

5. SELECTED ISSUES OF DISEASES OF THE CIRCULATORY SYSTEM IN POLAND

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In the previous Report,¹ we presented the impact of the first year of the COVID-19 pandemic on the functioning of healthcare services related to diseases of the circulatory system, as well as changes in mortality and morbidity trends associated with these conditions. The care provided to patients with diseases of the circulatory system deteriorated, with a decrease in the number of hospitalisations, outpatient consultations, and procedures in interventional cardiology, electrophysiology, and cardiac surgery.

Following the pandemic, in 2022 and 2023, there was a gradual rebuilding of cardiological care and an attempt to catch up on the backlog that had accumulated during the pandemic, referred to as the “repayment of the health debt”. The number of cardiology services increased in an effort to meet the growing needs of patients. Despite these positive trends, the number of services provided in certain areas still has not reached pre-pandemic levels. The healthcare system now faces new challenges related to the long-term effects of COVID-19 and the necessity of adapting care models.

¹ Feusette P, Gierlotka M, Gąsior M, Rabczenko D, Stokwiszewski J, Wojtyniak B.: “Choroby kardiologiczne w okresie pandemii COVID-19 w Polsce” in: Wojtyniak B, Goryński P. Sytuacja zdrowotna ludności Polski i jej uwarunkowania 2022, NIPH NIH-NRI, Warsaw 2022

Mortality due to diseases of the circulatory system during the post-COVID-19 pandemic period

Diseases of the circulatory system (DCS) have been the primary health concern and the leading cause of death in Poland and the vast majority of EU countries since the second half of the 20th century. According to analyses conducted as part of the Global Burden of Disease 2021 project, DCS were responsible for 22% of all disability-adjusted life years (DALYs) and 33% of years of life lost due to premature death in 2019.² Until 2019, the mortality rate from DCS, as measured by the standardised death rate, had been declining (see Chapter 3), but the years of the COVID-19 pandemic disrupted this trend. The time series analysis of death rates and the estimation of deviations in DCS mortality for 2022 and 2023, compared to the expected level based on the previous trend, were carried out using the methodology described in Chapter 3.

Table 5.1. Observed standardised death rates (obs. value) and estimated expected rates (exp. value) with relative difference (%) by voivodship in 2022–2023 (own calculations)

Voivodship	2022			2023		
	Obs. value	Exp. value	%	Obs. value	Exp. value	%
Dolnośląskie	605.9	389.9	56.4	543.9	388.0	41.2
Kujawsko-Pomorskie	436.5	430.6	1.7	400.8	429.1	-6.6
Lubelskie	558.5	501.8	11.5	529.5	501.4	5.6
Lubuskie	568.7	388.8	47.9	489.9	388.6	26.7
Łódzkie	417.6	455.5	-8.1	380.3	454.1	-15.9
Małopolskie	501.1	512.2	-2.0	453.8	512.0	-11.4
Mazowieckie	363.1	309.2	19.3	355.4	299.3	19.6
Opolskie	461.0	473.3	-1.9	454.3	472.0	-3.2
Podkarpackie	528.4	450.1	17.9	494.3	449.8	10.5
Podlaskie	557.1	485.7	14.7	460.9	484.5	-4.8
Pomorskie	487.0	503.9	-3.5	411.3	503.9	-18.4
Śląskie	512.9	500.5	3.1	451.3	500.7	-9.6
Świętokrzyskie	514.9	559.8	-7.4	493.6	559.3	-11.8
Warmińsko-Mazurskie	429.2	420.4	2.8	422.6	419.2	0.5
Wielkopolskie	389.7	445.4	-12.3	361.8	444.2	-18.5
Zachodniopomorskie	510.9	558.7	-8.3	434.5	557.7	-22.2
Poland	477.5	447.8	7.1	436.1	446.8	-2.3

² Institute for Health Metrics and Evaluation, GBD Result Tool, <http://ghdx.healthdata.org/gbd-results-tool>, accessed on 10 October 2022

Table 5.1 presents the observed values of the standardised death rate (obs. value), as well as estimates of the expected values (exp. value) and the percentage of excess (or reduction) in DCS death rates in Poland and individual voivodships in 2022 and 2023. While the overall mortality rate in Poland and that of nine voivodships in 2022 were still higher than expected based on the pre-pandemic trend of mortality rates, in 2023, both the nationwide mortality rate and that of ten voivodships were already lower than expected. It is worth noting the persistently high excess mortality in Dolnośląskie and Lubuskie voivodships and, to a somewhat lesser extent, also in Mazowieckie voivodship.

In 2023, mortality was lower than expected in the majority of months, whereas in 2022, this favourable situation occurred only in February and March (Fig. 5.1).

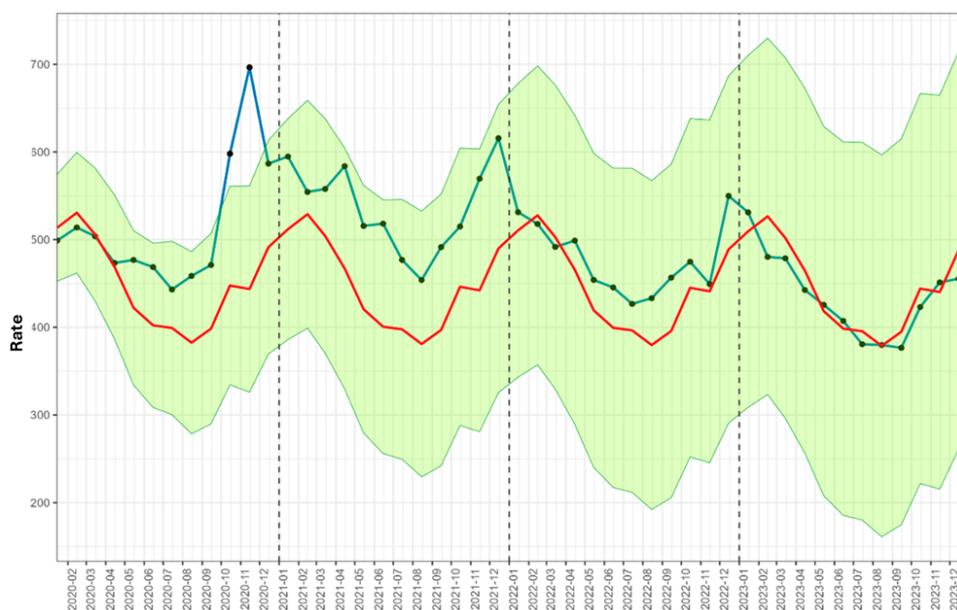


Fig. 5.1. Monthly death rates from diseases of the circulatory system overall (blue line) in 2020–2023 and their expected values (red line) with 95% confidence interval (green area), estimated based on previous 10-year trends (own calculations)

The deviations of the observed death rates from DCS compared to their expected values were relatively similar between men (4.7% in 2022 and -4.2% in 2023) and women (8.5% and -1.1%, respectively). Significant differences are observed in excess mortality depending on the specific DCS subgroup (Table 5.2).

Table 5.2. Observed standardised death rates (obs. value) from selected subgroups of diseases of the circulatory system and estimated expected rates (exp. value) with relative difference (%) for men and women in 2022–2023 (own calculations)

Cause of death	2022			2023		
	Obs. value	Exp. value	%	Obs. value	Exp. value	%
Total						
DCS (I00–I99)	477.5	447.8	7.1	436.1	446.8	-2.3
Hypertensive diseases (I10–I15)	38.1	24.8	53.4	35.7	24.8	43.7
Heart disease (I00–I09, I11, I13, I20–I51)	323.4	261.7	24.2	291.5	261.7	11.7
Ischaemic heart diseases (I20–I25)	189.5	127.7	48.6	178.8	127.4	40.6
Myocardial infarction (I21–I22)	33.2	37.9	-12.0	31.2	37.9	-17.4
Pulmonary embolism (I26)	6.2	5.3	18.3	6.0	5.3	13.1
Cerebrovascular diseases (I60–I69)	94.4	84.9	11.5	87.6	84.9	3.2
Atherosclerosis (I70)	43.0	78.0	-44.6	41.1	77.7	-47.3
Men						
DCS (I00–I99)	584.1	559.8	4.7	534.7	558.8	-4.2
Hypertensive diseases (I10–I15)	42.4	27.6	53.5	38.8	27.6	40.1
Heart disease (I00–I09, I11, I13, I20–I51)	406.0	351.0	16.1	364.3	351.0	4.0
Ischaemic heart diseases (I20–I25)	242.8	176.3	38.0	226.9	175.8	29.3
Myocardial infarction (I21–I22)	50.0	53.0	-5.2	45.7	52.8	-13.1
Pulmonary embolism (I26)	7.4	6.1	21.5	6.9	6.1	14.1
Cerebrovascular diseases (I60–I69)	109.5	98.5	11.4	103.2	98.0	5.3
Atherosclerosis (I70)	46.6	81.9	-42.9	46.4	81.7	-43.2
Women						
DCS (I00–I99)	397.2	368.0	8.5	362.8	367.6	-1.1
Hypertensive diseases (I10–I15)	33.8	23.4	44.5	32.2	23.5	37.0
Heart disease (I00–I09, I11, I13, I20–I51)	262.7	200.1	32.3	238.6	200.1	19.8
Ischaemic heart diseases (I20–I25)	151.4	93.6	62.2	144.7	93.5	55.3
Myocardial infarction (I21–I22)	21.0	24.2	-12.9	20.6	24.1	-13.9
Pulmonary embolism (I26)	5.3	4.7	14.0	5.2	4.7	10.6
Cerebrovascular diseases (I60–I69)	81.7	71.5	14.7	75.0	71.1	5.4
Atherosclerosis (I70)	39.8	73.7	-45.6	37.0	73.3	-49.7

The highest relative excess mortality continues to be recorded for hypertensive diseases and ischaemic heart disease (IHD); however, the excess mortality from IHD does not result from myocardial infarction, for which the mortality rate was lower than expected in both 2022 and 2023 (Fig. 5.2). This may be a partial artefact associated with changes in the coding of causes of death, as indirectly indicated by the markedly less frequent attribution of deaths to atherosclerosis.

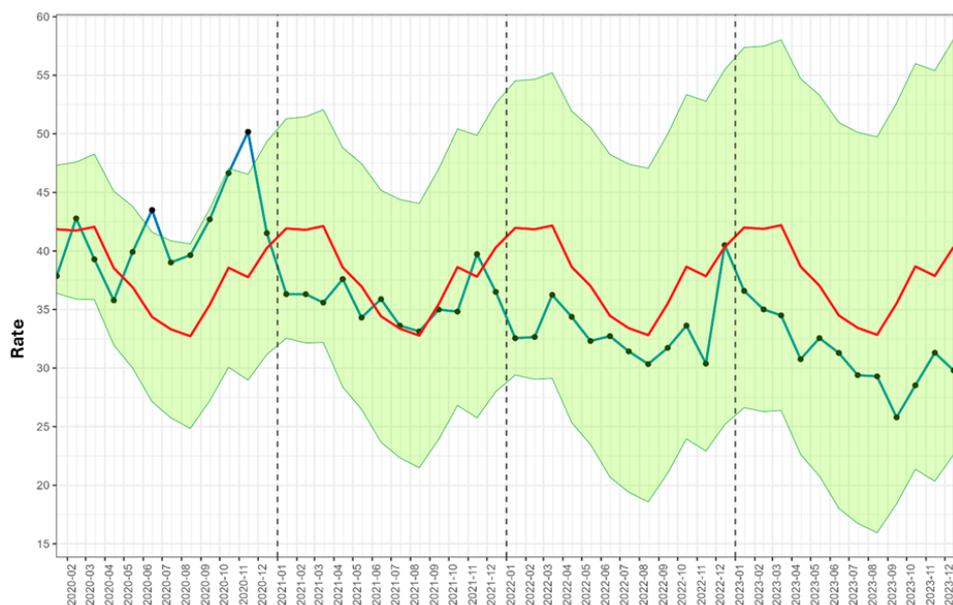


Fig. 5.2. Monthly death rates from myocardial infarction in Poland in 2020–2023 (blue line) and their expected values (red line) with 95% confidence interval (green area) for 2020–2023 (own calculations)

The deviations in observed death rates from DCS overall and in specific subgroups among urban and rural populations were relatively similar (Table 5.3).

Table 5.3. Observed standardised death rates (obs. value) from selected subgroups of diseases of the circulatory system and estimated expected rates (exp. value) with relative difference (%) for urban and rural residents in 2022–2023 (own calculations)

Cause of death	2022			2023		
	Obs. value	Exp. value	%	Obs. value	Exp. value	%
Urban areas						
DCS (I00–I99)	444.8	411.7	8.5	407.4	410.9	-0.6
Hypertensive diseases (I10–I15)	33.4	22.3	49.9	31.5	22.3	40.7
Heart disease (I00–I09, I11, I13, I20–I51)	299.6	239.7	25.8	270.8	239.7	13.4
Ischaemic heart diseases (I20–I25)	176.0	123.0	43.4	168.4	122.9	37.4
Myocardial infarction (I21–I22)	33.4	37.1	-9.6	31.4	37.0	-14.9
Pulmonary embolism (I26)	6.4	5.3	23.7	6.0	5.2	14.6
Cerebrovascular diseases (I60–I69)	89.7	78.9	14.1	84.1	78.5	7.1
Atherosclerosis (I70)	39.3	66.4	-40.4	37.2	65.7	-43.2
Rural areas						
DCS (I00–I99)	538.2	515.9	4.6	490.2	515.4	-4.9
Hypertensive diseases (I10–I15)	46.8	30.5	53.1	43.6	30.5	42.6
Heart disease (I00–I09, I11, I13, I20–I51)	367.5	302.0	22.1	330.9	301.9	9.7
Ischaemic heart diseases (I20–I25)	214.6	138.3	55.2	198.5	138.3	43.7
Myocardial infarction (I21–I22)	33.0	35.9	-7.6	31.0	35.7	-13.0
Pulmonary embolism (I26)	5.9	5.6	6.1	6.0	5.6	8.4
Cerebrovascular diseases (I60–I69)	103.1	92.1	12.2	94.1	91.6	2.7
Atherosclerosis (I70)	49.8	96.5	-48.2	48.3	96.4	-50.2

Hospitalisations due to diseases of the circulatory system during the post-COVID-19 pandemic period

The analysis of hospitalisations due to diseases of the circulatory system presented below pertains to the 2021–2023 period. However, time series of hospitalisation rates from 2010 to 2019 were used to estimate the expected values. These data come from the Nationwide General Hospital Morbidity Study conducted by the NIHP NIH – NRI on behalf of the Ministry of Health as part of the national official statistics research programme.

Figures 5.3a–5.3d show the observed and projected (expected) standardised hospitalisation rates due to diseases of the circulatory system among men and women, as well as urban and rural residents, for individual months in the years 2020–2023.

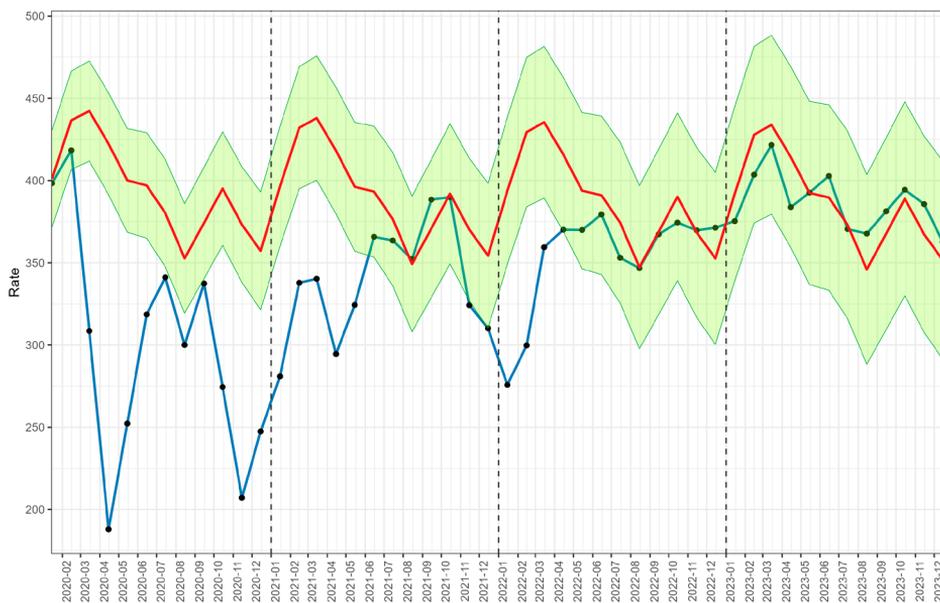


Fig. 5.3a. Monthly standardised hospitalisation rates of men (per 10,000 population) due to diseases of the circulatory system overall (blue line) in 2020–2023 and their expected values (red line) with 95% confidence interval (green area), estimated based on previous 10-year trends (own calculations)

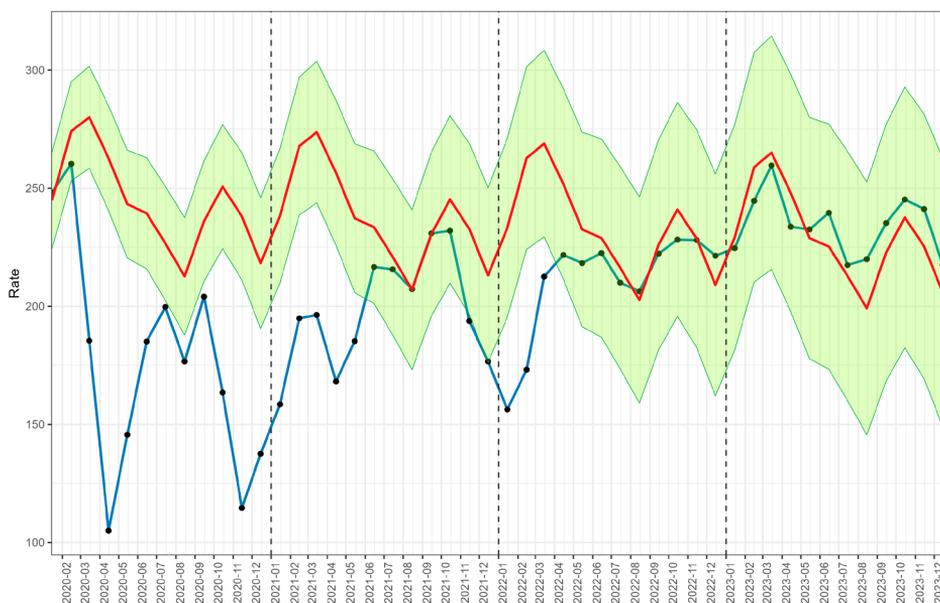


Fig. 5.3b. Monthly standardised hospitalisation rates of women (per 10,000 population) due to diseases of the circulatory system overall (blue line) in 2020–2023 and their expected values (red line) with 95% confidence interval (green area), estimated based on previous 10-year trends (own calculations)

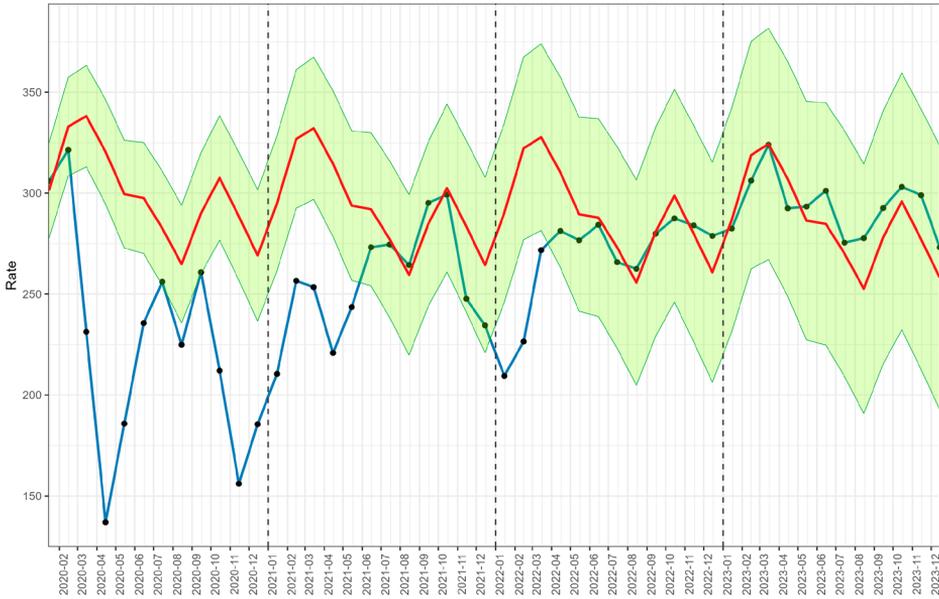


Fig. 5.3c. Monthly standardised hospitalisation rates of urban residents (per 10,000 population) due to diseases of the circulatory system overall (blue line) in 2020–2023 and their expected values (red line) with 95% confidence interval (green area), estimated based on previous 10-year trends (own calculations)

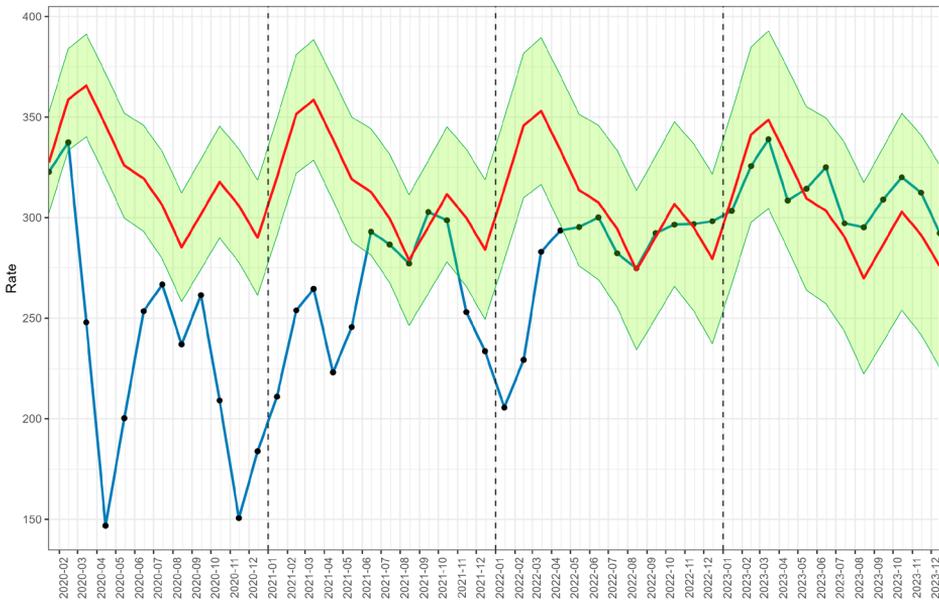


Fig. 5.3d. Monthly standardised hospitalisation rates of rural residents (per 10,000 population) due to diseases of the circulatory system overall (blue line) in 2020–2023 and their expected values (red line) with 95% confidence interval (green area), estimated based on previous 10-year trends (own calculations)

In all subpopulations analysed, the observed hospitalisation rates were lower than expected in every month of 2020 and in the majority of months during 2021–2022. In 2021–2022, the largest (and statistically significant) deviations occurred in the early months of each year. This points to a clear disruption of the seasonal pattern of hospitalisations due to diseases of the circulatory system during those years. Determining the causes and potential consequences of this phenomenon requires further dedicated analysis.

Cardiovascular diseases in the context of the Silesian Cardiovascular Database SILICARD

Below, we present summaries and analyses based on data reported to the National Health Fund from selected voivodships (Śląskie, Opolskie and Podlaskie), including the Silesian Cardiovascular Database SILICARD and the Opole Database of Civilisation Diseases. In particular, the Silesian Cardiovascular Database SILICARD, established on the initiative of Professor Mariusz Gąsior, comprises all medical events related to diseases of the circulatory system reported to the National Health Fund for patients in Śląskie voivodship since 2009. Similarly, the Opole Database of Civilisation Diseases, initiated by Professor Marek Gierlotka, collected comparable data for Opolskie voivodship, although it unfortunately does not include the post-pandemic period.

According to the data from the Silesian Cardiovascular Database – SILICARD, the number of hospitalisations due to cardiovascular diseases in Śląskie voivodship decreased by almost 34% between March and December 2019 and March and December 2020.³ This decline was most pronounced during months with the highest number of COVID-19 infections. After this marked drop in 2020 (approx. 83 thousand hospitalisations), compared to the preceding years (approx. 116 thousand in 2019), a modest increase was observed in 2021 (approx. 89 thousand), followed by a more dynamic recovery in 2022 (approx. 95 thousand) and 2023 (approx. 103 thousand), as shown in Figure 5.4. Nonetheless, the number of hospitalisations has not yet returned to pre-pandemic levels.

³ Feusette P, Gierlotka M, Gąsior M, Rabczenko D, Stokwiszewski J, Wojtyniak B.: “Choroby kardiologiczne w okresie pandemii COVID-19 w Polsce” in: Wojtyniak B, Goryński P. Sytuacja zdrowotna ludności Polski i jej uwarunkowania 2022, NIPH NIH-NRI, Warsaw 2022

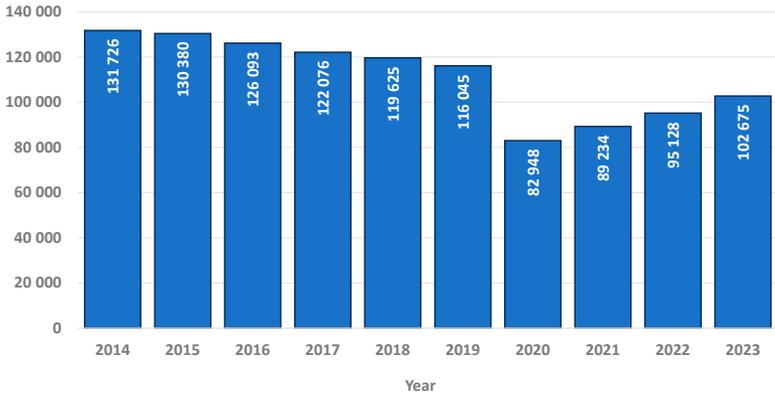


Fig. 5.4. Number of hospitalisations due to cardiovascular diseases in Śląskie voivodship in 2014–2023 (SILICARD data)

The SILICARD data also show a decline in the total number of outpatient visits (both in-person and remote) in 2020 (approx. 380 thousand) compared to 2019 (approx. 420 thousand). Between 2021 and 2022, the number of visits remained relatively stable at a slightly higher level (approx. 397–398 thousand) and increased to around 417 thousand in 2023, approaching pre-pandemic levels. In 2020, teleconsultations accounted for as much as 35% of all visits. In subsequent years, their share gradually declined (14% in 2021, 5% in 2022, and 4% in 2023), with in-person visits returning to normal, pre-pandemic levels. While the role of telemedicine diminished significantly after the peak of the pandemic, it nonetheless remains a permanent feature of the healthcare system (Figures 5.5, 5.6).



Fig. 5.5. Number of visits to cardiology outpatient clinics (including teleconsultations) in the Śląskie Voivodship in 2014–2023



Fig. 5.6. Distribution of types of consultations in cardiology outpatient clinics in Śląskie voivodship in 2018–2023 (SILICARD data)

Situation regarding selected diseases during and after the COVID-19 pandemic

Acute myocardial infarction in the emergency medicine system

According to data from the Silesian Cardiovascular Database, the number of patients and hospitalisations due to myocardial infarction in 2020 was 25% lower than in 2019 (Fig. 5.7). This reduction led to a 26% decline in the number of patients enrolled in the managed care for acute myocardial infarction survivors programme (KOS-zawał).⁴ Treatment outcomes for myocardial infarction in 2020 also worsened compared to 2019 – in-hospital mortality was 34% higher in 2020 than in the previous year. Figure 5.7 shows that from 2021 onwards, the number of hospitalisations due to myocardial infarction gradually increased, returning to pre-pandemic levels.

A significant success of Polish cardiology is the managed care for acute myocardial infarction survivors programme – KOS-zawał. This programme has contributed to a marked improvement in the prognosis of myocardial infarction patients. However, during the pandemic, the number of patients enrolled in KOS-zawał was significantly lower than in the pre-pandemic period, which undoubtedly had a negative impact on patient outcomes.

⁴ Feusette P, Gierlotka M, Gąsior M, Rabczenko D, Stokwiszewski J, Wojtyniak B.: “Choroby kardiologiczne w okresie pandemii COVID-19 w Polsce” in: Wojtyniak B, Goryński P. Sytuacja zdrowotna ludności Polski i jej uwarunkowania 2022, NIPH NIH-NRI, Warsaw 2022



Fig. 5.7. Number of hospitalisations due to myocardial infarction in Śląskie voivodship in 2014–2023 (SILICARD data)

Heart failure

According to the Silesian Cardiovascular Database SILICARD, the number of hospitalisations due to heart failure in 2020 was 33% lower than in 2019 (Fig. 5.8). In-hospital mortality in these patients increased by 16% when comparing 2020 to 2019. As with myocardial infarction, post-pandemic hospitalisation numbers gradually returned to levels observed in 2017–2019.

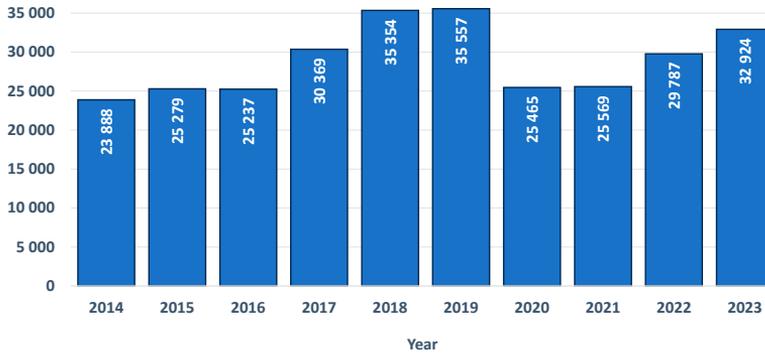


Fig. 5.8. Number of hospitalisations due to heart failure in Śląskie voivodship by month in 2019 and 2020, and annually from 2014 to 2023 (SILICARD data)

The Opole Database of Civilisation Diseases provided similar insights regarding heart failure patients. In 2020, hospitalisations due to heart failure decreased by over 21% compared to 2019. The number of patients with heart failure hospitalised also decreased from 2019 to 2020. Conversely, in 2020, an increased number of deaths was recorded among patients diagnosed with heart failure. The

findings from the Opole Database closely align with those from SILICARD, despite clear demographic differences between the two voivodships.

Atrial fibrillation, aortic stenosis

The SILICARD database also provides data on other diseases of the circulatory system in recent years. In the analysed period in 2020, hospitalisations due to atrial fibrillation dropped by 37% (Fig. 5.9), and due to aortic stenosis by 32% (Fig. 5.10).

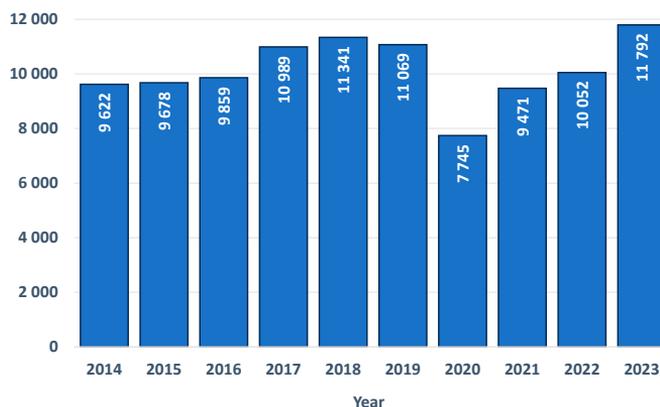


Fig. 5.9. Number of hospitalisations due to atrial fibrillation in Śląskie voivodship in 2014–2023 (SILICARD data)

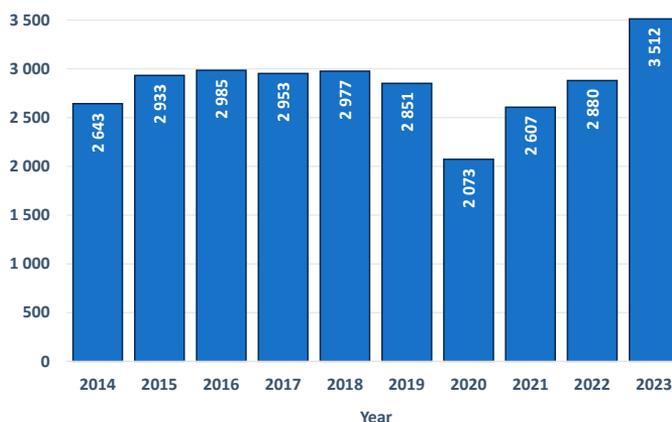


Fig. 5.10. Number of hospitalisations due to aortic stenosis in Śląskie voivodship in 2014–2023 (SILICARD data)

Interestingly, a rapid increase in hospitalisations for both conditions was observed after the pandemic, surpassing pre-pandemic levels. This reflects, on the one hand, the effective “repayment” of the healthcare debt in these disease areas

by cardiologists and, on the other, an increase in the prevalence of atrial fibrillation and aortic stenosis in recent years.

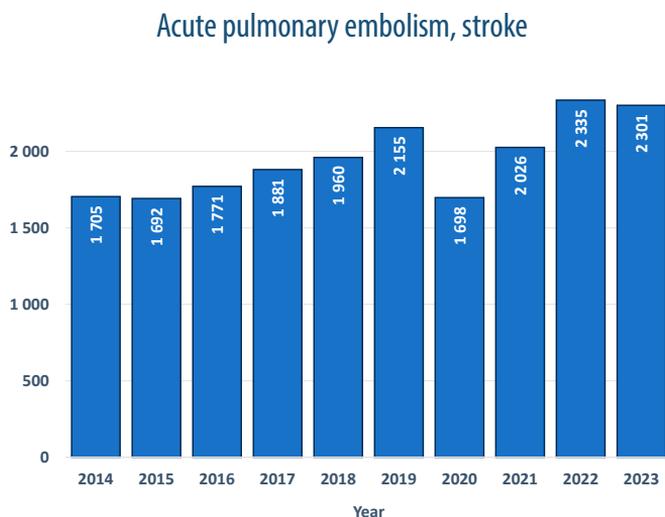


Fig. 5.11. Number of hospitalisations due to pulmonary embolism in Śląskie voivodship in 2014–2023 (SILICARD data)

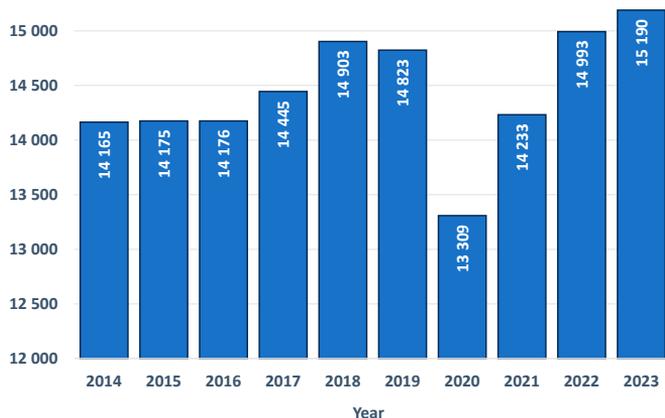


Fig. 5.12. Number of hospitalisations due to stroke (CNS infarction) in Śląskie voivodship in 2014–2023 (SILICARD data)

In 2020, compared to 2019, the number of hospitalisations due to pulmonary embolism decreased by 22% (Fig. 5.11) and due to stroke by 26% (Fig. 5.12). In the following years, these numbers returned to previous levels. Notably, the frequency of hospitalisations for pulmonary embolism was significantly higher in 2022 and 2023 compared to the pre-pandemic period.

Selected procedures performed for diseases of the circulatory system

Figures 5.13 to 5.19 illustrate the changes in the number of selected procedures performed to treat cardiovascular diseases between 2014 and 2023. The first year of the COVID-19 pandemic also saw a decline in the number of cardiological procedures. According to data from the Silesian Cardiovascular Database SILICARD, when comparing 2020 to 2019, the number of coronary angiographies dropped by 29% (Fig. 5.13), and the number of percutaneous coronary interventions fell by 24% (Fig. 5.14). There was an 18% decrease in electrophysiology procedures (Figures 5.15, 5.16, 5.17). The year 2020 also saw a reduction in the number of cardiac surgery procedures. Hospitalisations for coronary artery bypass grafting (CABG) were 28% lower (Fig. 5.25), and valve procedures declined by 19% (Fig. 5.26). In the post-pandemic years 2022–2023, the number of cardiological procedures performed has steadily increased, which is an essential component of “repaying the health debt”. In certain areas (e.g. ablations, pacemaker implantations), the numbers exceeded pre-pandemic levels, likely due to both clearing backlogs and technological progress, along with growing population needs. In others (e.g. CABG, PCI), the return to pre-2019 levels has been slower or incomplete.

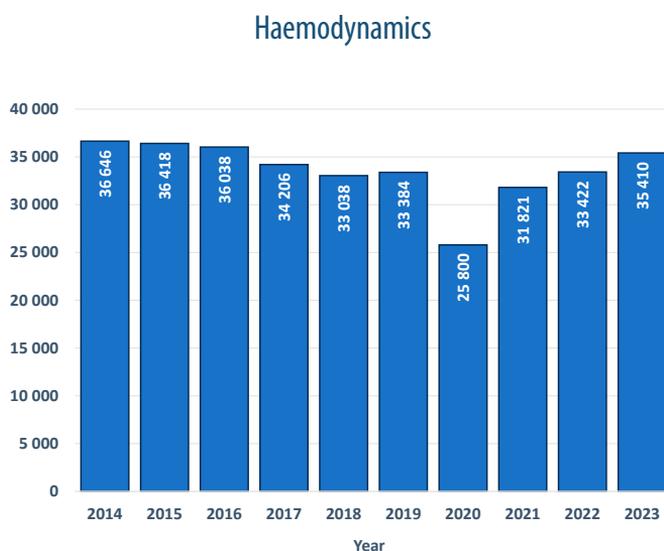


Fig. 5.13. Number of hospitalisations for coronary angiography in Śląskie voivodship, 2014–2023 (SILICARD data)

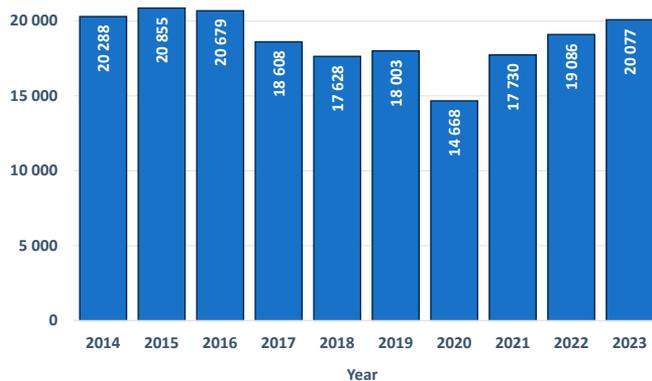


Fig. 5.14. Number of hospitalisations for PCI in Śląskie voivodship, 2014–2023 (SILICARD data)

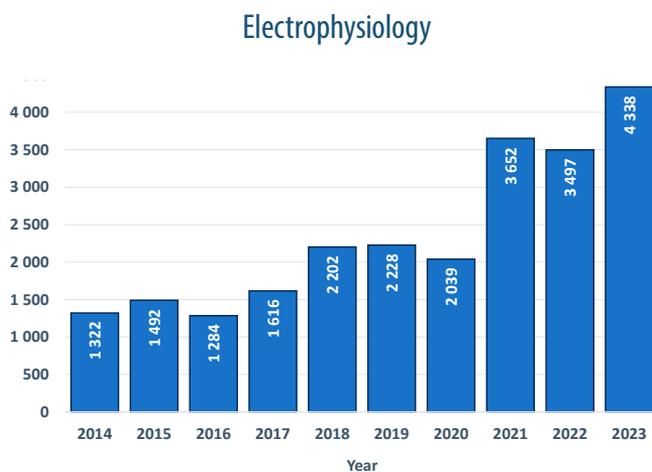


Fig. 5.15. Number of hospitalisations for ablation in Śląskie voivodship, 2014–2023 (SILICARD data)

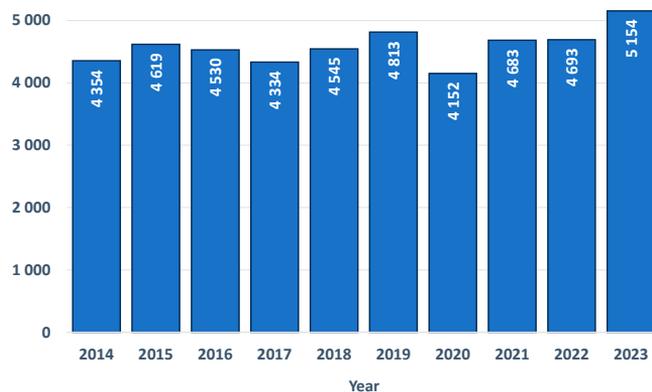


Fig. 5.16. Number of hospitalisations for pacemaker implantation in Śląskie voivodship, 2014–2023 (SILICARD data)

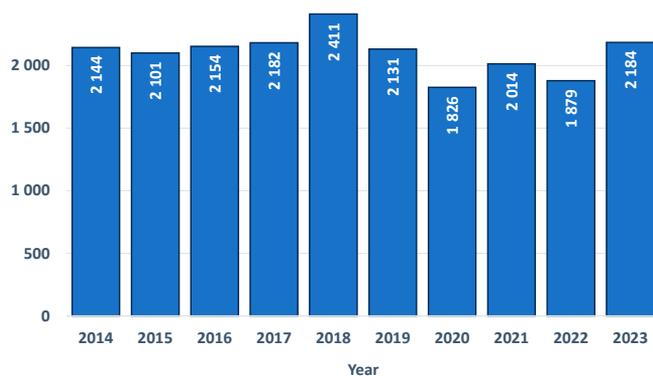


Fig. 5.17. Number of hospitalisations for ICD/BiV implantation procedures in Śląskie voivodship, 2014–2023 (SILICARD data)

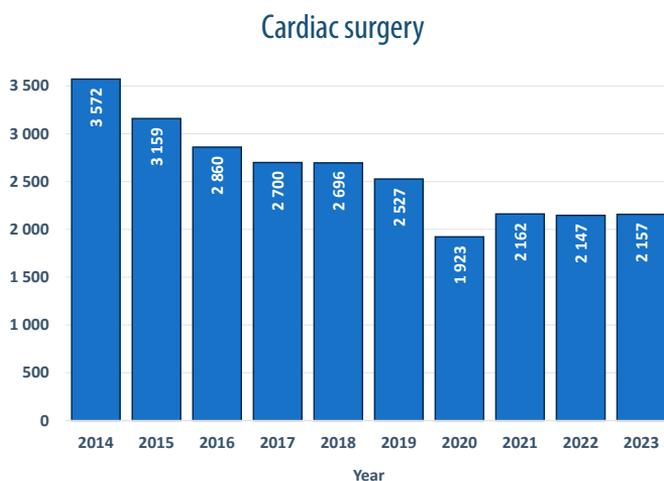


Fig. 5.18. Number of hospitalisations for CABG in Śląskie voivodship, 2014–2023 (SILICARD data)



Fig. 5.19. Number of hospitalisations for heart valve surgery in Śląskie voivodship, 2014–2023 (SILICARD data)

Repayment of Health Debt in Cardiology

The health debt in cardiology refers to the cumulative number of delayed or missed consultations, diagnostic tests (e.g. echocardiograms, stress tests), and interventional procedures (e.g. PCI, pacemaker implantations). Repaying this debt is critically important for the health of Polish society. The goal is to prevent the progression of diseases of the circulatory system, reduce the risk of acute cardiovascular events (such as heart attacks and strokes), and improve patients' quality of life. The health debt in cardiology is not only a matter of backlogs but also represents a potential increase in future cardiovascular events and healthcare needs if appropriate preventive measures are not implemented.

Although precisely quantifying this debt is difficult, available data and indicators help estimate its scale. A key marker is the decline in the number of cardiological procedures in 2020–2021 compared to 2019. For instance, according to the National Health Fund data, the number of hospital services in cardiology dropped by 25%. In Poland, the number of procedures for treating acute coronary syndromes (such as PCI) fell by 12%, and certain types of electrophysiological procedures declined by as much as 20%. The number of pacemaker implantations decreased by 20%.

Various initiatives and strategies have been undertaken to address the repayment of health debt in cardiology. One key action is implementing the National Cardiology Network (Pol. Krajowa Sieć Kardiologiczna, KSK), which aims to improve the efficiency, coordination, and quality of cardiac care in Poland. The KSK is designed to ensure that all patients, regardless of their place of residence, receive cardiology care based on the same diagnostic and therapeutic standards, as well as coordinated and continuous care — from the stage of cardiology diagnostics, through treatment and rehabilitation, to further treatment within specialist outpatient care, primary healthcare, or long-term care. Another crucial element of the repayment strategy is utilising funds from the national recovery and resilience plan (RRP). The RRP envisions investments in modernising medical infrastructure and improving access to services, including cardiology.