.

The high prevalence of smoking among health care workers in the Federation of BiH indicates the need for a systematic approach to smoking cessation and quitting in this group of professionals who provide daily health care services, representing not only a source of knowledge but also examples of health - related behaviours to their patients and the public. (3)

Smoking and population health in the Federation of BiH

High percentages of smoking prevalence are associated with the trend of various diseases and conditions directly caused by adverse health effects of this leading addiction disease. Below is a presentation of the trends in the incidence of selected diseases that, according to the WHO, are directly associated with smoking as a leading risk factor.

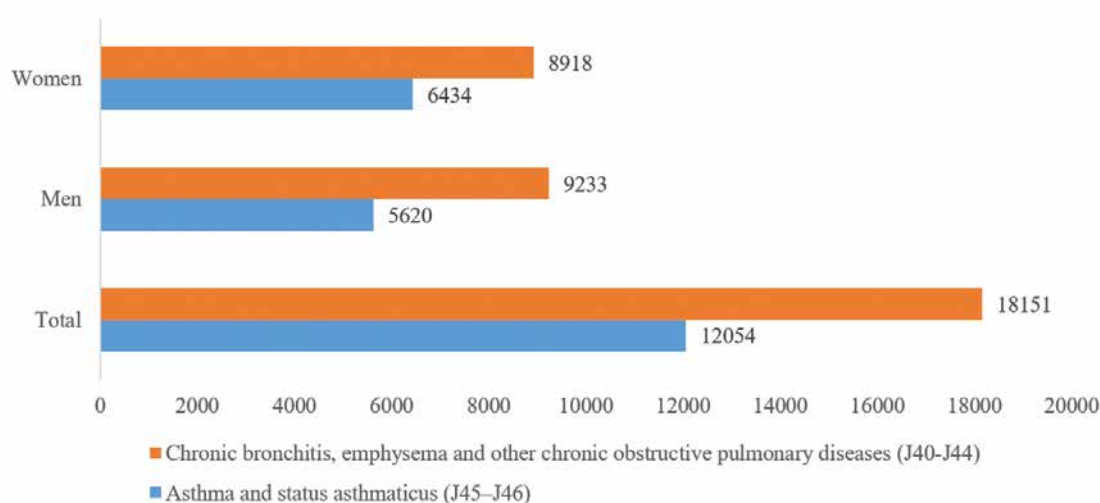
In the period 2019–2021, a decrease in the number of patients with chronic obstructive pulmonary diseases (J40–J46) was recorded, from 34,634 patients or 158/10,000 of the population in 2019 to 30,205 patients or 139/10,000 of the population in 2021.

Table 46: Number of cases of chronic obstructive pulmonary diseases (J40–J46) in the Federation of BiH 2019–2021

ICD diseases	Total number of cases			Rate per 10 000		
	2019	2020	2021	2019	2020	2021
Chronic obstructive pulmonary diseases (J40–J46)	34,634	30,839	30,205	158	141	139

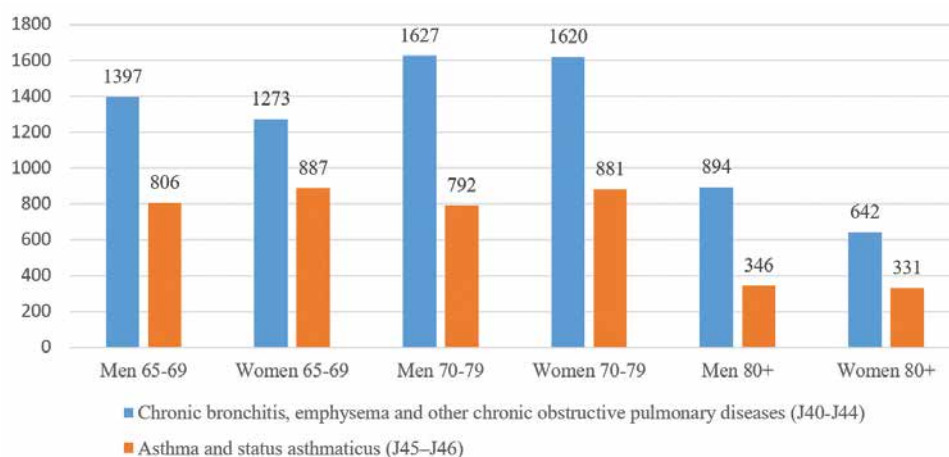
In primary health care, a more pronounced incidence of asthma and status asthmaticus (J45–J46) was recorded in women with 6,434 cases compared to 5,620 cases of men, while 9,233 men suffered from chronic bronchitis, emphysema and other chronic obstructive pulmonary diseases (J40–J44) compared to 8,918 women.

Figure 69: Number of cases of chronic obstructive pulmonary diseases (J45–J46, J40–J44) in PHC in the Federation of BiH, in 2021, by gender



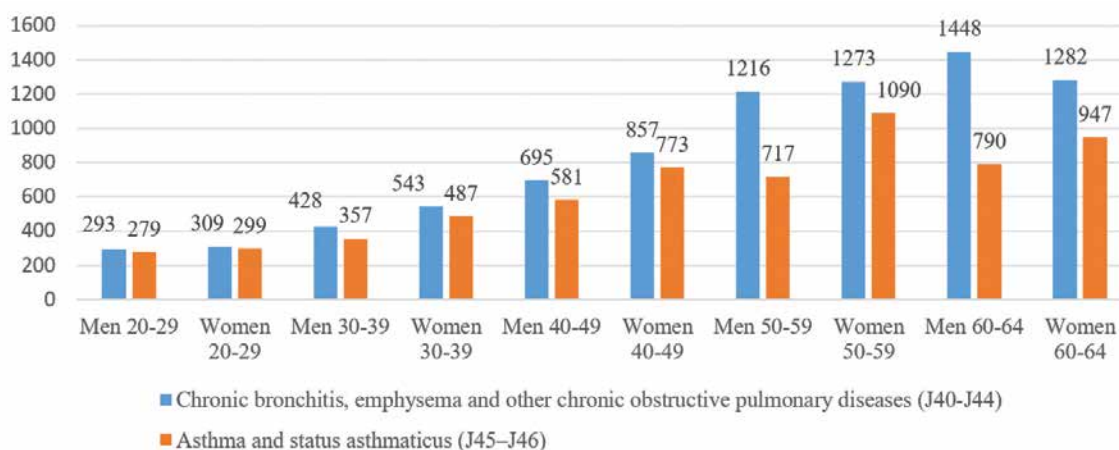
In the records of the number of patients suffering from chronic obstructive pulmonary diseases (J45–J46, J40–J44) in PHC in the Federation of BiH in 2021 among the elderly population (65 to 80 years and older), there is a greater number of men suffering from chronic bronchitis, emphysema and other chronic obstructive pulmonary diseases in all age groups compared to women.

Figure 70: Number of cases of chronic obstructive pulmonary diseases (J45–J46, J40–J44) in PHC in the Federation of BiH, in 2021, in elderly population (65 to 80 years and older)



In the records of the number of patients with chronic obstructive pulmonary diseases (J45–J46, J40–J44) in PHC in the Federation of BiH in 2021 among the working age population (20–64 years), there is a greater number of men suffering from chronic bronchitis, emphysema and other chronic obstructive pulmonary diseases in all age groups compared to women.

Figure 71: Number of cases of chronic obstructive pulmonary diseases (J45–J46, J40–J44) in PHC in the Federation of BiH, in 2021 in working age population (20–64 years)



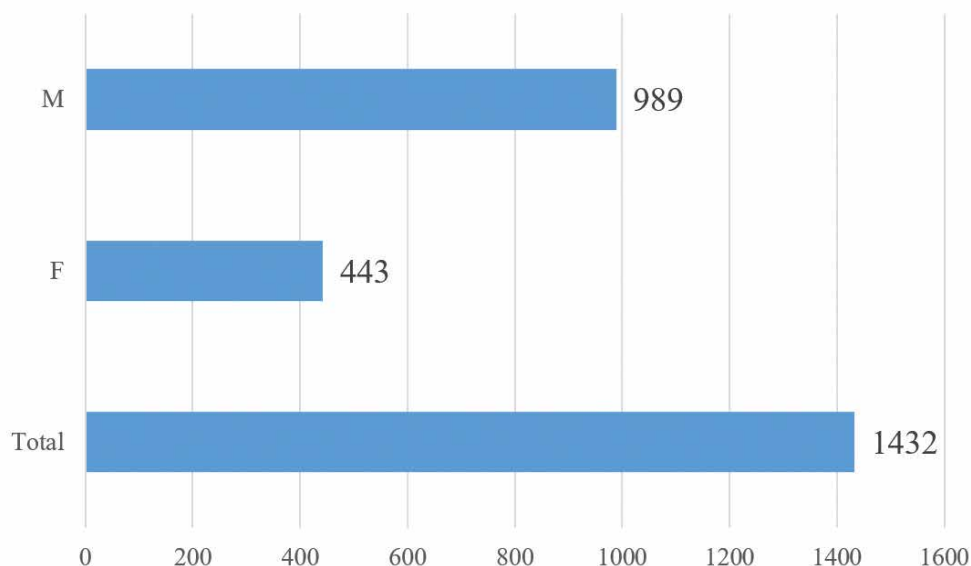
To assess the effects of smoking on the health of the population, it is extremely important to monitor the trend in the incidence rate of malignant neoplasms of the bronchus and lung (C34). A decrease in the incidence rate of malignant neoplasms of the bronchus and lung (C34) was recorded, from 1,612 patients or 7/10,000 in 2019 to 1,432 patients or 7/10,000 in 2021.

Table 47: Number of cases of malignant neoplasms of the bronchus and lung (C34) in PHC in the Federation of BiH, 2019–2021

ICD diseases	Total number of cases			Rate per 10 000		
	2019	2020	2021	2019	2020	2021
Malignant neoplasms of the bronchus and lung (C34)	1,612	1,138	1,432	7	5	7

Out of a total of 1,432 patients with malignant neoplasms of the bronchus and lung (C34) recorded in PHC in the Federation of BiH in 2021, there were significantly more patients among men: 989 patients compared to 433 female patients.

Figure 72: Number of cases of malignant neoplasms of the bronchus and lung (C34) in PHC in the Federation of BiH in 2021, by gender



Tobacco control interventions in the Federation of BiH

During 2017, the Federation of BiH Ministry of Health initiated the drafting of the Law on the Control and Limited Use of Tobacco, Tobacco Products and Other Smoking Products in the Federation of BiH.

The document was prepared in line with the WHO Framework Convention on Tobacco Control and EU Directive 2014/40. In the form of a Draft, the Law went through a cycle of public debates in the cantons of the Federation of BiH, after which it was finalized in the form of a Proposal of the Law.

After the adoption of the Proposal of the Law on Control and Limited Use of Tobacco, Tobacco Products and Other Smoking Products in the Federation of BiH in the House of Representatives of the Parliament of the Federation of BiH in May 2021, the document was submitted for further procedure to the House of Peoples of the Parliament of the Federation of BiH. The Proposal of the Law on Control and Limited Use of Tobacco, Tobacco Products and Other Smoking Products in the Federation of BiH was adopted in the House of Peoples of the Parliament of the Federation of BiH in March 2022 with amendments, after which it was again submitted to the House of Representatives for harmonization.

The law envisages the formation of a Federation commission for tobacco control that will be appointed by the Government of the Federation of BiH and composed of intersectoral representatives, thereby creating the conditions for more effective tobacco control interventions in the Federation of BiH in the future.

3.3.2 Alcohol and other psychotropic substances

Alcohol consumption

Since 2012, no new population surveys have been conducted despite certain initiatives of the Institute for Public Health of the Federation of BiH towards WHO and potential international partners. In the future, the Institute will insist on providing funds for a new

population-based study of alcohol consumption as a risk factor for chronic diseases. Until then, data from the 2012 Study on the state of health of the adult population in the Federation of BiH will be used.

Alcohol consumption in population groups

According to the results of the Study on the state of health in the Federation of BiH from 2012, alcohol consumption is a significant public health problem of the adult population in the Federation of BiH. Over a quarter of respondents in FBiH (28.8%) confirm that they have consumed some of the alcoholic beverages during the past 12 months (beer, wine, brandy), of which 29.7% in urban and 28.1% in rural areas. During the previous 12 months, alcohol was consumed by almost half of men (46.1%), most of them (54.3%) in the age group 25-34 and the least of them (30.0%) in the age group 65+ ($p=0.000$). Alcohol consumption is reported by 11.0% of women, most of them (20.5%) in the age group 18-24, and the least of them (5.0%) in the age group 55-64.

According to the results of the same survey, in relation to the frequency of consumption of any alcoholic beverages in the past 12 months, the largest percentage of respondents (29.0%) report alcohol consumption several times a month. 23.5% of respondents report alcohol consumption several times a week, 21.5% of respondents confirm alcohol consumption several times a year, while 11.6% of respondents report daily alcohol consumption. (1)

The impact of alcohol on the health of the population in the Federation of BiH

According to the data of outpatient and polyclinic services, in the group of mental and behavioural disorders due to use of alcohol (F10), there is a decreasing trend from 2,431 patients and a rate of 11/10,000 in 2019 to 1,905 patients and a rate of 9/10,000 in 2021.

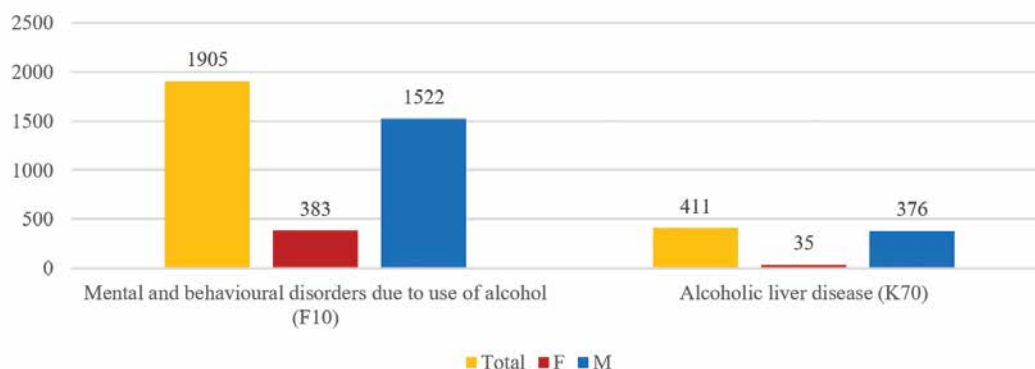
There is also an increasing trend of alcoholic liver disease (K70) from 370 patients and a rate of 2/10,000 in 2019 to 411 patients and a rate of 2/10,000 in 2021.

Table 48: Number of cases of mental and behavioural disorders due to use of alcohol (F10) and alcoholic liver disease (K70) in PHC in the Federation of BiH 2019–2021, rate per 10,000 population

ICD disease	Total number of cases			Rate per 10 000		
	2019	2020	2021	2019	2020	2021
Mental and behavioural disorders due to use of alcohol (F10)	2,431	2,116	1,905	11	10	9
Alcoholic liver disease (K70)	370	338	411	2	2	2

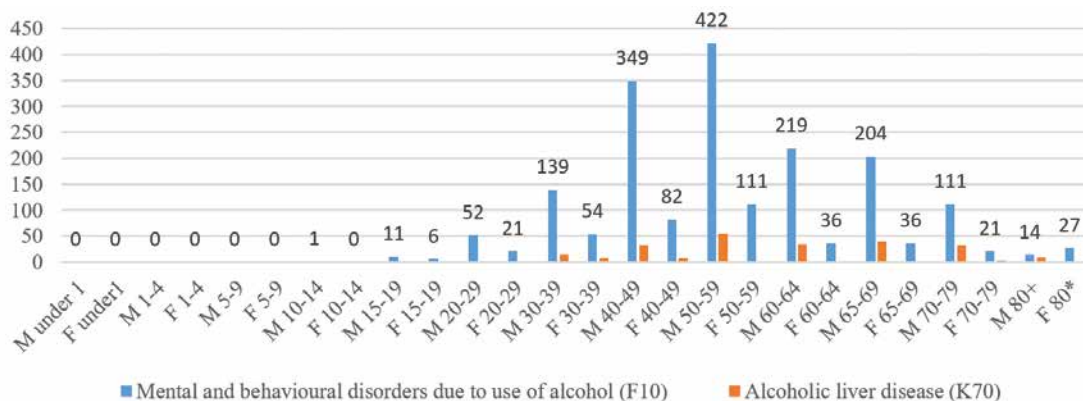
Out of a total of 1,905 people suffering from mental and behavioural disorders due to use of alcohol (F10), there are significantly more cases in men, 1,522 compared to 383 women. Also, in alcoholic liver disease (K70) out of 411 registered in PHC, there are significantly more affected men with 376 cases compared to 35 affected women.

Figure 73: Number of cases of mental and behavioural disorders due to use of alcohol (F10) and alcoholic liver disease (K70) in PHC in the Federation of BiH 2021, by gender



Out of a total of 1,520 patients with mental and behavioural disorders due to use of alcohol (F10) and alcoholic liver disease (K70) recorded in the PHC of the Federation of BiH in 2021, the largest number of patients is recorded in the age groups 30-39, 40-49, 20-29 and 50-59, 60-64 and 70-79 years.

Figure 74: Number of cases of mental and behavioural disorders due to use of alcohol (F10) and alcoholic liver disease (K70) in PHC in the Federation of BiH 2021, by age groups



3.3.3 Drug and psychotropic substances consumption

According to data from the register of treated psychoactive substance addicts in the Federation of BiH, published in the Analysis of reports of treated psychoactive substance addicts in the Federation of BiH for 2019-2020 from the Institute for Public Health of the Federation of BiH, 685 treated addicts have been registered so far with an addiction rate of 31.3/100,000 population.

Institutes for addiction diseases are located in Sarajevo Canton and Zenica-Doboj Canton, and accordingly, the largest number of treated addicts are registered in these cantons.

The registered addiction rate ranged from 2.3/100,000 in the Herzegovina-Neretva Canton to 87.3/100,000 in the Sarajevo Canton. Data are missing for three cantons that are just being included in the reporting system. (4)

Table 49: Overview of reported treated addicts of psychoactive substances in the Federation of BiH in 2019 and 2020

CANTON	2019	2020	Total	%
Una-Sana	60	20	80	11.7 %
Posavina	0	9	9	1.3 %
Zenica-Doboj	0	204	204	29.8 %
Bosnian Podrinje	0	3	3	0.4 %
Central Bosnia	3	13	16	2.3 %
Herzegovina-Neretva	5	0	5	0.7 %
Sarajevo Canton	312	56	368	53.8 %
TOTAL	380	305	685	100.0 %

In relation to the age structure of treated addicts of psychoactive substances in the Federation of BiH in 2019 and 2020, the largest number is recorded between the ages of 25 and 49, 605 (88.3%) of both genders, 26 (3.8%) were recorded under 25 years of age, while 54 (7.9%) treated addicts were registered in the age group of 50 and over.

Table 50: Treated addicts of psychoactive substances in the Federation of BiH in 2019 and 2020, by age structure and gender

Age	2019			2020		
	Gender		Total	Gender		Total
	Men	Women		Men	Women	
15–19	2	1	3	0	0	0
20–24	8	3	11	12	0	12
25–29	56	17	73	24	4	28
30–34	81	14	95	48	3	51
35–39	84	8	92	71	7	78
40–44	44	6	50	63	3	66
45–49	25	11	36	34	2	36
50–54	7	4	11	17	2	19
55–59	0	3	3	7	0	7
60–64	2	2	4	4	1	5
65+	1	1	2	1	2	3
TOTAL	310	70	380	281	24	305

According to the data on the main substance of addiction, it is evident that the largest number of addicts come to treatment for heroin abuse. In the period 2019–2020, 531 (77.5%) treated addicts were registered, stating heroin as the main substance of abuse.

The largest number of heroin addicts, 265 (50%) is in the age group 30-39. Up to 19 years of age, one (1) heroin addict was registered, while over 50 years of age, 27 (5.1%) heroin addicts were registered.

In second place are depressants, which were used by 47 (6.9%) respondents in the mentioned period.

Next to heroin and depressants as the most commonly used substances of addiction, stimulants are in third place and are consumed by 31 (4.5%) respondents over the age of 25.

Table 51: Treated addicts of psychoactive substances in the Federation of BiH in 2019 and 2020, by main substance of addiction and age

SUBSTANCES	Age										Total	
	15-19	20-24	25-29	30-34	35-39	40-44	45-50	50-54	55-59	60-64		65+
Depressants	1	1		0	3	5		4	3	2	1	33
Heroin	1	10	62	87	80	40	25	3	0	1	0	309
Cannabinoids	1	0	2	1	4	1	2	0	0	0	0	11
Cocaine	0	0	0	0	1	0	0	0	0	0	0	1
MOP	0	0	1	1	0	1	0	0	0	0	0	3
Morphine	0	0	0	0	0	0	1	0	0	0	0	1
Opium	0	0	0	0	0	1	0	0	0	0	0	1
Other	0	0	1	4	2	3	3	1	0	1	1	16
Stimulants	0	0	1	2	2	0	0	0	0	0	0	5
2019 TOTAL	3	11	73	95	92	50	36	11	3	4	2	380
Depressants	0	1	2	2	2	2	2	1	0	0	1	14
Heroin	0	7	10	38	60	54	30	13	5	5	0	222
Cannabinoids	0	4	4	3	1	3	0	0	0	0	0	15
Cocaine	0	0	0	0	2	2	1	0	0	0	0	5
Opiates	0	0	0	1	0	0	0	0	0	0	0	1
Other	0	0	2	3	7	3	1	3	1	0	2	22
Stimulants	0	0	10	4	6	2	4	0	0	0	0	26
2020 TOTAL	0	12	28	51	78	66	36	19	7	5	3	305

The impact of drugs and psychotropic substances on the health of the population in the Federation BiH

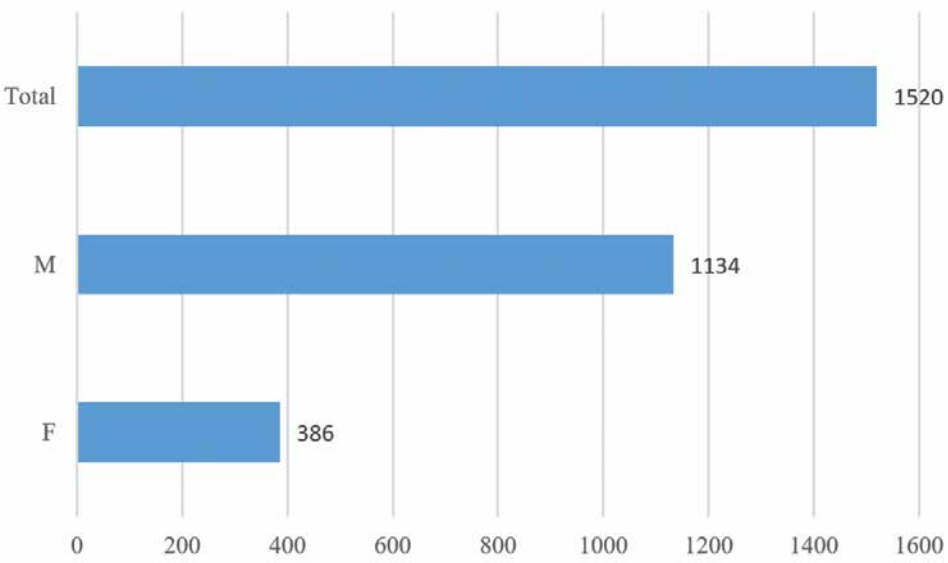
The incidence of mental and behavioural disorders due to use of psychoactive substances (F11–F19) records a downward trend from the number of 2,453 cases and a rate of 11/10,000 persons in 2019 to 1,520 cases and a rate of 7/10,000 persons in 2021.

Table 52: Number of cases of mental and behavioural disorders due to other psychoactive substances use (F11–F19) in PHC in the Federation of BiH (rate per 10,000), 2019–2021

ICD diseases	Total number of cases			Rate per 10,000		
	2019	2020	2021	2019	2020	2021
Mental and behavioural disorders due to other psychoactive substances use (F11–F19)	2,453	2,251	1,520	11	10	7

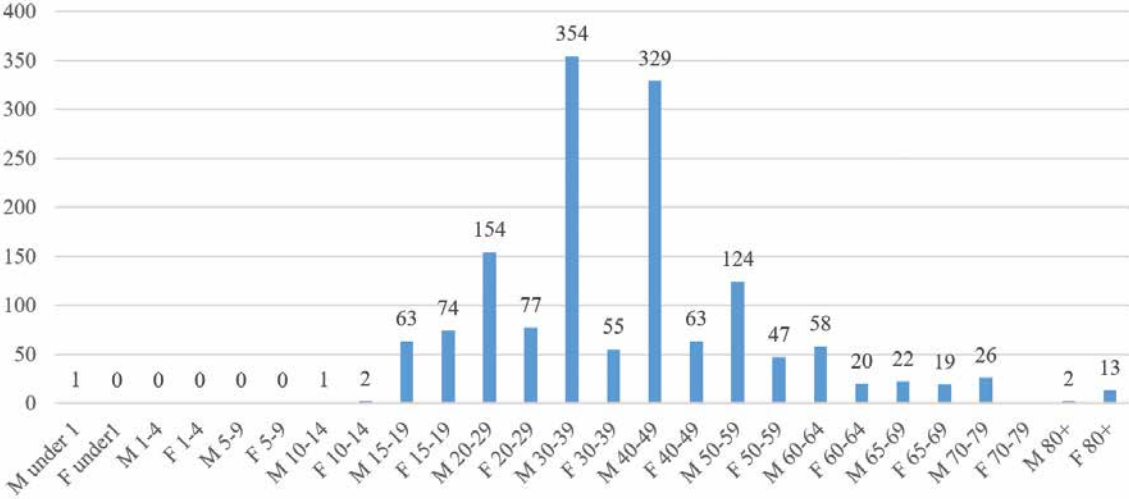
Out of a total of 1,520 cases of mental and behavioural disorders due to other psychoactive substances use (F11–F19) recorded in PHC in the Federation of BiH in 2021, significantly more patients were among men, with 1,134 cases, compared to women with 386 cases.

Figure 75: Number of cases of mental and behavioural disorders due to other psychoactive substances use (F11–F19) in PHC in the Federation of BiH, 2021, by gender



Out of a total of 1,520 cases of mental and behavioural disorders due to other psychoactive substances use (F11–F19) recorded in PHC in the Federation of BiH in 2021, the highest number of cases is recorded in age groups 30–39, 40–49, 20–29 and 50–59 years.

Figure 76: Number of cases of mental and behavioural disorders due to other psychoactive substances use (F11–F19) in PHC in the Federation of BiH, 2021, by age groups



4. ENVIRONMENT AND HEALTH

Changes in the physical, chemical or biological state of the environment affect human health and safety, as well as the economic and social efficiency of society. All population groups are continuously exposed to environmental risk factors. Children, pregnant women, the chronically ill and the elderly are particularly vulnerable, as they are at greater health risk due to polluted air, water and soil, contaminated food, noise, ionizing radiation, UV radiation, and poor housing and working conditions.

Public health control of drinking water in the territory of the Federation of Bosnia and Herzegovina is not completely satisfactory. There is no single register of local water supply facilities, which makes it impossible to have a complete insight into the water supply system, as well as the adoption of measures aimed at improving the quality of water supply. Local water supply systems that are under the control of utility companies and public health institutes generally have only the first zone of sanitary protection defined, and regular control and chlorination of drinking water is carried out in them. In the majority of individual local water supply facilities (wells, unconfined springs, cisterns, reservoirs), drinking water is not controlled for health safety, chlorination is generally not performed, and sanitary protection zones are not defined.

Air quality monitoring in the Federation of BiH is the responsibility of the FBiH Hydrometeorological Institute and competent authorities of cantons and local self-government units. Existing conditions in the Federation of Bosnia and Herzegovina do not allow regular monitoring of all prescribed parameters, and some parameters are not measured at all. A major problem is that indoor air quality monitoring is not carried out, as well as the absence of domestic legislation in this area. Nevertheless, there is evident progress regarding the number of new automatic stations for measuring ambient air quality and the gradual increase in the number of valid measurements of individual pollutants (particulate matter, SO₂, NO₂, etc.).¹

In the Federation of BiH, about 270 kg of municipal waste is produced annually per capita. A part of solid municipal waste is disposed of in non-compliant landfills and in illegal dumpsites (along roads, in rural dumpsites, riverbeds or in abandoned mines), while liquid waste is often discharged into waterways without prior treatment, which increases the risk of contamination of groundwater used for drinking. Industry in the Federation of BiH annually generates about 2.4 million tons of waste, of which hazardous waste makes up about 0.5%. Only 10% or less of the generated industrial waste is adequately disposed of, while the rest is disposed of on unprotected land within industrial plants or inadequately incinerated.²

4.1 Drinking water

According to the Water Management Strategy of the Federation of Bosnia and Herzegovina 2010-2022, 60% of the population in the Federation of Bosnia and Herzegovina is supplied with water from public water supply systems in which the health safety of the water is continuously controlled. In urban areas the coverage is 94%, and in rural areas it is significantly lower and amounts to 20%. The rest of the population meets its needs for drinking water through individual, group or local water supply systems, whose jurisdiction and management are not the responsibility of public utility companies. Protective (sanitary) zones of their

sources have not been established in a large number of cases, while water chlorination is generally not carried out.³

According to the data of the cantonal institutes for public health, the hygienic and sanitary condition of water facilities and the system of public health control of drinking water in the territory of the Federation of BiH are not fully satisfactory. Central water supply sources generally have a regulated first and second zones of sanitary protection. The first zone of sanitary protection is satisfactorily secured, while already in the second protection zone there are often one or more potential contaminants.

The most common potential pollutants are unregulated and illegal landfills. In most central water supply systems, chlorination is performed automatically, with regular control of residual chlorine.

In local waterworks that are under the control of the Institutes for Public Health and public utility companies, regular control and chlorination of drinking water is performed. In local water supply systems owned by local communities or citizens' associations, regular control and chlorination of drinking water is not performed.

In individual water supply facilities (e.g., wells, unconfined springs), chlorination is in most cases not performed at all, or is occasionally done manually, while sanitary protection zones are generally not defined. Water control in these water supply facilities is performed exclusively at the request of the owner.

Over the past few years, the public health institutes of Sarajevo Canton, Tuzla Canton and Zenica-Doboj Canton have strengthened their supervision over the health safety of drinking water from public fountains, as well as drinking water in isolated school buildings and places that are not covered by systemic control.

The quality of water supply can also be judged by the epidemiological situation related to diseases whose causative agents can be found in contaminated water. Enterocolitis acuta most often occurs in areas where the population is supplied with drinking water from individual water supply facilities (wells, cisterns, unconfined springs), which are not under the control of public health institutes and utility companies.

According to data from the Institute for Public Health of the Federation of BiH, in the period from 2019 to 2021, the incidence rate of acute enterocolitis in the Federation of BiH shows an uneven trend (2019 – 160.1/100,000 population, 2020 – 49.9/100,000 population, 2021 – 62.1/100,000 population). Incidentally, in 2019, there was the largest number of recorded epidemics (6) caused by contaminated water and food.

Institutes for public health, as part of their regular activities, perform periodic quality control of surface and swimming waters. Due to the lack of legislation for recreational and swimming waters, reference values for these waters are determined according to the Rulebook on health safety of drinking water (Official Gazette of BiH, 40/10, 32/12) and the Decree on water classification (Official Gazette of SR BiH, 19/80). The waters of public swimming areas (swimming pools) are mostly under the regular supervision of the Institute for Public Health, especially during the summer season.

The Institute for Public Health of the Federation of BiH and the institutes for public health of Sarajevo Canton, Tuzla, Central Bosnia and Una-Sana Canton, as well as the Institute for

Health and Food Safety Zenica have certified laboratories for water analysis (ISO 17025) (ISO 17025). In other cantons, the laboratories of the institutes for public health have the equipment to determine the basic bacteriological and physico-chemical parameters. Due to the lack of modern equipment, it is not possible to determine all the physico-chemical parameters determined by the Rulebook on the health safety of drinking water (e.g., some heavy metals, pesticides, phenols, mineral oils, etc).

The Institute for Public Health of the Federation of Bosnia and Herzegovina performs analyses on basic physico-chemical and microbiological parameters, as well as a large number of other toxicological parameters, according to the requirements of inspection authorities and through contractual services with utility companies and bottling plants of spring, table and mineral water. In cooperation with the Adriatic Sea Watershed Agency, the Institute conducts monitoring of chemical, microbiological and radiological parameters in the underground and surface waters of the Neretva and Cetina rivers, from source to mouth, their tributaries, natural lakes and artificial reservoirs, and the sea in the Neum municipality.

4.2 Air

Air quality monitoring is performed by a number of operators within the FBiH Network of Stations (managed by the FBiH Hydrometeorological Institute) and local station networks at the level of cantons and municipalities. The basic indicators of air pollution are SO₂, nitrogen oxides, carbon monoxide and suspended particulate matter (PM₁₀, PM_{2,5}). If the average concentrations of these pollutants in the air exceed the maximum allowed values, they can seriously affect human health.

Existing automatic air quality monitoring stations in the Federation of Bosnia and Herzegovina are located in Sarajevo, Tuzla, Lukavac, Zenica, Kakanj, Ilijaš, Živinice, Ivan-Sedlo, Goražde, Jajce, Visoko, Tešanj, Bihać, Livno, Hadžići and Travnik. Three new automatic measuring stations are being prepared in Mostar, Vogošća and Kakanj (Centre).

The air pollutants that are measured at these automatic stations are: sulphur dioxide, nitrogen dioxide, carbon dioxide, carbon monoxide, ozone, suspended particulate matter PM₁₀ and PM_{2,5} (Lukavac, Tuzla, Zenica and Goražde). In 2019, the automatic station in Visoko started operating. This station, located near the General High School in the city centre, is also equipped with a hydrogen sulphide monitoring device (H₂S) due to specific emissions from a nearby leather processing plant. Apart from that, measurements of hydrogen sulphide (H₂S) are performed at three measurement locations (Visoko, Maglaj, Iliđža). Continuous measurements of basic air pollutants (SO₂, CO, nitrogen oxides and suspended particulate matter) are also carried out by the Institute for Public Health of Sarajevo Canton. Benzene measurements, sampling and analysis of benzopyrene, sampling and analysis of the composition of suspended particulate matter are not performed.

In the territory of the Federation, the distribution of measuring points is uneven and there are areas that are not covered by air quality monitoring, and in which there are indications that air quality is seriously impaired. The most important air polluters in the territory of the Federation of BiH are thermal power plants, industrial facilities, motor vehicles and individual residential heating (winter period). The state of air quality in the Federation of BiH largely depends on the geographical position, season and meteorological conditions. The biggest pollution occurs in colder periods when the so-called temperature inversions occur in which

the concentrations of individual pollutants exceed the limit values many times over, even in the summer period, but in lower concentrations and with a much lower frequency.

Compared to the previous two years, the results of measuring the concentrations of air pollutants in 2021 show a decrease in the concentrations of suspended particulate matter PM_{10} and $PM_{2.5}$ at almost all automatic measuring stations. This reduction in suspended particulate matter concentrations is significant, although the concentrations are still high and often unhealthy. It is assumed that the main reason for this somewhat more favourable meteorological picture during 2021 is the maintenance of stable atmospheric conditions, i.e., the lower frequency of temperature inversions in the winter period.

In 2021, sulphur dioxide concentrations were also somewhat lower compared to 2019 and 2020, but not as pronounced as the case with PM particles. Other pollutants (nitrogen dioxide, carbon monoxide, ozone) did not show significant deviations compared to the previous two years.

Measurements of hydrogen sulphide (H_2S) indicate a large number of days with exceeded limit values ($24h > 5 \mu g/m^3$). For H_2S , it should be kept in mind that the threshold value is relatively low and is set on the basis of sensory perception (unpleasant smell), while concentrations dangerous to human health ($>150 \mu g/m^3$ 1h) occur rarely or not at all.

Polluted air represents one of the most significant risk factors for the development of chronic obstructive pulmonary diseases.

According to the data of the Institute for Public Health of the Federation of BiH, the incidence rate of chronic obstructive pulmonary diseases in the territory of the Federation has been decreasing in the last three years - in 2019 (158/10,000 population), 2020 (141/10,000 population) and 2021 (139/10,000 population).

Large amounts of grass and tree pollen are also in the air during May and June (end-August high concentrations of ragweed too), which can lead to a deterioration in the health of the population allergic to these substances, especially if they suffer from chronic obstructive pulmonary diseases. Centre for Ecology and Natural Resources "Academician Sulejman Redžić", Sarajevo, in recent years has been monitoring pollen concentrations in the Sarajevo Canton, using two monitoring devices (measuring stations Pofalići and Stari grad). Weed pollen concentrations are highest in June, July, August and September.⁴

4.3 Wastes

Inadequate waste management can lead to pollution of groundwater and surface water, air and soil and thus adversely affect human health and the environment. In the territory of the Federation of BiH, municipal waste disposal sites are mostly of the open type and are located in areas that are not regulated according to the principles of hygienic and sanitary landfills, i.e., there are no protective systems for the preservation of soil, water and air.

Data collection, monitoring and reporting in the waste sector lags behind other sectors, such as the water and air sectors. There are no reliable statistical data on the amount of medical waste generated in the Federation of BiH, because there is no system for registration of generated medical waste.

Available data on industrial and municipal waste, including hazardous waste, are based on estimates. The Agency and the statistical institutes in BiH annually publish data on waste generated from human and animal health protection and/or related research (as part of the total waste generated from manufacturing activities according to the European Waste Catalogue), but these data are not representative.⁵

In the territory of the Federation of BiH, there are about 2,000 locations of uncontrolled (wild) landfills on an area of 974,221 m², except in Sarajevo Canton and Canton 10, where such landfills have not been observed in all municipalities. In other cantons they are located everywhere, and mostly in Zenica-Doboj and Tuzla cantons. Municipal, industrial, inert and animal waste is disposed of at these landfills. Landfills that partially meet the requirements for sanitary landfills are located in Sarajevo ("Smiljevići"), Zenica ("Mošćanica") and Tuzla.⁶

Rulebook on Medical Waste Management in the Federation of BiH (Official Gazette of FBiH, 77/09) obliges health care institutions to appoint a body responsible for medical waste treatment, develop medical waste management plans, separate waste, treat infectious waste with heat or chemical sterilization on site. The results of the survey conducted by the Institute for Public Health of the Federation of BiH during 2021 and 2022 in health institutions of all three levels of health care in the territory of the Federation of BiH showed that 80.3% of these institutions have an Internal Medical Waste Management Plan, as well as persons responsible for adequate management of hazardous medical waste (including all stages of disposal of this type of waste - sorting, storage, transport and final disposal).

Thanks to these plans, the majority of health care institutions in the territory of the Federation of BiH respect the provisions of the aforementioned Rulebook and do not dispose of infectious and potentially infectious waste together with municipal waste, while the issue of pathological, chemical and pharmaceutical waste is resolved through contracts with authorized companies that are in charge of its proper disposal.

Currently, equipment for the safe destruction of infectious medical waste is available in five health care institutions (University Clinical Centre Sarajevo, General Hospital "Abdulah Nakaš" Sarajevo, Cantonal Institute for Public Health Travnik, Health Care Centre Bugojno, Cantonal Hospital "Irfan Ljubijankić" Bihać).

It is estimated that at least 170 ha of unprotected land in the Federation of BiH is covered with accumulated inadequately disposed industrial waste from large industrial plants, primarily slag and ash from large boilers. The FBiH Ministry of Environment and Tourism exports hazardous waste (asbestos waste, galvanic sludge, waste paints and varnishes, waste lead-acid batteries, pharmaceutical waste and cytostatics, chemicals, etc.) in accordance with the provisions of the Basel Convention on the Transboundary Movements of Hazardous Waste and its Disposal.²

According to the results of research and studies conducted in recent years in the Federation of BiH, 47% of the population is connected to the public sewerage system (note: according to estimates given in the Water Management Strategy of the Federation of BiH 2010-2022, this percentage is 33%).

Wastewater treatment plants are located in Sarajevo, Gradačac, Srebrenik, Žepče, Trnovo, Odžak, Živinice, Grude, Čitluk, Ljubuški and Bihać. The wastewater treatment plant in Bihać is equipped with the most modern technical and technological equipment intended for

wastewater treatment (SCADA management system) and is the only plant of this type in the Una-Sana Canton.^{3,6}

The number of surface water samples taken and analysed is not satisfactory (sampling is carried out 1-2 times a year, mainly in the summer). Reference values for surface waters are determined according to the Decree on water classification (Official Gazette of SR BiH, 19/80).

Due to microbiological and chemical contamination, most surface water samples, especially those taken downstream from the settlements, do not comply with regulations, which is why the use of most watercourses for recreational purposes is not recommended.

4.4 Food and water safety

Food safety and hygiene

Control, monitoring and supervision of the entire food safety system are a condition for a successful fight against a wide range of diseases caused by unsafe food. As we witness new and ever-emerging public health threats every day, efforts to improve every segment in the food safety system should remain a priority.

The data collected through the system of health statistical reporting in the Federation of BiH showed that in 2021, not a single outbreak of foodborne infectious diseases was registered. These are encouraging data, because since 2019, when 6 outbreaks of foodborne infectious diseases were recorded, for the second year in a row, there have not been any outbreaks of foodborne infectious diseases.

With a total of 199 cases and a rate of 9.1%, alimentary toxic infections remained, as in the previous year, in ninth place on the list of 10 leading infectious diseases.

By reviewing the received data on the health safety control of foodstuffs, it was recorded that the safety of 29,526 foodstuffs was analysed in domestic production. Microbiological analyses included a total of 28,465 samples, of which 726 or 2.5% were unsafe. For the microbiological safety of foodstuffs from industrial production, 7,749 samples were examined, of which 110 or 1.4% were unsafe, from craft production 4,759 samples were examined, of which 110 or 2.3% were unsafe, while 15,957 samples were examined from trade, of which 506 or 3.1% were unsafe.

Chemical safety of foodstuffs in domestic production included control of a total of 1,061 samples of which 57 or 5.4% were unsafe. Of these, 245 samples from industrial production were inspected, of which 5 or 2% were unsafe. A total of 125 samples were inspected from craft production, of which 28 or 22.4 % were unsafe, while 691 samples were inspected from trade of which 24 or 3.5% were unsafe.

Analysis on imported food safety included a total of 1,977 samples. Of these, 932 were tested for microbiological safety and they were all safe, while chemical safety was tested for 1,045 samples, of which 48 or 4.6 % were unsafe.

It can be concluded that the situation is satisfactory, except for a significantly higher percentage of chemically unsafe samples from craft production, which indicates the need for increased control of foodstuffs from craft production.

Table 52: Overview of food safety control in the territory of the Federation of BiH in 2021

	Domestic production and import					
	Microbiological safety			Chemical safety		
	Total	Non compli- ant no	%	Total	Non compli- ant no (%)	%
Industrial production	7,749	110	1.4	245	5	2.0
Craft production	4,759	110	2.3	125	28	22.4
Trade	15,957	506	3.1	691	24	3.5
Domestic production total	28,465	726	2.5	1,061	57	5.4
Import	932	0	0.0	1,045	48	4.6

*Domestic production sum: industrial production, craft production and trade

A total of 18,329 analyses were performed as part of the health safety control of items of general use in domestic production. Of these, a total of 18,326 samples were included in microbiological analyses, of which 671 or 3.7% were unsafe.

Of these, 4,359 samples from industrial production were inspected, of which 481 or 11% were unsafe. 6,750 samples were inspected from craft production, of which 55 or 0.8% were unsafe, while 7,217 samples from trade were examined, of which 135 or 1.9% were unsafe.

The laboratory of the Institute for Public Health of the Federation of BiH, in cooperation with the Administration for Inspection Affairs and the Market Surveillance Agency of BiH, performs analyses of items of general use, among them the analysis of children's toys for the content of toxic phthalate chemical compounds that are added to plastics to improve flexibility. Phthalates are esters of phthalic acid that are added as compounds in the production of toys and can be found in the softened plastic that is an integral part of the toy.

The content of phthalates must meet the requirements of the Decision on the restriction of placing toys and childcare articles containing phthalates on the market (Official Gazette of BiH, 4/10).

The content of phthalates (DEHP, DBP, BBP, DINP, DIDP, DNOP) is determined by a sophisticated laboratory technique - gas chromatography.

In 2018, 27 samples of children's toys were examined for the content of phthalates and toxic metals, of which 6 samples or 22% were non-compliant. In 2019, 46 samples of children's toys were examined for phthalate content, of which 6 samples or 13% were non-compliant. In 2020, 34 samples of children's toys were examined for phthalate content and all of them complied with the provisions of the Rulebook. Also, in 2021, 14 samples of children's toys were examined for the content of phthalates, all of which also complied with the provisions of the Rulebook. Although a small number of samples were included, it can be concluded that continuous monitoring of phthalates in children's toys contributes to improving the safety of children's toys.

Table 53: Overview of general use items safety in the territory of the Federation of BiH in 2021

	Domestic production and import					
	Microbiological safety			Chemical safety		
	Total	Non-compliant	%	Total	Non-compliant no. (%)	%
Industrial production	4,359	481	11.0	3	0	0.0
Craft production	6,750	55	0.8	0	0	0.0
Trade	7,217	135	1.9	0	0	0.0
Domestic production total	18,326	671	3.7	0	0	0.0

* Domestic production sum: industrial production, craft production and trade

The presented data show a satisfactory situation.

The same as before, in addition to the mandatory continuous monitoring of food safety, targeted, and swift monitoring based on risk analysis and knowledge obtained through international early warning and safety alert systems is recommended.

The laboratory of the Institute for Public Health of the Federation of BiH started targeted monitoring of drinking water, natural spring water, table water and mineral water in 2021. A total of 70 samples of different manufacturers from domestic production and imports were taken. The analyses were carried out in accordance with the Rulebook on the health safety of drinking water (Official Gazette of BiH, 40/10, 43/10, 30/12, and 62/17), the Rulebook on natural mineral and natural spring waters (Official Gazette of BiH, 26/10 and 32/12) and the Rulebook on Table Water (Official Gazette of BiH, 40/10, 43/10, 30/12 and 62/17.).

Out of a total of 70 analysed samples, 18 (25.7%) did not comply with the provisions of rulebooks due to deviations from the contents of the specified parameters on the manufacturer's declaration, primarily anions (hydrogen carbonates, sulphates) and cations (sodium, potassium, calcium and magnesium), due to lower values compared to the declared ones. In terms of microbiological analyses, 7 samples (10%) did not comply. *Pseudomonas aeruginosa* was isolated in 4 samples, and faecal coliform bacteria (*Escherichia coli*) in 3 samples, while in one sample, apart from *Pseudomonas aeruginosa*, faecalis streptococcus was isolated.

Monitoring of drinking water, natural spring water, table water and mineral water will continue in 2022, and even more detailed data will be presented.

4.5 Mines and unexploded ordnance

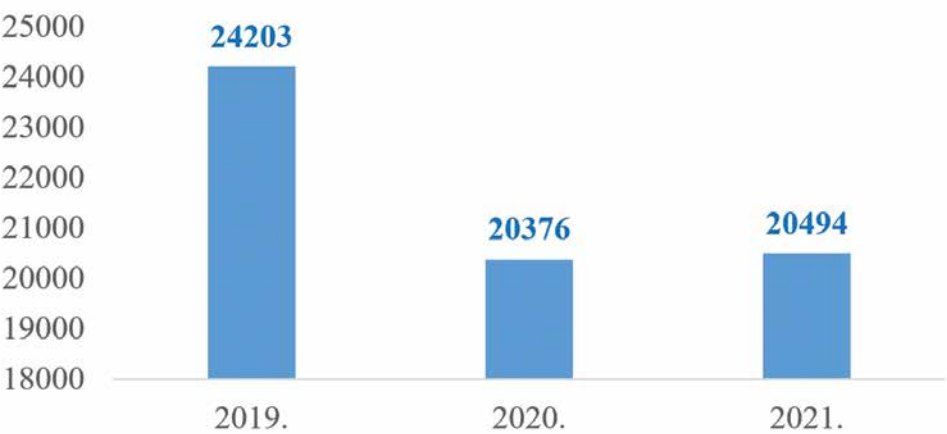
According to the latest available data from the Mine Action Centre in BiH, in the period from 2016 to 2021, a total of 24 people were injured by mines and explosive devices in the territory of the Federation of BiH, of which 11 died (adults).

The largest number of injured and killed in the mentioned time period were men in the age groups 19-39 and 40-60.⁷

4.6 Traffic injuries

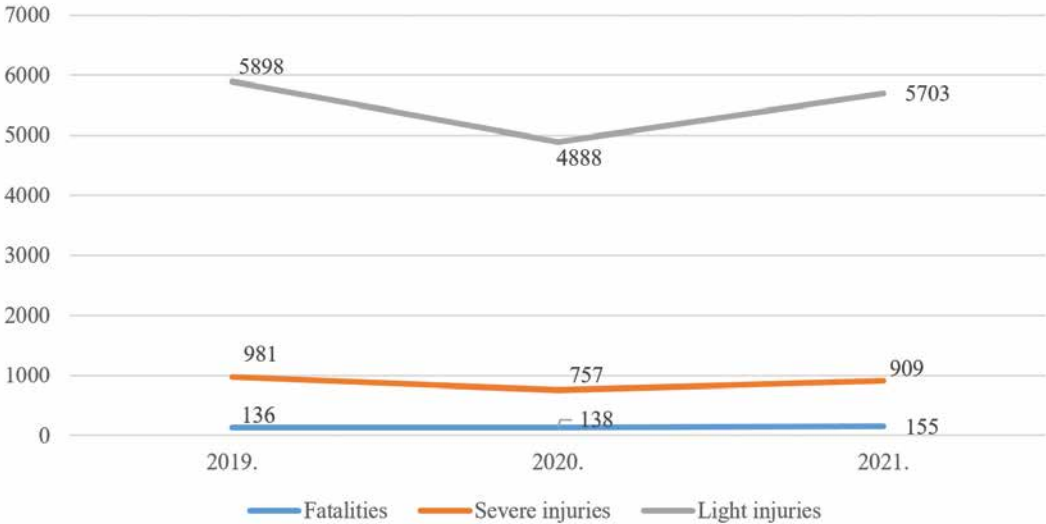
According to data from the Federation of BiH Ministry of Internal Affairs, in 2021 the number of traffic accidents was 20,494, which is less compared to 24,203 in 2019, but more compared to 2020, when the total number was 20,376.

Figure 77: Traffic accidents in the Federation of BiH, period 2019–2020



By comparing the data on fatalities for the period from 2019 to 2021, there is an evident increase in the number of fatalities in 2021 (155) compared to 2019 (136). The number of seriously injured in 2021 (909) is lower compared to 2019 (981), while the number of lightly injured in 2021 (5,703) is lower compared to 2019 (5,898).

Figure 78: Number of fatalities, seriously and lightly injured in the period 2019–2021



5. HEALTH CARE ORGANIZATION

Health care in the Federation of BiH, according to the Law on Health Care, is organized at the level of primary, specialist-consultative, hospital health care and public health activities, and health care of the population is mostly financed from compulsory health insurance.

5.1 Health care personnel

In the territory of the Federation of BiH, 27,761 there were employees in the public health care sector during 2021, which is more than in 2020 (27,517).

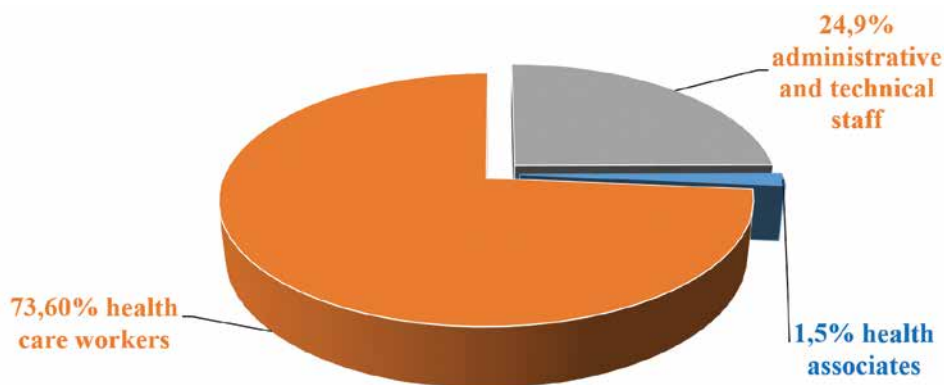
According to the health statistics, there were 580 employees working in the institutes for public health, of which 365 (63%) were health professionals.

Of the 79 medical doctors employed in institutes for public health, 60 of them (76%) are specialists in public health disciplines.

The largest part of specialist personnel is employed in the Institute for Public Health of the Federation of BiH, the Institute for Public Health of Sarajevo Canton and the Institute for Health and Food Safety of Zenica-Doboj Canton.

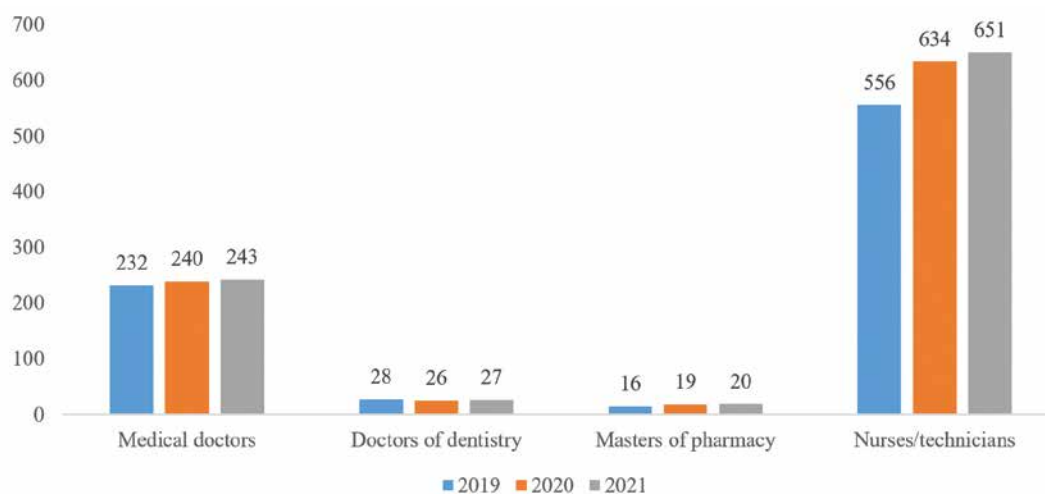
In 2021, the public health care sector in the Federation of BiH employed 73.6% of health workers, 1.5% of health associates and 24.9% of administrative and technical staff.

Figure 79: Health care employees in the Federation of BiH, 2021, structure index (%)



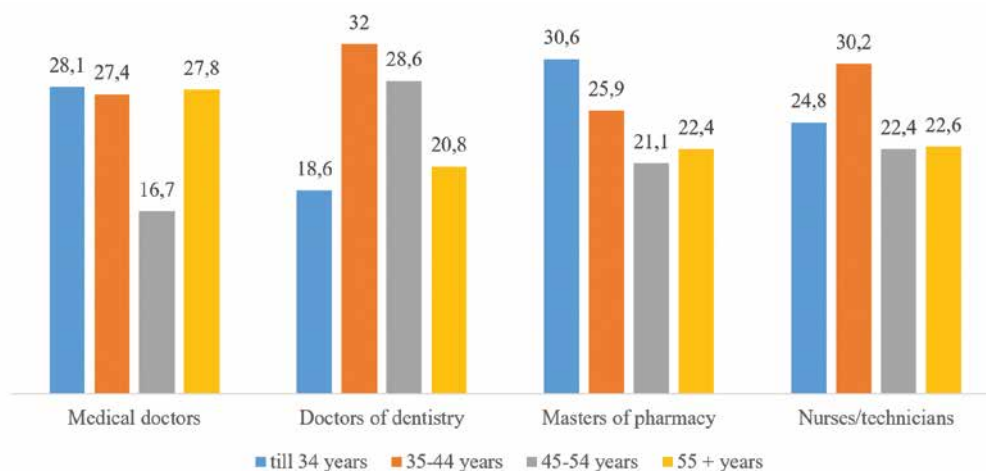
In 2021, the public health care sector in the Federation of BiH employed 243 medical doctors, 27 doctors of dentistry, 20 masters of pharmacy and 651 nurses/technicians, per 100,000 population.

Figure 80: Health care employees in the Federation of BiH, 2019–2021, rate per 100,000 population



According to the age structure of employees in the health care sector in the Federation of BiH (public sector), the majority of medical doctors and masters of pharmacy are in the age group up to 44 years of age, and they make up almost more than half of the total number of employees.

Figure 81: Health care employees in the Federation of BiH, by age groups, 2021, structure index (%)



In 2021, almost two thirds of all medical doctors in the public health care sector in the Federation of BiH were specialists in various disciplines (63.7%). The highest percentage was in Sarajevo Canton (71.8 %), and the lowest in Bosnian Podrinje Canton (49.0%).

In 2021, the share of employees with a degree in health studies was 5.4%, while in 2020, this share was 4.8%.

5.2 Students enrolled in the Faculty of Medicine, Faculty of Pharmacy and Faculty of Health Studies according to the manner of study in the academic year 2020/2021, public and private faculties

In the Federation of BiH, health care workers acquire university education of the first and second cycle at 19 medicine and health related faculties. Out of the total number, there are

11 public health related faculties organized in five cantons: Una-Sana Canton (1), Tuzla Canton (2), Zenica-Doboj Canton (1), Herzegovina-Neretva Canton (3) and Sarajevo Canton (4). There are 8 private health related faculties in the Federation of BiH and they are organized in four cantons: Tuzla Canton (2), Bosnian Podrinje Canton (1), Central Bosnia Canton (2) and Sarajevo Canton (3).

The total number of students enrolled in the academic year 2020/2021 is 10,151. Of the total number of students enrolled, 8,961 (88.3%) were enrolled in public faculties, while 1,190 (11.7%) students were enrolled in private faculties. In the academic year 2020/2021, 4,800 (47.3%) students were enrolled in full-time studies, namely 4,241 (88%) students were enrolled in public health related faculties, while 559 (12%) full-time students were enrolled in private health related faculties. In the 2020/2021 academic year, 4,556 (44.9%) self-financing full-time students were enrolled, namely 4,298 (94%) in public and 258 (6%) in private health related faculties. In the same school year, there were 795 (7.8%) part-time students enrolled, of which 422 (53%) in public and 373 (47%) in private health related faculties.

Table 53: Number of students enrolled in public health related faculties (overview by gender for the 2020/2021 academic year)

Canton	Name of higher education institution	Type of ownership/ Public/ Private	Enrolled students							
			Total	Women	Full-time	Women	Full-time / Self-financing	Women	Part-time	Women
Canton Sarajevo	Faculty of Health Studies	Public	1029	761	460	372	330	235	239	154
Canton Sarajevo	Faculty of Pharmacy	Public	870	774	343	314	527	460	0	0
Canton Sarajevo	Faculty of Medicine	Public	1049	724	546	402	503	322	0	0
Canton Sarajevo	Faculty of Dentistry with Clinics	Public	682	481	249	194	433	287	0	0
Canton Sarajevo	USSST – Medical School	Private	226	134	0	0	226	134	0	0
Canton Sarajevo	USSST – School of Dentistry	Private	26	16	0	0	26	16	0	0
Canton Sarajevo	USSST – School of Pharmacy	Private	6	5	0	0	6	5	0	0
Tuzla Canton	Faculty of Pharmacy	Public	506	448	425	380	81	68	0	0
Tuzla Canton	Faculty of Medicine	Public	2236	1610	1741	1260	491	347	4	3
Tuzla Canton	Faculty of Health Studies	Private	201	133	101	65	0	0	100	68
Tuzla Canton	Faculty of Medicine	Private	53	22	50	21	0	0	3	1
Zenica-Doboj Canton	Faculty of Medicine	Public	426	338	197	155	229	183	0	0
Herzegovina-Neretva Canton	Faculty of Health Studies	Public	1118	857	14	13	969	727	135	117
Herzegovina-Neretva Canton	Faculty of Pharmacy	Public	167	152	25	22	142	130	0	0
Herzegovina-Neretva Canton	School of Medicine	Public	563	384	3	3	525	359	35	22
Una-Sana Canton	Faculty of Health Studies	Public	315	255	238	198	68	49	9	8
Central Bosnia Canton	Faculty of Pharmacy and Health	Private	554	348	358	210	0	0	196	138
Central Bosnia Canton	Faculty of Health Studies	Private	116	86	44	29	0	0	72	57
Bosnian Podrinje	Faculty of Health Sciences	Private	8	4	6	2	0	0	2	2

Figure 82: Number of students enrolled in public health related faculties 2020/2021

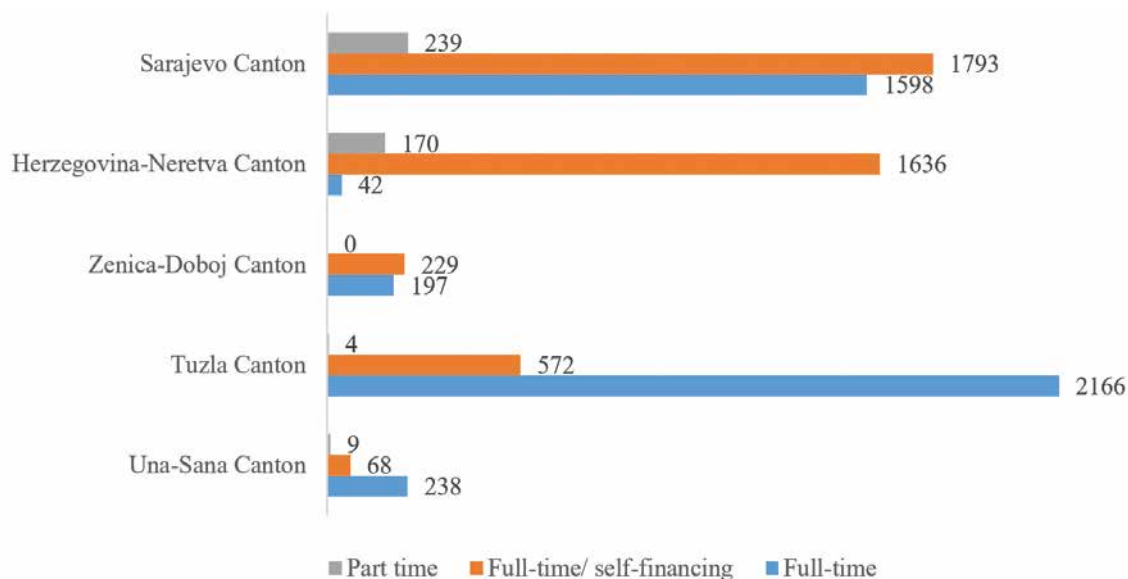


Table 54: Number of students enrolled in private health related faculties/overview by gender for the 2020/2021 academic year

Name of higher education institution	Type of ownership	Enrolled students							
		Total	Wom-en	Full-time	Wom-en	Full-time/ Self-financing	Wom-en	Part-time	Wom-en
Tuzla Canton									
Faculty of Health Studies	Private	201	133	101	65	0	0	100	68
Faculty of Medicine	Private	53	22	50	21	0	0	3	1
Bosnian Podrinje Canton									
Faculty of Health Sciences	Private	8	4	6	2	0	0	2	2
Central Bosnia Canton									
Faculty of Pharmacy and Health	Private	554	348	358	210	0	0	196	138
Faculty of Health Studies	Private	116	86	44	29	0	0	72	57
Sarajevo Canton									
USSST - Medical School	Private	226	134	0	0	226	134	0	0
USSST - School of Dentistry	Private	26	16	0	0	26	16	0	0
USSST - School of Pharmacy	Private	6	5	0	0	6	5	0	0

Figure 83: Number of students enrolled in private health related faculties 2020/2021

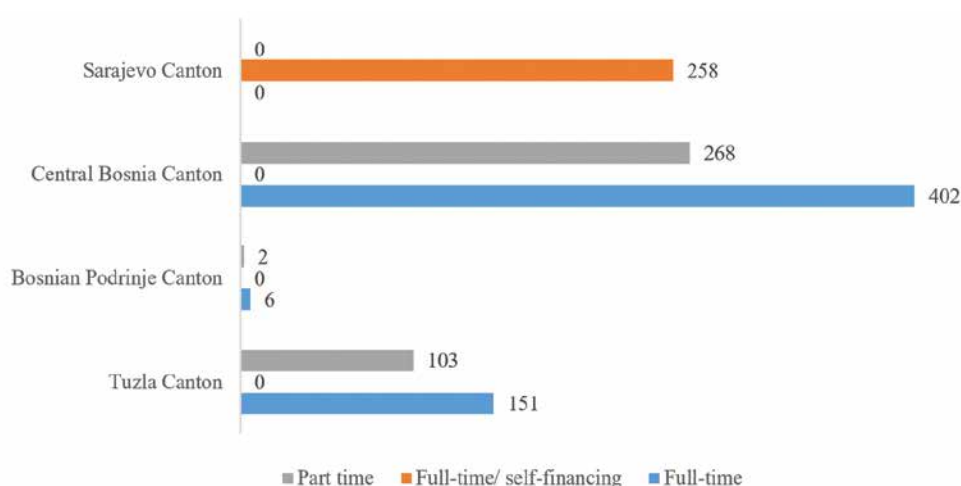


Table 55: Number of students enrolled in public health related faculties (overview by gender and years of study for the academic year 2020/2021)

Name of higher education institution	Type of ownership	Students enrolled by year of study											
		First		Second		Third		Fourth		Fifth		Sixth	
		Total	Women	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women
Una-Sana Canton													
Faculty of Health Studies	Public	96	72	65	54	81	66	73	63	0	0	0	0
Tuzla Canton													
Faculty of Pharmacy	Public	93	80	94	83	130	115	81	72	108	98	0	0
Faculty of Medicine	Public	477	348	474	341	547	396	417	304	177	120	144	101
Zenica-Doboj Canton													
Faculty of Medicine	Public	150	123	138	109	89	66	43	38	6	2	0	0
Herzegovina-Neretva Canton													
Faculty of Health Studies	Public	534	402	369	281	215	174	0	0	0	0	0	0
Faculty of Pharmacy	Public	37	35	28	26	37	31	38	36	27	24	0	0
Faculty of Medicine	Public	186	131	108	68	99	69	82	63	88	53	0	0
Sarajevo Canton													
Faculty of Health Studies	Public	364	277	246	175	204	161	215	148	0	0	0	0
Faculty of Pharmacy	Public	121	112	136	118	167	146	159	146	213	183	74	69
Faculty of Medicine	Public	162	109	291	210	178	126	165	110	111	83	142	86
Faculty of Dentistry with Clinics	Public	101	76	109	73	134	91	73	51	119	83	146	107

Figure 84: Number of students enrolled in public health related faculties (overview by years of study for the academic year 2020/2021)

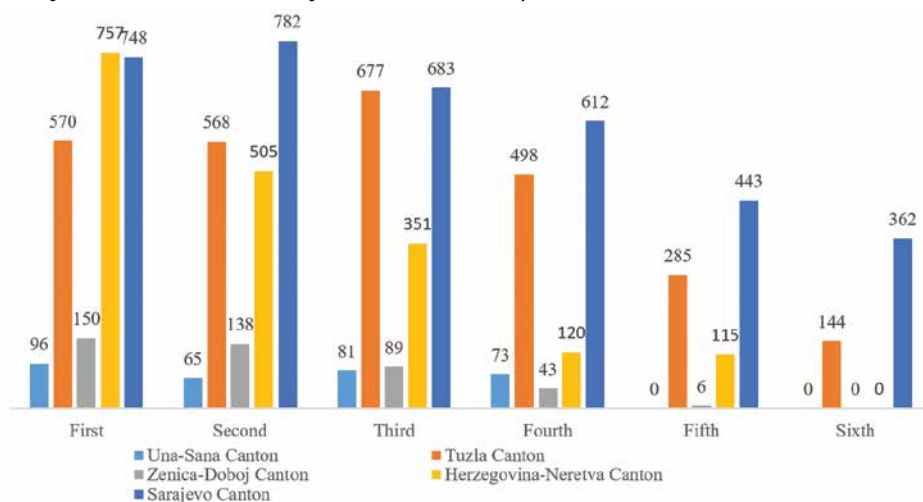
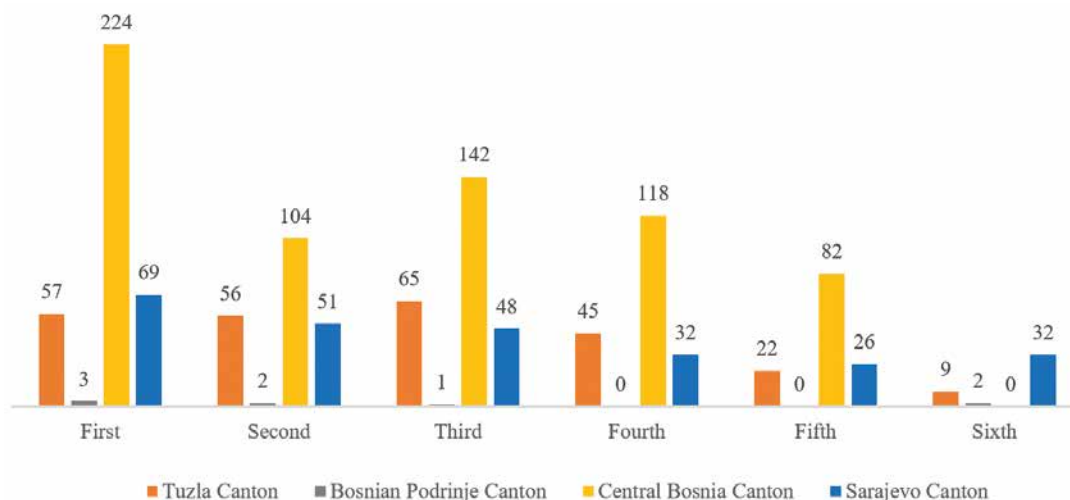


Table 56: Number of students enrolled in private health related faculties (overview by gender and years of study for the academic year 2020/2021)

Name of higher education institution	Type of ownership	Students enrolled by year of study											
		First		Second		Third		Fourth		Fifth		Sixth	
		Total	Women	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women
Tuzla Canton													
Faculty of Health Studies	Private	44	37	39	28	54	37	36	18	22	9	6	4
Faculty of Medicine	Private	13	7	17	8	11	3	9	2	0	0	3	2
Bosnian Podrinje Canton													
Faculty of Health Sciences	Private	3	2	2	1	1	1	0	0	0	0	2	0
Central Bosnia Canton													
Faculty of Pharmacy and Health	Private	173	115	81	49	126	77	92	60	82	47	0	0
Faculty of Health Studies	Private	51	37	23	19	16	13	26	17	0	0	0	0
Sarajevo Canton													
USSST - Medical School	Private	54	31	43	29	39	23	32	21	26	12	32	18
USSST - School of Dentistry	Private	9	4	8	5	9	7	0	0	0	0	0	0
USSST - School of Pharmacy	Private	6	5	0	0	0	0	0	0	0	0	0	0

Figure 85: Number of students enrolled in private health related faculties (overview by years of study for the academic year 2020/2021)



5.3 Primary health care (PHC)

According to the Law on Health Care, health care at the primary level includes the implementation of measures to protect and improve the health of the population, prevention, treatment and rehabilitation of diseases and injuries, detection and control of risk factors for non-communicable diseases, specific youth preventive health care, immunization against infectious diseases, treatment and rehabilitation, palliative care etc.

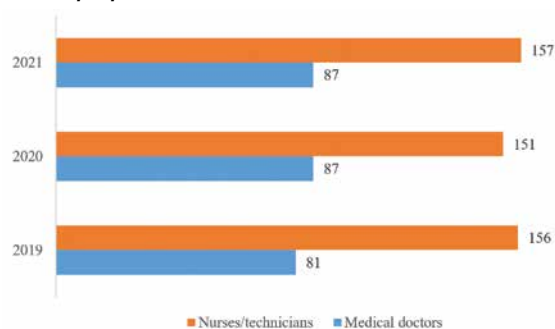
In order to ensure the necessary access to health care, the PHC is organized in such a way that it is available to users in the municipality of their residence.

Primary health care includes family medicine, child health care, community polyvalent nurses, hygienic and epidemiological care, emergency medical care, women's reproductive health care, health care for non-specific and specific lung diseases, community-based physical and mental rehabilitation, specific health care of workers as part of occupational medicine, dental health care, laboratory and radiological diagnostics of the primary level and pharmacy services.

Health care professionals in PHC

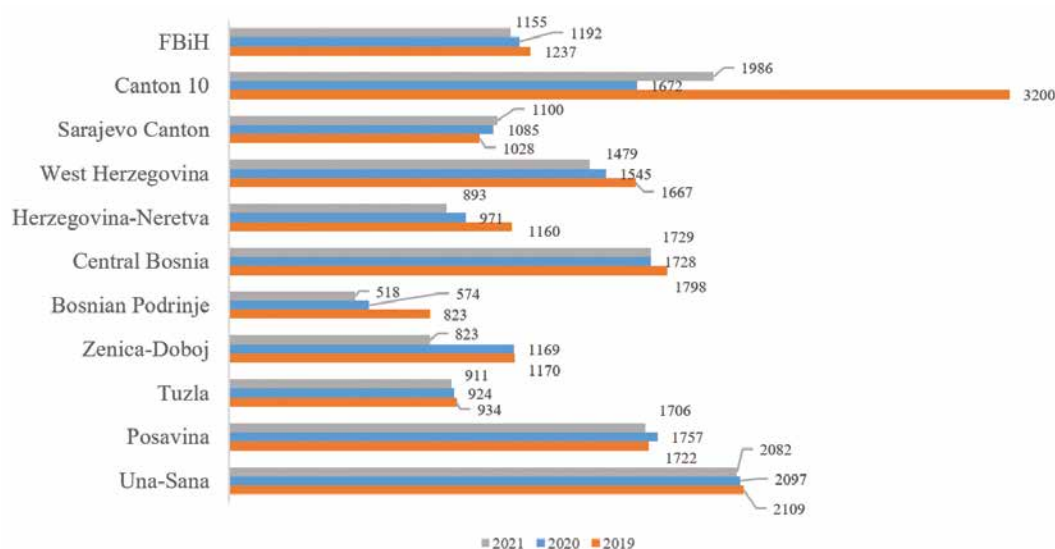
According to the data of regular health statistics for 2021, in the PHC services in the Federation of BiH (family medicine, health care of preschool and school age children, emergency medical care, women's reproductive health care, community mental health centers, polyvalent community nurses, occupational medicine) there were 1,819 medical doctors (34.4% of the total number) and 3,402 nurses/technicians (26.9%) employed, i.e. 87 medical doctors and 157 nurses/technicians per 100,000 population. In 2020, there were 1,891 medical doctors and 3,289 nurses/technicians employed at the PHC level.

Figure 86: Medical doctors and nurses/technicians in PHC in the Federation of BiH, 2019-2021, rate per 100,000 population



In 2021, there were an average of 1,192 inhabitants per one medical doctor PHC, with the highest number of inhabitants per one medical doctor in the Una-Sana Canton (2,097), and the smallest in the Bosnian Podrinje Canton (574).

Figure 87: Number of inhabitants per one medical doctor in PHC in the Federation of BiH, 2019–2021



Family medicine

In 2021, according to regular health statistics, 1,004 medical doctors were employed in family medicine services in the Federation of BiH, of which two fifths, i.e. 400 (40 %), had completed specialization in family medicine, 121 of them (12.1 %) are specialists of other disciplines with completed additional training (PAT), 265 (26.4%) are medical doctors with completed PAT. There were 173 other medical doctors employed in the family medicine service (17%), and 45 doctors of medicine were on specialization (4.5%).

Of the 1,799 nurses/technicians in family medicine services, 1,309 (72.8%) had completed additional training in the field of family medicine (PAT), of which 75 (5.7%) were health care workers with a degree in health studies and with completed additional training in family medicine (PAT), there were 41 (3.1%) nurses/technicians of higher education level with PAT, and 1,193 (91.1%) nurses/technicians of secondary education with PAT, and 379 other nurses/technicians.

In 2021, the total number of visits to medical doctors in family medicine services in the public health sector was 7,086,212, i.e. 11.6% more than in 2020 (6,346,521). The average number of visits per medical doctor per year was 7,058, or 26 per day, which is more than in 2020 (the average number of visits per medical doctor per year was 5,909, and 22 per day).

Table 57: Visits to medical doctors in family medicine services in the Federation of BiH in 2021, overview by cantons

Canton	Number of points	Number of medical doctors	Visits to medical doctors TOTAL	Average number of visits per medical doctor per year	Average number of visits per medical doctor per day
Una-Sana	60	63	455,591	7,231	27
Posavina	10	14	81,540	5,824	22
Tuzla	122	284	1,863,084	6,560	24
Zenica-Doboj	104	158	1,173,403	7,426	27
Bosnian Podrinje	16	17	166,763	9,809	36
Central Bosnia	51	64	513,909	8,029	30
Herzegovina-Neretva	60	136	555,885	4,087	15
West Herzegovina	12	33	264,506	8,015	30
Sarajevo Canton	96	217	1,864,686	8,593	32
Canton 10	10	18	146,845	8,158	30
Federation of BiH	540	1.004	7,086,212	7,058	26

Contrary to visits to the medical doctors, in 2021 slightly fewer preventive examinations were registered in family medicine services than in 2020. Thus, 99,280 systematic health check ups of the adult population were registered (121,759 in 2020), 1,028,361 consultations by medical doctors (832,237 in 2020), 1,074,188 consultations by nurses/technicians (936,461 in 2020), other preventive services of medical doctors (335,658), which is more than in 2020 (173,718), and 472,864 other preventive services of nurses/technicians (377,478 in 2020).

In 2021, 42,255 home visits by doctors of medicine were registered (29,780 in 2020), so the share of home visits in relation to the number of first visits to doctors' offices (1,353,770) was 3.1%.

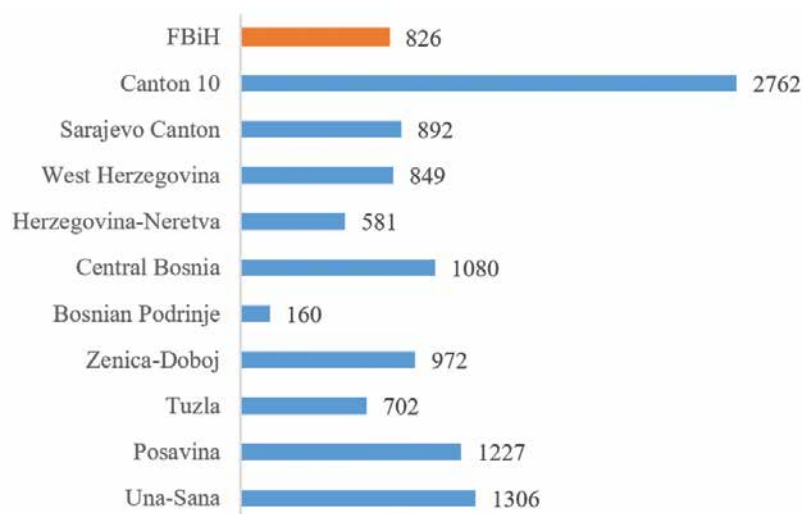
The share of patients referred to the laboratory in relation to the first visits was 72%, and the share of patients referred to specialists in relation to the first visits was 119%, which means that the patient was referred to several doctors of different specialties at the first visit.

Health care of preschool children

In the health care services for preschool children in 2021, according to regular health statistics, there were 154 medical doctors and 287 nurses/technicians, which is similar to 2020 (158 medical doctors and 287 nurses/technicians). Nearly three-quarters of medical doctors were paediatricians, 113 of them (73.4%).

There were an average of 826 preschool aged children in these services per one medical doctor in the Federation of BiH, and there are differences among the cantons.

Figure 88: Number of children per medical doctor in the health care of preschool children in the Federation of BiH and by cantons in 2021



In 2021, 477,659 visits were made per one medical doctor in health care services of preschool children, significantly more than in 2020 (329,791). On average, 11 visits were made per medical doctor per day.

Also, slightly more total preventive health check ups were registered in 2021 (109,620) compared to 2020 (79,475).

In 2021, there were 82,214 systematic health check ups in the counselling centre, much more than in 2020 (58,765), among which the majority were infants (46,163 or 56.1%), followed by children aged 1-3 years (20,903 or 25.4 %). There were 27,406 systematic health check ups made due to enrollment in kindergarten and school with a share of 25.0% in preventive health check ups of children. The number of control check ups of children after systematic health check ups has also increased, from 22,625 in 2020 to 29,412 in 2021, which is an increase of 23%. The ratio of first and second visit is 1:1.3.

Mental health care centres

Mental health care services in the Federation of BiH in 2021 were provided in 65 geographical locations/outpatient clinics of mental health care centres.

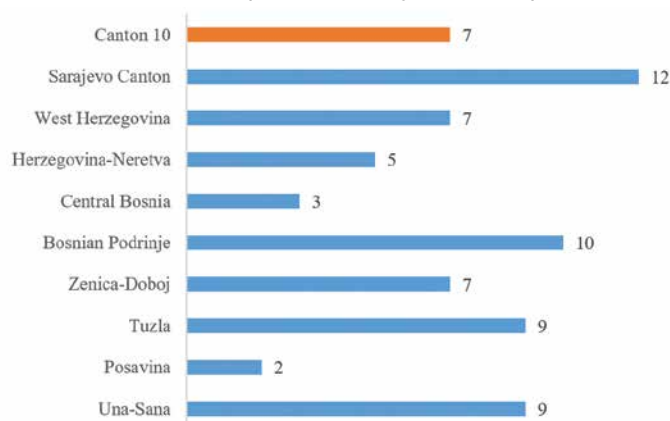
According to the regular health statistics report in 2021, there were 61 medical doctors employed, of which 37 neuropsychiatry specialists and 21 psychiatry specialists, and 147 nurses/technicians, 19 occupational therapists, 76 psychologists and 45 social workers.

The Mental Health Care Centre provides specialist-consultative health care, providing psychosocial assistance to war-traumatized persons, individual and group psychotherapy of psycho-traumatized persons, psychosocial assistance to vulnerable persons, psychological diagnostics, home visits as needed, family assistance, consultative-specialist psychiatric examinations, processing for the disability pension commission /DPC/, medication therapy, crisis interventions, etc.

In preventive work, the centres have the task of promoting mental health, each in its own community/canton, mostly through educational activities.

During 2021, there were 115,561 visits to the doctor, slightly more than in 2020 (105,675), and 251,751 visits to other team members, which is more than in 2020 (208,602). There were 481 registered doctors' home visits (445 in 2020) and 3,073 home visits by other team members, and 704 patients were referred for hospitalization (585 in 2020). Despite the COVID-19 pandemic, group therapy (2,599) and community-based prevention and promotional programmes were carried out.

Figure 89: Mental health care centres, average number of visits per 1 medical doctor per day in the Federation of BiH in 2021 (overview by cantons)



Emergency medical care

The emergency medical service on the territory of the Federation of BiH in 2021 played an important role in the fight against the COVID-19 pandemic. Emergency medical services were organized in 75 geographical locations/outpatient clinics, which is slightly less than in 2020 (77).

According to the regular health statistics report, in 2021, there were 379 medical doctors employed in emergency medical services (369 in 2020), of which only 79 (20.8%) were emergency medicine specialists, 785 nurses/technicians (763 in 2020) and 10 other workers.

There were 825,875 recorded visits to medical doctors, which is more than in 2020 (744,103), followed by 1,283,854 examinations by other health professionals (1,094,308 in 2020), 92,426 field interventions - at home, which is more than in 2020 (90,974), 20,931 interventions in public places, and slightly fewer emergency medical transports (44,120) than in 2020 (44,286)).

Dental care

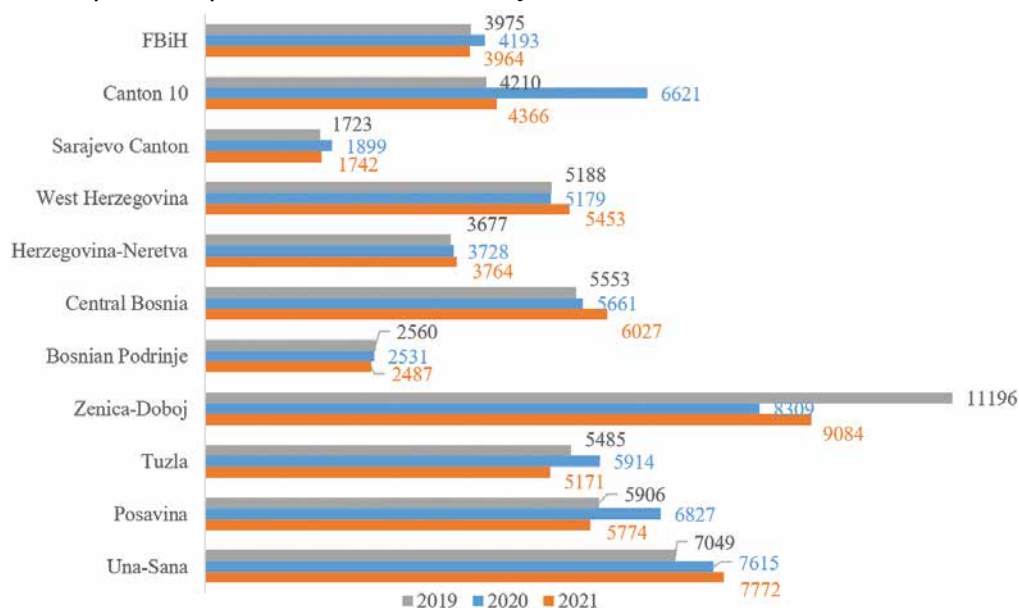
In 2021, the inhabitants of the Federation of BiH received dental and oral health care services in the public sector in 186 geographical locations/clinics, which is less than in 2019 (192).

In 2021, there were 547 dentists (25/100,000 inhabitants) and 606 dental nurses/technicians (28/100,000) providing dental care services in the public sector of PHC.

In 2021, there were an average of 3,964 residents per dentist in the public PHC sector, the highest in Zenica-Doboj (9,084) and Una-Sana cantons (7,772), and the lowest number of

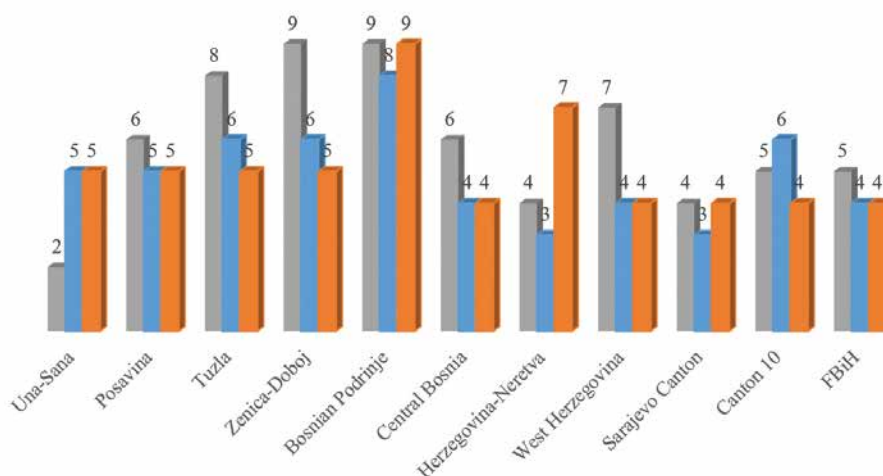
residents per dentist was registered in Sarajevo Canton (1,742), noting that an increasing number of residents use the services of the private sector.

Figure 90: Population per dentist, overview by cantons, 2019-2021



In 2021, there were 671,451 visits to dentists in the public PHC sector, so more visits were made than in previous years, i.e., an average of 4.5 visits per day. The highest average number of visits was registered in Bosnian Podrinje Canton (9), and the lowest average number of visits was registered in four cantons: Canton Sarajevo, Central Bosnia, West Herzegovina and Canton 10 Livno (4). The ratio of first and second visit in dental care is 1: 2.5, i.e., two visits on average for one intervention.

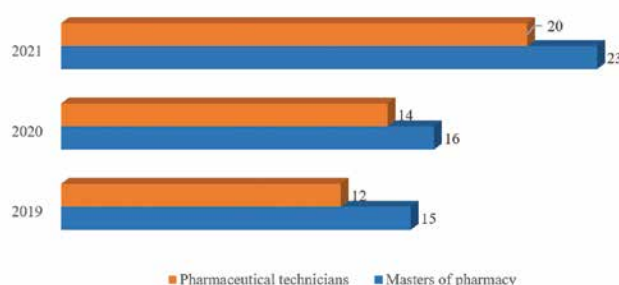
Figure 91: Average number of visits per dentist, overview by cantons, 2019–2021



Pharmacies

According to incomplete data from regular health statistics (two cantons did not provide data), in 2021, there were 505 masters of pharmacy (23/100,000) and 428 pharmaceutical technicians (20/100,000) working in 57 pharmacies, health institutions in the public sector, slightly more than the previous year. In 2021, the private sector of the Herzegovina-Neretva Canton is included.

Figure 92: Employees in public sector pharmacies in the Federation of BiH, 2019–2021, rate per 100,000 population



There were 5,087,969 ready-made essential prescription drugs, 6,608,416 ready-made other prescription drugs and 112,223 magistral drugs were recorded, an average of 2.3 issued ready-made essential prescription drugs per inhabitant, slightly more than the previous year, when the number of drugs issued per inhabitant amounted to 1.7.

Specialist-consultative health care

In 2021, specialist-consultative health care was available to residents of the Federation of BiH in 431 geographical locations/outpatient clinics, i.e. in 1,003 offices (in 2020, in 1,088 offices).

Specialist-consultative health care in the public sector in 2021 was provided by 1,303 specialist medical doctors (60.1 specialist medical doctors per 100,000 inhabitants), similar to the previous year (60.9 specialist medical doctors per 100,000 inhabitants), and 2,031 nurses/technicians (93.7/100,000 and 93.0/100,000 in 2020).

There were 1.7% more visits to specialist medical doctors registered (2,615,735 compared to 2020 when it was 2,569,699), so the average number of visits per medical doctor in specialist-consultative health care per day was 7.4, which is more than in 2020 (7.1 visits per day, average). Despite the COVID-19 pandemic, the number of visits in specialist services was maintained.

5.4 Hospital health care

In the Federation of BiH in 2021, hospital health care was provided in 24 hospitals (3 university-clinical centres, 6 cantonal hospitals, 9 general hospitals, 3 special hospitals and 3 rehabilitation centers/spas).

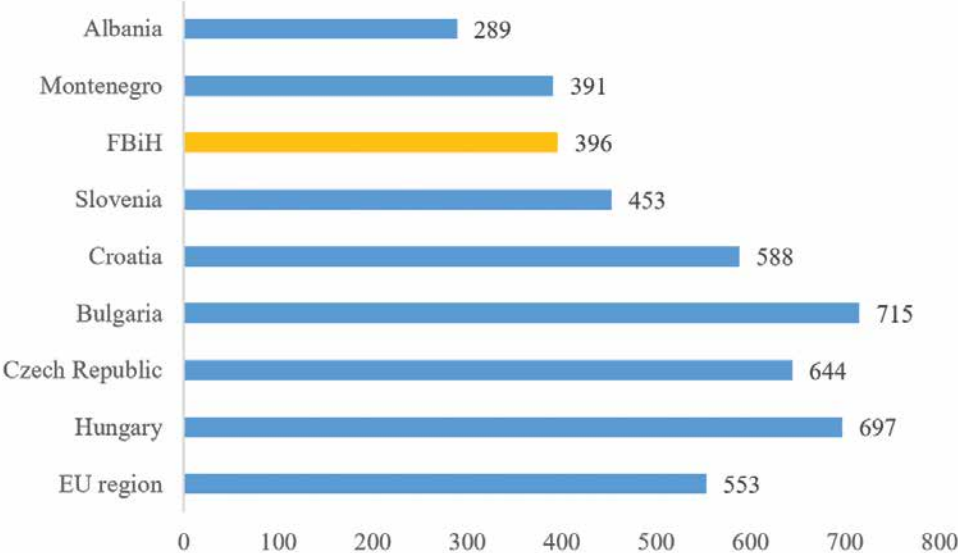
In 2021, all hospitals in the Federation of Bosnia and Herzegovina organized their work in such a way that patients with COVID were treated as a priority, which affected other hospital services.

In 2021, slightly more than two fifths of all medical doctors worked in hospitals, namely 2,361 medical doctors (44.7%), and 5,612 nurses/technicians (49.1% of the total number).

In 2021, there were 109 medical doctors and 259 nurses/technicians per 100,000 inhabitants working in hospitals in the Federation of BiH, and there were on average 2.4 nurses/technicians per one medical doctor, which is similar to the previous year.

According to the latest available data from the WHO database, the Federation of BiH still has a lower number of beds (396/100,000 inhabitants) compared to neighboring countries, as well as the average of the WHO European Region (553/100,000 inhabitants).

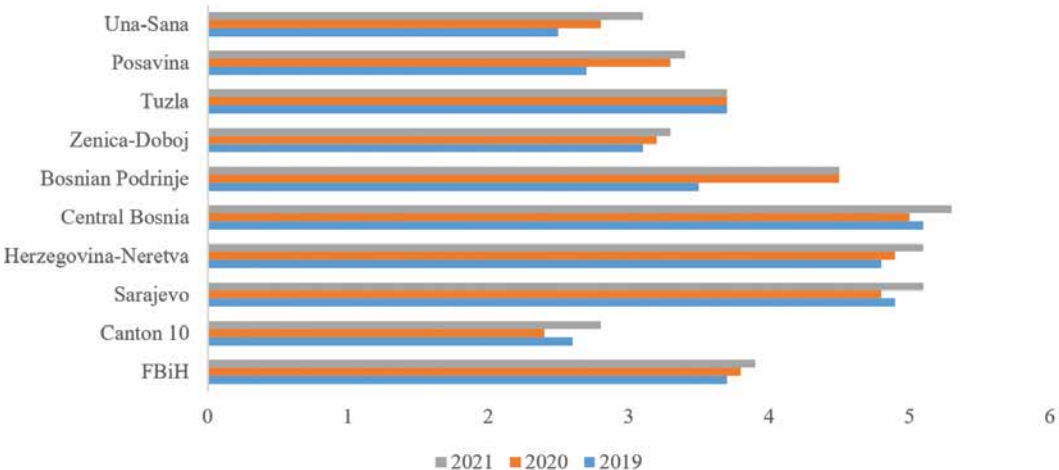
Figure 93: Number of hospital beds in the Federation of BiH and selected countries of the European Region in 2021, rate per 100,000 population



In hospitals in the Federation of BiH in 2021, the largest number of hospital beds per 100,000 population were in Central Bosnia Canton (5.3/1,000 population), Herzegovina-Neretva Canton (5.1/1,000 population), and Sarajevo Canton (5.1 /1,000 population). The lowest number of beds, 2.8/1,000 population, was registered in Canton 10. Sarajevo Canton has another 80 hospital beds for daily hospitalization (psychiatry).

There are also 13 inpatient beds in operation in the territory of the Federation of BiH.

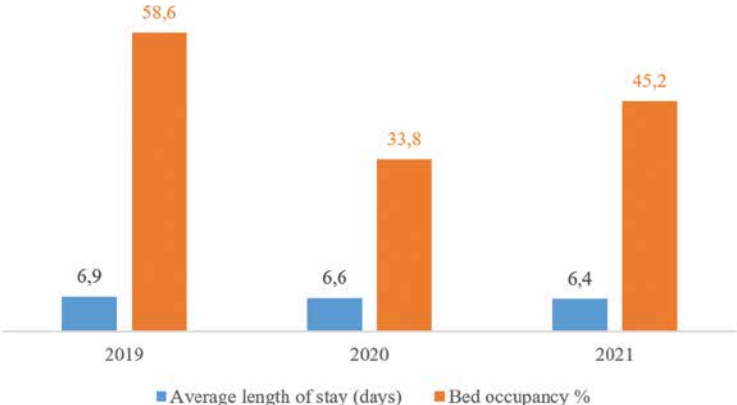
Figure 94: Number of hospital beds by cantons and in the Federation of BiH, 2019–2021, rate per 1,000 population



In 2021, one medical doctor in hospital care served 3.6 beds, and one nurse/technician served 1.5 beds, similar to 2020.

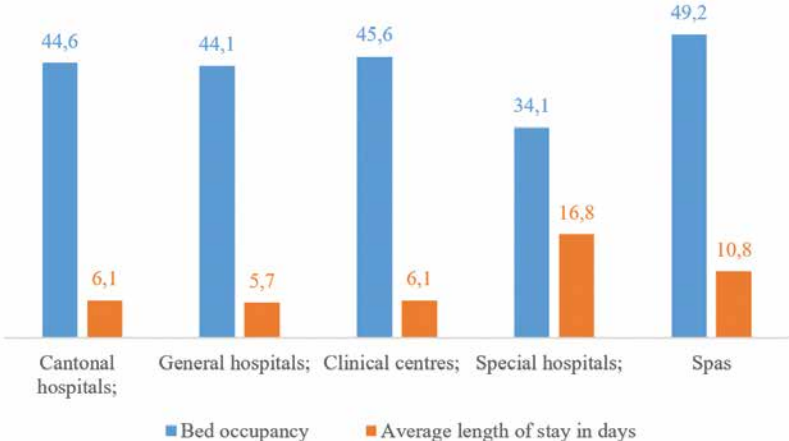
In the Federation of BiH in 2021, the average length of stay in hospitals was 6.4 days, and the average occupancy of hospital beds was 45.2%, which shows a slightly higher value compared to the situation in 2020.

Figure 95: Utilization of hospital resources in the Federation of BiH, 2019–2021



In 2021, the longest length of stay was recorded in special hospitals (16.8 days), and the highest occupancy of beds was in spas (49.2%). Compared to the previous year, bed occupancy increased in all hospitals, except for spas, where bed occupancy was lower (49.2%) than in 2020 (54.5%). A decrease in the average number of days of stay was registered in all hospitals, except for special hospitals, which registered an increase in the number of days of stay from 16.2 in 2020 to 16.8 in 2021.

Figure 96: Utilization of hospital resources by hospital levels in the Federation of BiH, 2021



5.5 Health management

Report on the implementation of continuing professional education in health management for 2021

The organization of the new cycle of Continuing professional education in health management for the first semester of 2021 was preceded by the harmonization of the proposal of the List of lecturers engaged in the implementation of education, for all three levels, based on the previously delivered Letter of the Federal Minister of Health to the representatives

of all institutions that organize and implement continuing professional education in health management.

A list of proposals for lecturers - holders and co-holders of modules for all three levels has been agreed upon, based on previously established criteria and the agreement of representatives of all institutions that organize education (IPH FBiH, Faculty of Economics of UNSA and Faculty of Medicine of the University of Mostar), and institutions participating in the implementation of education (Faculty of Medicine of UNSA, Faculty of Economics of UNTZ, Faculty of Economics of the University of Mostar and AKAZ), on the appointment of new lecturers or confirmation of previously engaged ones, and in accordance with the criteria and provisions of the Rulebook on CPE in health management (Official Gazette of the Federation of BiH, 6/20). At the meeting of the Coordinating Body on 28 January 2021, that list was considered and accepted by all present members of the Coordinating Body, and submitted to the Federal Minister of Health for approval.

By decision of the Federal Minister of Health from June 2, 2021, the president and members of the examination commissions for SHCE participants of all levels of education in the field of health management were appointed.

The public advertisement for the new cycle of education was published on 21 January 2021 in the daily newspapers "Avaz" Sarajevo and "Večernji list" Mostar, and on the websites of the education organizers: the Institute for Public Health of the Federation of BiH, the Faculty of Economics of the University of Sarajevo and the Faculty of Medicine of the University in Mostar, and on the basis of the previously obtained consent of the Federal Minister of Health from 18 January 2021.

Due to the uncertain epidemiological situation in the country and the region, the organizers of the education decided to organize this cycle of education online.

Classes began simultaneously for all three levels of education, on 5 March 2021, with timetables adapted to the professional obligations of the candidates. The lectures have been completed with the last lecture at the advanced level of SHCE 3, on 19 June 2021.

According to the established curricula, the lectures were held in 19 compulsory and 3 elective subjects, with the engagement of 42 lecturers.

A total of 99 candidates enrolled in the programme of education, namely: 38 candidates of basic level, 30 candidates of intermediate level, and 31 candidates of advanced level of education. The final exams were also held online, namely: on 19 June, 3 July and 10 July 2021. All candidates who took the exam successfully completed the knowledge test, i.e., passed the final exam.

Partly due to the still uncertain epidemiological situation, and partly due to the expressed requests of a large number of candidates who intended to enrol in the CPE programme or continue their education at a higher level, online education continued in the second semester as well.

Classes began simultaneously for all three levels of education, on 24 September 2021, with timetables adapted to the professional obligations of the candidates. The lectures have been completed with the last lecture at the advanced level of SHCE 3, on 4 December 2021.

A total of 96 candidates enrolled in the programme of education, namely: 28 candidates of basic level, 38 candidates of intermediate level, and 30 candidates of advanced level of education, and a total of 94 candidates took the exam and successfully completed the knowledge test.

In 2019, 57 candidates enrolled in the basic level of education, 69 in the intermediate level, and 78 in the advanced level. A total of 204 candidates enrolled in all three levels in 2019.

In 2020, 69 candidates enrolled in the basic level, 63 in the intermediate level, and 60 in the advanced level. A total of 182 candidates enrolled in 2020, and 195 candidates in 2021.

6. CONCLUSIONS

The analysis of data relevant to the assessment of the health status of the population was done comparatively, for 2019, 2020 and 2021, for most of the indicators. Some indicators are presented for 2020 (data from CAN-REG), as well as data from areas where there was no research due to the hygienic-epidemiological situation caused by the COVID-19 pandemic.

Demographic and socioeconomic indicators

- According to estimates, the total population in 2021 was 2,168,602. The negative difference in the total number of the population is 16,078, which is an extremely large decrease compared to previous years. This contraction of the population is accompanied by a deterioration of its age structure, an increase in mortality, a fall in the birth rate, and therefore a significant decline in the natural increase, but also a large number of deaths due to the COVID pandemic.
- It is evident that we have gone deep into the process of aging of the population by observing the values of the aging index, which in the last two years have been significantly higher than the threshold value of 40. The share of the population over 65 has increased to 16.7% and is higher than the share of children and youth up to 15 years of age, which fell to 14.2%. Therefore, it is clear that the aging of the population has an impact on all aspects of human life and brings with it multiple negative effects, mostly socioeconomic. The increase in the share of elderly people is mainly due to the increase in life expectancy. The average age in 2021 for men was 71.2, while it was slightly higher, 75.8 for women.
- An extremely unfavourable natural increase is continuously present due to the worrying fact that the number of live births is decreasing year after year, while the number of deaths is increasing. As the population ages, the share of the younger population also decreases, which further affects fertility and birth rates. The birth rate in 2021 was 7.6, and the mortality rate was 13.4.
- The latest data from the FBiH Institute for Statistics show that a total of 21,434 inhabitants took part in migrations during 2021. Of course, it is assumed that the actual number of people who left BiH in the mentioned period is not known, considering that most people do not deregister their residence in BiH.
- Over the past few years, there has been a noticeable trend of increased emigration abroad, mostly to Croatia (25.3%), Germany (25.1%), Austria (22.96%) and Slovenia (17%). It is interesting to point out that slightly more women (53.7%) left the Federation of BiH than men (46.3%). If we look at the Figure 3, we see that it is mostly the working-age population that left the country, predominantly in the age group from 25 to 39.
- According to data from the FBiH Employment Institute for 2021, positive trends were recorded on the labour market. The number of employed persons increased by 2.2% compared to the previous year, while at the same time the number of unemployed persons decreased by 7.8%.
- The net monthly salary was slightly higher compared to the previous year and amounted to BAM 996. The lowest amount was in the Central Bosnian Canton (BAM 799), while the highest amount was in the Sarajevo Canton (BAM 1,251).

- According to the latest available data of the FBiH Institute for Statistics, the life expectancy at birth for the population of the Federation of BiH in 2020 was 75.75 years and decreased compared to 77.13 years in 2019. The greater decline in life expectancy for men was largely influenced by COVID-19, which has been proven to cause higher mortality in men than in women.

Causes of mortality and morbidity of the population of the Federation of BiH

- The highest mortality in the last five years in the Federation of Bosnia and Herzegovina was recorded in 2021 (29,086 people died). The COVID-19 pandemic certainly had a significant impact on the increase in mortality.
- In 2021, the general mortality rate per 100,000 population in the Federation of BiH was 1,341/100,000 and recorded a significant increase compared to 2020, when this value was 1,202/100,000.
- General mortality is a reflection of the aging process of the population and old-age specific pathology.
- In 2021, the leading group of diseases as the cause of death of the population of the Federation of Bosnia and Herzegovina are Diseases of the circulatory system (I00-I99) with an SDR rate of 336.7, while the second is COVID-19 virus confirmed with an SDR of 185.6 and a general rate of 273.4/100,000 population. The SDR for males is 239.1 and the SDR for females is 144.7.
- From the compared data for 2020 and 2021, it can be concluded that the population of the Federation of Bosnia and Herzegovina is aging and that the number of leading diseases that were the cause of death is increasing accordingly. Non-observance of healthy lifestyles, insufficient physical activity, smoking, inadequate nutrition, etc., are factors that contribute to the fact that the listed groups of diseases are the most common causes of death of the population of the Federation of BiH.
- Standardized death rate (SDR) for cardiovascular diseases in 2021 was 336.7 and slightly decreased compared to 348 in 2020. Malignant neoplasms follow with an SDR of 152.4 in 2021, and they are in a slight decline compared to 159.2 in 2020.
- The third are chronic respiratory diseases with an SDR of 45.2 in 2021, which is also a slight fall compared to SDR of 47.3 in 2020. The fourth value of the SDR is 39.9 and refers to diabetes mellitus for 2021, which is almost identical to the previous year 2020.
- The leading disease causing death of the population of the Federation of Bosnia and Herzegovina in 2021 was COVID-19 (U07.1 virus confirmed) with a rate of 271.8/100,000 population, and as a cause of death it appears for the first time in 2020 with a mortality rate of 122/100,000 population.
- The leading cause of death for women in 2021 was COVID-19 (U07.1 virus confirmed) with a rate of 238.4 per 100,000 women - for the first time it was registered among the five leading causes of death for women in 2020, when the rate was 87.2 per 100,000 women.
- The leading cause of death for men in 2021 was COVID-19 (U07.1 virus confirmed) with a rate of 306.5 per 100,000 men, which is a significantly higher death rate in relation to 158 per 100,000 men in 2020.
- Cardiovascular diseases are the leading cause of death of the population of the Federation of BiH with a mortality rate of 522/100,000 population.

- As in previous years, in 2021, in this group of diseases, the leading cause of death in men was acute myocardial infarction, and in women, stroke.
- Malignant neoplasms (C00-C94) are the second leading cause of death by disease groups, with 4,577 deaths and a rate of 211.1/100,000 population.
- Malignant neoplasms of the bronchus and lung (C34) are the leading malignant diseases that cause death in the population of the Federation of BiH, with a mortality rate of 47.2/100,000 population. Men die significantly more than women with a mortality ratio of 3:1, although a slight increase in the mortality of women from malignant lung neoplasms has been registered over the years.
- Among the causes of death from malignant neoplasms in men in 2021, the leading one was malignant neoplasm of bronchus and lung (C34), with a share of 29.2 %, turning slightly downwards compared to 2020. It is followed by malignant neoplasm of prostate (C61), with a share of 8.8%, showing the same values as in 2020.
- The most common malignant neoplasm that caused the death of women in the Federation of Bosnia and Herzegovina in 2021 is malignant neoplasm of breast (C50), with a share of 17.4% in the total mortality of women in the Federation of BiH, slightly lower compared to 2020, when the share of this malignant neoplasm in the total mortality of women from malignant neoplasms was 18.4 %.
- The death rate from injuries, poisonings and other consequences of external causes of death per 100,000 population in the Federation of BiH in 2021 was 21.4/100,000 and recorded a slightly higher value than in 2020, when it was 20.3/100,000.
- There is an increase in the share of injuries, poisonings and other consequences of external causes of death in 2021 in the age group 20-64 years, namely 61.7% compared to 2020, when this percentage was 57.1%.
- In 2021, the leading cause of infant mortality in the Federation of Bosnia and Herzegovina were certain conditions originating in the perinatal period (P00-P96), with a share of 70.7%, which is slightly higher compared to 2020, when this share was 65.5%. They are followed by congenital malformations, deformities, and chromosomal abnormalities (Q00-Q99), with the share of 12.1%, which is slightly less compared to 14.3% in 2020.
- In 2021, the leading cause of death in children up to 5 years of age in the Federation of BiH were certain conditions originating in the perinatal period (P00-P96), with a share of 61.9%, which is an increase compared to the structure index of 54.5% in 2020.
- In 2021, 139,794 diseases and conditions of children up to 4 years of age were recorded, which is significantly more than in 2020 (91,829), or slightly less than in 2019 (140,174).
- The leading diseases in 2021 were: acute upper respiratory tract infections; acute bronchitis, bronchiolitis; otitis media and other diseases of the middle ear and mastoid; diseases of the eye and adnexa; other diseases of intestines and peritoneum; other diseases of skin and subcutaneous tissue. Boys and girls were equally affected: the incidence rates were very similar.
- According to the data of the Health Care Service for School Children and Youth for the period 2019–2021, the largest total number of systematic health check ups of preschool children (from systematic health check ups of infants in the counselling centre to systematic health check ups of children when enrolling in school) was in 2019 (110,952), then in 2021 (109,620), and the lowest in 2020 (79,475). The highest total number of control health examinations, after systematic check ups, was in 2019 (33,243), then in 2021 (29,412), and the lowest in 2020 (22,625).

- The total number of diseases and conditions (without injuries) in the age group 5–19 years in 2021 is 215,406, which is less compared to 2019 (254,758), i.e. more compared to 2020 (203,727). According to the frequency of occurrence, acute upper respiratory tract infections are dominant; they are followed by acute bronchitis, bronchiolitis; COVID-19; otitis media and other diseases of the middle ear and mastoid; diseases of the eye and adnexa. Boys and girls were equally affected: the incidence rates were similar.
- In 2021, there were 1,621,637 diseases and conditions (without injuries) registered in this age group.
- The leading diseases in this age group are similar to previous years, with the exception of COVID-19, namely: acute upper respiratory tract infections, slightly more common in men than in women; then hypertensive diseases, more common in women than in men; then COVID-19, with slightly more frequent occurrence in women than in men; followed by non-insulin-dependent diabetes, which was more frequent among women; and fifth in terms of disease frequency in both women and men are dorsopathies, with fairly equal frequency of occurrence in both males and females.
- As for the leading diseases and conditions registered in the Service for Women's Reproductive Health Care in the Federation of BiH, women in the age group 15-49 most often suffered from candidiasis B37 (108/10,000), while women over 50 years of age most often suffering from inflammatory disease of cervix uteri N72 (35/10,000).
- The importance of the role of mental health in achieving the global development goals is increasing, which is illustrated by the inclusion of mental health-related objectives in the sustainable development goals. Depression is one of the leading causes of disability, while suicide is the second leading cause of death among the younger population aged 15 to 29. People with severe mental disorders die prematurely – as much as two decades earlier – due to preventable physical conditions/problems.
- Many mental health problems can be effectively treated at relatively low cost, but the gap between people who need care and those who have access to care remains wide. Effective treatment coverage remains extremely low.
- COVID-19 has disproportionately affected people in already vulnerable situations, including people with psychosocial challenges. The right to health and access to health care is a basic human right; nevertheless, COVID–19 has exposed the existing inequalities.
- People with psychosocial disabilities usually have difficult access to appropriate support and care services, which has been further exacerbated by the pandemic. Lack of trust within communities towards mental health care services can be attributed to wider issues of access to care, including poor patient experiences, social stigma around mental health, financial factors, language barriers and concerns about being subjected to coercive treatment. This makes marginalized groups less likely to seek help. Delays in interventions can also prompt increased incidence of preventable yet serious mental and wider health outcomes.
- The leading mental disorders in 2021 are other anxiety disorders, the second is schizophrenia, followed by reactions to severe stress and adjustment disorders, then moderate depressive episodes, and the fifth one is post-traumatic stress disorder. There is a noticeable higher incidence of other anxiety disorders in women.
- COVID–19 and other infectious diseases in 2021
- Public health surveillance and response to COVID-19 is the result of close cooperation between the IPH of the Federation of BiH, cantonal public health institutes and health care institutions, which was crucial in the fight against the spread and impact of COVID-19. In

the past year, the third wave of the COVID-19 epidemic in the Federation of BiH reached its peak in the last week of March 2021, when the alpha variant of SARS-CoV-2 was dominant, while the fourth wave began in September/October 2021 and lasted until the end of 2021, and then the delta variant was dominant. Vaccination against COVID-19 was carried out throughout 2021. More than 500,000 residents of the Federation of BiH were vaccinated with the primary series. Thanks to this result, during the fourth wave, there was less pressure on the health system and the number of deaths decreased by 40%, although the delta variant was more infectious and caused a more serious clinical picture.

- When it comes to the mandatory immunization programme, we can once again state that the presented data speak of a worryingly low coverage, which is a consequence of the secondary effects of the pandemic, and which threatens with the re-emergence of epidemics of vaccine-preventable diseases.
- Although after two years of the pandemic and a significant number of people vaccinated against COVID-19, an extended period of continuously controlled impact of COVID-19 on the population can be expected in the coming period as well, emphasis should be placed on strengthening surveillance, health care systems and preparedness for the pandemic.
- In 2021, a total of 129,410 cases of infectious diseases were reported to the Institute for Public Health of the Federation of Bosnia and Herzegovina (I 5,923.5/100,000), in contrast to 2020, when 99,857 cases were reported (I 4,516.3/100,000). A significantly higher total incidence of infectious diseases was recorded in 2020 and 2021, during the COVID-19 pandemic.

Diet and physical activity

- Overweight, obesity, poor eating habits and low level of physical activity recorded in all population groups are at an additional risk of worsening due to the corona virus pandemic and an unhealthy food and infrastructure environment.
- Universal salt iodization is carried out in the territory of the Federation of BiH, but the iodine status of the population is not monitored, nor is the presence of anaemia due to iron deficiency.

Food safety

- In 2021, there were no recorded outbreaks of foodborne infectious diseases.
- It is necessary to continue, in cooperation with the competent inspection bodies, to continuously improve the system of monitoring food and items of general use from domestic production and from imports, from the aspect of health safety and quality, all with the aim of protecting and improving people's health.

Lifestyle/behaviour

Smoking and population health in the Federation of BiH

- Consumption of tobacco and tobacco products, as well as exposure to tobacco smoke or the so-called passive smoking, significantly contribute to morbidity, disability and premature death in all age groups, which is why, according to the ICD, smoking is classified as a disease under code F17.2 as "tobacco addiction syndrome". Numerous consequences of the use of tobacco products have been scientifically proven, which

can be seen through the effects on the health of the individual, the population and the community as a whole.

- During 2016 and 2017, the Federal Ministry of Health initiated the drafting of the Law on the Control and Limited Use of Tobacco, Tobacco Products and Other Smoking Products in the Federation of BiH. The document was prepared in line with the WHO Framework Convention on Tobacco Control and EU Directive 2014/40. In the form of a Draft, the Law went through a cycle of public debates in the cantons of the Federation of BiH, after which it was finalized in the form of a Proposal of the Law.
- After the adoption of the Proposal of the Law on Control and Limited Use of Tobacco, Tobacco Products and Other Smoking Products in the Federation of BiH in the House of Representatives of the Parliament of the Federation of BiH in May 2021, the document was submitted for further procedure to the House of Peoples of the Parliament of the Federation of BiH. The Proposal of the Law on Control and Limited Use of Tobacco, Tobacco Products and Other Smoking Products in the Federation of BiH was adopted in the House of Peoples of the Parliament of the Federation of BiH in March 2022 with amendments, after which it was again submitted to the House of Representatives for harmonization. The law envisages the formation of a Federation commission for tobacco control that will be appointed by the Government of the Federation of BiH and composed of intersectoral representatives, thereby creating the conditions for more effective tobacco control interventions in the Federation of BiH in the future.

Alcohol, drugs and psychotropic substances

- According to the data of outpatient and polyclinic services, in the group of mental and behavioural disorders due to use of alcohol (F10), there is a decreasing trend from 2,431 patients and a rate of 11/10,000 in 2019 to 1,905 patients and a rate of 9/10,000 in 2021.
- There is also an increasing trend of alcoholic liver disease (K70) from 370 patients and a rate of 2/10,000 in 2019 to 411 patients and a rate of 2/10,000 in 2021.
- According to data from the register of treated psychoactive substance addicts in the Federation of BiH, published in the Analysis of reports of treated psychoactive substance addicts in the Federation of BiH for 2019-2020 from the Institute for Public Health of the Federation of BiH, 685 treated addicts have been registered so far with an addiction rate of 31.3/100,000 population.
- The largest number of heroin addicts, 265 (50%) is in the age group 30-39. Up to 19 years of age, one (1) heroin addict was registered, while over 50 years of age, 27 (5.1%) heroin addicts were registered.

Health care organization

- In the territory of the Federation of BiH, 27,761 there were employees in the public health care sector during 2021, which is more than in 2020 (27,517).
- According to the health statistics, there were 580 employees working in the institutes for public health, of which 365 (63%) were health professionals. Of the 79 medical doctors employed in institutes for public health, 60 of them (76%) are specialists in public health care disciplines. The largest part of specialist personnel is employed in the Institute for Public Health of the Federation of BiH, the Institute for Public Health of Sarajevo Canton and the Institute for Health and Food Safety of Zenica-Doboje Canton.

- In 2021, the public health care sector in the Federation of BiH employed 73.6% of health workers, 1.5% of health associates and 24.9% of administrative and technical staff.
- In 2021, the public health care sector in the Federation of BiH employed 243 medical doctors, 27 doctors of dentistry, 20 masters of pharmacy and 651 nurses/technicians, per 100,000 population.
- In 2021, almost two thirds of all medical doctors in the public health care sector in the Federation of BiH were specialists in various disciplines (63.7%). The highest percentage was in Sarajevo Canton (71.8 %), and the lowest in Bosnian Podrinje Canton (49.0%).
- In 2021, the share of employees with a degree in health studies was 5.4%, while in 2020, this share was 4.8%.
- According to the data of regular health statistics for 2021, in the PHC services in the Federation of BiH (family medicine, health care of preschool and school age children, emergency medical care, women's reproductive health care, community mental health centers, polyvalent community nurses , occupational medicine) there were 1,819 medical doctors (34.4% of the total number) and 3,402 nurses/technicians (26.9%) employed, i.e. 87 medical doctors and 157 nurses/technicians per 100,000 population. In 2020, 1,891 medical doctors and 3,289 nurses/technicians were employed at the PHC level.
- In 2021, there were an average of 1,192 inhabitants per one medical doctor PHC, with the highest number of inhabitants per one medical doctor in the Una-Sana Canton (2,097), and the smallest in the Bosnian Podrinje Canton (574).
- Contrary to visits to the medical doctors, in 2021 slightly fewer preventive examinations were registered in family medicine services than in 2020. Thus, 99,280 systematic health check ups of the adult population were registered (121,759 in 2020), 1,028,361 consultations by medical doctors (832,237 in 2020), 1,074,188 consultations by nurses/technicians (936,461 in 2020), other preventive services of medical doctors (335,658), which is more than in 2020 (173,718), and 472,864 other preventive services of nurses/technicians (377,478 in 2020).
- In 2021, 42,255 home visits by medical doctors were registered (29,780 in 2020), so the share of home visits in relation to the number of first visits to doctors' offices (1,353,770) was 3.1%.
- The share of patients referred to the laboratory in relation to the first visits was 72%, and the share of patients referred to specialists in relation to the first visits was 119%, which means that the patient was referred to several doctors of different specialties at the first visit.
- Mental health care services in the Federation of BiH in 2021 were provided in 65 geographical locations/outpatient clinics of mental health care centres.
- According to the regular health statistics report in 2021, there were 61 medical doctors employed, of which 37 neuropsychiatry specialists and 21 psychiatry specialists, and 147 nurses/technicians, 19 occupational therapists, 76 psychologists and 45 social workers.
- During 2021, there were 115,561 visits to the doctor, slightly more than in 2020 (105,675), and 251,751 visits to other team members, which is more than in 2020 (208,602). There were 481 registered doctors' home visits (445 in 2020) and 3,073 home visits by other team members, and 704 patients were referred for hospitalization (585 in 2020). Despite

the COVID-19 pandemic, group therapy (2,599) and community-based prevention and promotional programmes were carried out.

- What particularly marked health care in the Federation of Bosnia and Herzegovina during 2021 was the restructuring of organizational units, due to the pandemic of the COVID-19 infection. A large number of COVID-19 hospitals, clinics and points were opened, which required staff, and that staff was redirected from all medical branches. During the biggest blow to the healthcare system, in the midst of the pandemic, many healthcare workers fell ill, and a significant number of them lost the battle for their lives, pursuing their honourable vocation.

Environment

- Environmental risk factors (contaminated water and food, polluted air, noise, hazardous chemicals, waste materials, etc.) are among the leading public health problems that require constant monitoring. Children, pregnant women, the chronically ill and the elderly are particularly at risk.
- In the Federation of BiH, 60% of the population is covered by public water supply systems in which the water quality is continuously monitored for health safety. In urban areas, the coverage is 94%, and in rural areas, 20%.
- Since there is no single register of local water supply systems in the territory of the Federation of BiH, a full insight into the water supply system, and thus the adoption of measures aimed at its improvement, is impossible.
- The waters of public swimming areas (swimming pools) are mostly under the regular supervision of the Institute for Public Health, especially during the summer season.
- Compared to the previous two years, the results of measuring the concentrations of air pollutants in 2021 showed a decrease in the concentrations of suspended particulate matter PM10 and PM2.5 at almost all automatic measuring stations.
- In 2021, sulphur dioxide concentrations were also slightly lower compared to 2019 and 2020, but not as marked as the case with PM particles.
- The incidence rate of chronic obstructive pulmonary diseases in the territory of the Federation of BiH in the last three years has shown a gradual decline - in 2019 (158/10,000 population), 2020 (141/10,000 population) and 2021 (139/10,000 population).
- There is no indoor air quality monitoring, nor domestic legislation in this area.
- According to the results of research and studies conducted in recent years in the territory of the Federation of BiH, 47% of the population is connected to the public sewerage system.
- On the territory of the Federation of BiH, there are about 2,000 locations of uncontrolled (wild) landfills on an area of 974,221 m², except in Canton Sarajevo and Canton 10, where such landfills have not been observed in all municipalities.
- The results of the survey conducted by the Institute for Public Health of the Federation of BiH during 2021 and 2022 in health institutions of all three levels of health care in the territory of the Federation of BiH showed that 80.3% of these institutions have an Internal Medical Waste Management Plan. According to these plans, the majority of health care institutions do not dispose of infectious and potentially infectious waste together with municipal waste, while the issue of pathological, chemical and pharmaceutical waste is resolved through contracts with authorized companies.

- Landfills that partially meet the requirements for sanitary landfills are located in Sarajevo (“Smiljevići”), Zenica (“Mošćanica”) and Tuzla.
- Wastewater treatment plants are located in Sarajevo, Gradačac, Srebrenik, Žepče, Trnovo, Odžak, Živinice, Grude, Čitluk, Ljubuški and Bihać.
- Due to microbiological and chemical contamination, the largest number of surface water samples, especially those taken downstream from the settlements, do not comply with regulations, which is why the use of most watercourses for recreational purposes is not recommended.
- According to the latest available data from the Mine Action Centre in BiH, in the period from 2016 to 2021, a total of 24 people were injured by mines and explosive devices in the territory of the Federation of BiH, of which 11 cases were fatal (adults).
- For the introduction of complete monitoring of environmental risk factors (polluted water, food, air, land) in the territory of the Federation of BiH, the existing modern equipment and personnel in the cantonal public health institutes are insufficient.

7. RECOMMENDATIONS

The first recommendation arising from the analysis of the health status of the population of the Federation of Bosnia and Herzegovina for 2021 would be to find funds as soon as possible to conduct research related to risk factors, which was last conducted in 2012. After so much time has passed, the data obtained then are not adequate for comparison.

In order to improve the scope, process and quality of data collection provided by health institutions in the Federation of BiH, the coordination role of the Institute for Public Health of the Federation of BiH continues, with the aim of supporting health institutions to adapt to reporting using the single information system that has been introduced.

It is necessary to take all necessary measures to obtain data from private health care institutions as well (these institutions are obliged by law to submit their reports to the cantonal institutes for public health).

Population

As depopulation is a basic demographic feature in the territory of the Federation of BiH, the priority response is to adopt an intersectoral population policy in the Federation of BiH.

Morbidity and mortality

- Strengthen activities to reduce trends in the leading causes of morbidity and mortality in the Federation of BiH through public health interventions aimed at educating and informing citizens and community support.
- Strengthen and harmonize cooperation with cantonal institutes for public health and initiate cross-sectoral promotional interventions at the local community level, related to leading risk factors (smoking, alcohol, unhealthy diet, physical inactivity, mental health and oral health).
- Strengthen capacities at all levels of surveillance (epidemiological, laboratory, clinical), especially the establishment and strengthening of early alert and response capacities. Align the Law on the Protection of the Population against Infectious Diseases with EU standards, as well as implement the ECDC's recommendations for surveillance. It is necessary to educate health workers in the field of surveillance at all levels of health care (primary, secondary and tertiary).
- Continuous improvement of data quality and harmonization of activities with the Ministry of Civil Affairs of BiH (MoCA) and the Institute of Public Health of Republika Srpska in order to create conditions for reporting key infectious diseases in a single European database - The European Surveillance System (TESSy).
- Strengthen cooperation on preventive activities related to the pandemic, with all cantonal institutes and institutions involved in the control and surveillance of the pandemic, in line with WHO recommendations.
- Improve control of zoonoses through strengthening cooperation between the human and veterinary sectors in the "One Health" approach of international cooperation in the control of zoonoses.

Diet and physical activity

Legislation

- Improve legislation related to nutrition, food safety and physical activity, especially in the area of food reformulation, marketing of unhealthy food targeting children, and legislation related to public procurement of food in public institutions.

Monitoring

- Insist on conducting regular population surveys related to lifestyles, targeted surveys related to micronutrient deficits, especially iodine deficit, and targeted food monitoring, along with continuous improvement of laboratory capacities and staff education.

Promotion and prevention

- Intensify the implementation of promotional and preventive activities to improve nutrition and physical activity in educational institutions, continue intersectoral cooperation related to the improvement of the nutritional environment and infrastructure for physical activity and ensure the continuation of the implementation of the “Baby Friendly Hospital” and “Nutrition Friendly Educational Institutions” accreditation schemes.

Environment and health

- For the implementation of complete monitoring of environmental risk factors in the Federation of BiH, further improvements of laboratory equipment and space are needed, as well as continuous training of staff employed in laboratories of relevant institutions.
- In cooperation with the relevant sectors, it is necessary to promote continuous monitoring of drinking water and food on the parameters of safety (chemical safety for toxic metals, organochlorine and organophosphorus pesticides, polychlorinated biphenols, mycotoxins, additives, and microbiological and radiological safety), as well as the detection of pollutants in the air and soil, which is necessary for complete monitoring of environmental risk factors and assessment of their impact on population health.
- Continuous targeted population surveys are necessary in order to collect accurate data on the harmful effects of certain environmental risk factors on human health (polluted air, contaminated drinking water, polluted surface water and soil, the impact of climatic factors, hazardous chemicals, noise, mines, etc.).
- Continuously carry out educational and promotional activities related to health and the environment - lectures, designing brochures, posters, leaflets, etc., with the aim of reducing the impact of harmful environmental factors on the health of the population (e.g., protection against diseases transmitted by contaminated water, food and vectors, protection against air pollutants of inorganic and organic origin - plant pollen, protection against chemicals and other harmful substances, protection against the effects of climate change - extreme heat and cold, etc.).
- Conduct continuous training of staff (medical and non-medical) in health care institutions on the principles of proper medical waste management - through lectures or training courses.
- Improve programmes related to the procurement of modern equipment that works on the principle of sterilization and shredding of medical waste in the Federation of BiH.

- In order to improve the health of the population, strengthen the cooperation of the health sector with all institutions and sectors whose activities contribute to the protection of health from environmental risk factors – environment, education, agriculture, water management, construction, energy, etc.).

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