4. HOSPITAL MORBIDITY IN POLAND

Paweł Goryński, Anna Poznańska, Anna Smaga, Paweł Radomski, Anna Tymicka, Bogdan Wojtyniak

Monitoring the frequency of hospital admissions and their causes constitutes one of the most important tools for analysing and assessing the health status of the population. These data enable the identification of the most severe health problems requiring hospital treatment, as well as the tracking of changes in the burden of chronic and acute diseases over time. Although certain interpretative limitations must be taken into account – hospitalisation depends, among other factors, on the severity of the disease course, availability of hospital beds, organisation of outpatient services, socio-economic factors, and changing external circumstances (e.g. the COVID-19 pandemic) – hospital data remain one of the most reliable sources of diagnostic information. The high quality of clinical diagnoses in hospital records, resulting in part from broad access to diagnostic methods and specialist medical supervision, renders these data more precise when compared with other routine systems for assessing population health.

In Poland, the primary source of data on hospitalisations is the Nationwide General Hospital Morbidity Study (NGHMS), conducted in accordance with the Programme of Statistical Surveys of Official Statistics. This study is carried out by the National Institute of Public Health NIH – National Research Institute (NIPH NIH – NRI), and its scope is defined by the General Hospital Statistical Form (MZ/Szp-11). The study is population-based and includes all cases of hospitalisation in public and non-public hospitals (excluding psychiatric wards, which are covered by a separate system).

The most recent available data pertain to 2023.

Frequency of hospitalisation in Poland in 2017–2023

Table 4.1 presents the absolute numbers of hospitalisations for all causes, excluding physiological childbirths, as well as for selected diseases grouped according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). The frequency of hospitalisations in recent years must be analysed with reference to 2019. In the following year (2020), the COVID-19 pandemic reached Poland, disrupting, as in many countries around the world, long-term trends not only in health phenomena, including hospital morbidity, but also in demographic processes.[1]

Table 4.1. Number of hospitalisations for selected groups of causes in 2017–2023

Diagnosis (ICD-10)	Years						
	2017	2018	2019	2020	2021	2022	2023
All diagnoses (A00–T98 excluding O80 and O84)	6,999,219	6,782,687	6,805,344	5,126,396	6,001,200	6,611,299	7,035,719
Certain infectious and parasitic diseases (A00–B99)	185,637	178,996	183,387	100,410	119,491	169,205	154,038
Neoplasms (C00–D48)	490,650	534,375	573,954	568,434	637,971	698,979	756,151
Endocrine, nutritional and metabolic diseases (E00–E90)	251,255	247,341	252,318	174,624	198,052	232,208	256,631
Diseases of the nervous system (G00–G99)	307,631	304,395	303,477	200,338	217,516	257,743	288,940
Diseases of the circulatory system (I00–I99)	1,085,975	1,036,535	1,011,716	744,976	807,713	892,275	984,396
Diseases of the respiratory system (J00–J99)	538,747	507,304	473,445	307,879	359,536	419,094	466,340
Diseases of the digestive system (K00–K93)	612,560	590,253	584,445	409,689	474,189	556,314	605,285
Diseases of the genitourinary system (N00–N99)	612,464	597,702	610,187	437,359	520,122	588,065	641,784
Pregnancy, childbirth and the puerperium (O00–O99 excluding O80 and O84)	446,683	416,242	399,398	334,063	334,344	321,215	299,904
Injuries (S00–T14)	337,592	321,478	316,955	253,494	283,504	299,878	305,072
COVID-19 (U07–U12)	0	0	0	85,615	256,929	113,066	23,023

Source: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

In Poland, the number of hospitalisations in 2020 dropped sharply compared with previous years, to 5.1 million cases, representing a 25% reduction compared with 2019 (6.8 million hospitalisations). These changes were linked to the

[1] Tilstra A. M. et al. Projecting the long-term effects of the COVID-19 pandemic on U.S. population structure. Nature Communications (2024) 15:2409. https://doi.org/10.1038/s41467-024-46582-4

reorganisation of hospitals in Poland. So-called "dedicated COVID-19 hospitals" were established to treat patients infected with the coronavirus, and patient care priorities shifted. Scheduled hospital admissions for conditions not requiring immediate intervention were postponed, often to much later dates following the acute phase of the pandemic. At the same time, some patients refrained from seeking hospital admission due to concerns about contracting nosocomial infections. Delayed or unrealised hospitalisations constitute one of the significant components of the so-called health debt, understood as the accumulated delay in the provision of healthcare services caused by disruptions in the functioning of healthcare systems in the context of the COVID-19 pandemic.

The atypical period of the epidemic in Poland, both in terms of the intensity and structure of hospitalisations (beginning in March 2020), extended into 2021. That year, 6.0 million patients were hospitalised, 12% fewer than in 2019 but 17% more than in 2020.

In 2022 and 2023, the number of hospitalisations increased further, reaching numbers exceeding 6.6 million and 7.0 million, respectively, representing increases of 29% and 37% compared to 2020. It is worth emphasising that the absolute number of hospitalisations exceeded the 6.8 million recorded in 2019, only in 2023. Hence, the overall number of hospitalisations from the period before the pandemic outbreak was reached again after four years. However, this result does not apply to all diagnostic groups that constitute reasons for hospital treatment. In the case of diseases of the nervous and circulatory systems, infectious and parasitic diseases, and injuries, the number of hospitalisations in 2023 did not surpass the pre-pandemic level.

Similar trends can be observed in the crude hospitalisation rates presented in Table 4.2.

Table 4.3 presents standardised rates, which reflect the burden of disease after eliminating differences in the age structure of the Polish population across the observed years. As is well known, the share of older individuals in Poland's population has been increasing year by year, and among this group, a naturally and biologically justified higher incidence of illnesses and conditions requiring hospital treatment is observed. The overall rise in hospitalisation frequency may result not only from increased disease risk but also from population ageing. This phenomenon has been accounted for in the presented analysis through the standardisation of hospitalisation rates by age (using the direct method, based on the 2013 European Standard Population – ESP 2013).[2]

[2] European Commission, Eurostat, Pace, et al. Revision of the European Standard Population: report of Eurostat's task force: 2013 edition, Publications Office, 2013, https://data.europa.eu/doi/10.2785/11470

Table 4.2. Crude hospitalisation rates for selected groups of causes (per 10,000 population) in 2017–2023

Diagnosis (ICD-10)	Years						
	2017	2018	2019	2020	2021	2022	2023
All diagnoses (A00–T98 excluding O80 and O84)	1,821.1	1,765.2	1,772.3	1,342.4	1,579.1	1,747.3	1,866.3
Certain infectious and parasitic diseases (A00–B99)	48.3	46.6	47.8	26.3	31.4	44.7	40.9
Neoplasms (C00–D48)	127.7	139.1	149.5	148.9	167.9	184.8	200.6
Endocrine, nutritional and metabolic diseases (E00–E90)	65.4	64.4	65.7	45.7	52.1	61.4	68.1
Diseases of the nervous system (G00–G99)	80.0	79.2	79.0	52.5	57.2	68.1	76.6
Diseases of the circulatory system (I00–I99)	282.5	269.7	263.4	195.1	212.5	235.8	261.1
Diseases of the respiratory system (J00–J99)	140.2	132.0	123.3	80.6	94.6	110.8	123.7
Diseases of the digestive system (K00–K93)	159.4	153.7	152.3	107.3	124.8	147.1	160.6
Diseases of the genitourinary system (N00–N99)	159.4	155.6	158.9	114.5	136.9	155.4	170.2
Pregnancy, childbirth and the puerperium (O00–O99 excluding O80 and O84)	116.2	108.3	104.0	87.5	88.0	84.9	79.6
Injuries (S00–T14)	87.8	83.6	82.5	66.3	74.5	79.2	80.9
COVID-19 (U07–U12)	0.0	0.0	0.0	22.4	67.6	29.9	6.1

Source: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

Table 4.3. Age-standardised hospitalisation rates for selected groups of causes (per 10,000 population) in 2017–2023

Diagnosis (ICD-10)	Years						
	2017	2018	2019	2020	2021	2022	2023
All diagnoses (A00–T98 excluding O80 and O84)	1,908.5	1,835.2	1,829.7	1,377.4	1,618.5	1,783.9	1,894.5
Certain infectious and parasitic diseases (A00–B99)	50.1	48.1	49.1	27.0	32.4	46.8	43.4
Neoplasms (C00–D48)	135.0	145.2	153.8	151.2	169.5	183.8	196.9
Endocrine, nutritional and metabolic diseases (E00–E90)	68.9	67.5	68.5	47.4	53.8	62.9	69.4
Diseases of the nervous system (G00–G99)	82.7	81.4	80.6	53.2	57.9	68.6	76.8
Diseases of the circulatory system (I00–I99)	314.9	295.7	284.0	207.7	224.5	244.9	266.4
Diseases of the respiratory system (J00–J99)	147.8	137.9	127.7	82.9	97.3	114.5	128.4
Diseases of the digestive system (K00–K93)	165.9	158.7	155.9	109.2	126.6	147.9	160.3
Diseases of the genitourinary system (N00–N99)	164.3	159.5	161.7	116.0	137.6	155.2	168.8
Pregnancy, childbirth and the puerperium (O00–O99 excluding O80 and O84)	100.6	95.7	93.8	80.7	82.9	82.5	79.2
Injuries (S00–T14)	91.3	86.8	85.3	68.3	76.6	81.2	82.4
COVID-19 (U07–U12)	0.0	0.0	0.0	23.7	70.8	32.0	6.9

Source: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

Figure 4.1 presents the standardised hospitalisation rates for the total population of Poland in the years 2017–2023. As shown, the frequency of hospital treatment, which slightly declined between 2017 and 2019, dropped by 25% in 2020 compared to the previous year. In the following year of the pandemic, the intensity of hospitalisations increased slightly but remained 12% lower than in 2019. By 2022, this difference had narrowed to 2.5%. In 2023, the overall hospitalisation rate in Poland exceeded the 2019 level by 3.5%. However, as shown in the latter part of the chapter, the recovery to pre-pandemic hospitalisation rates did not occur across all diagnostic groups.

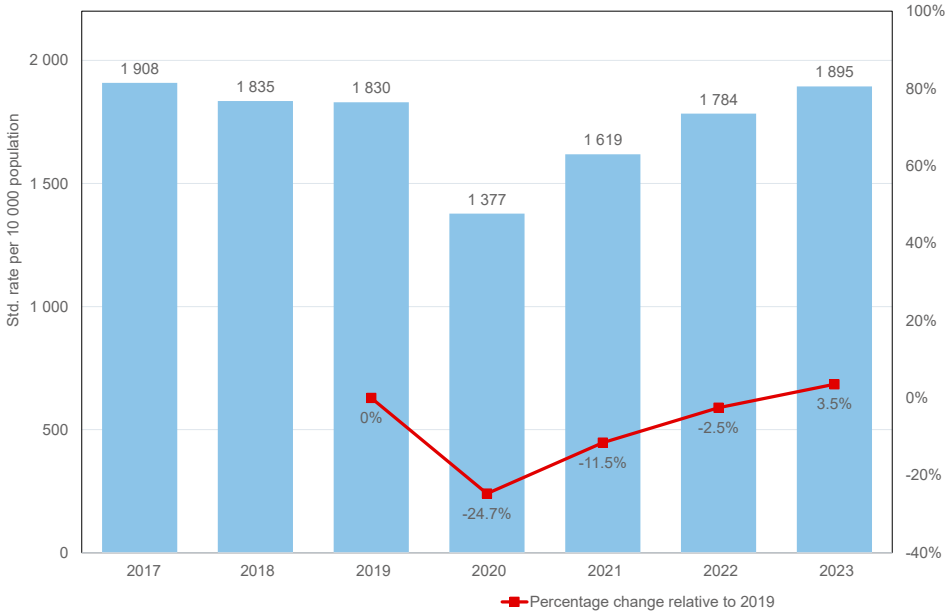

Fig. 4.1. Age-standardised hospitalisation rate for all causes excluding uncomplicated childbirths (per 10,000 population) in 2017–2023 and its percentage change relative to 2019 (data: NIPH NIH – NRI)

Hospitalisation by cause in 2017–2023

The most frequent causes of hospitalisation between 2017 and 2023 were diseases of the circulatory system (Table 4.3, Fig. 4.2). The second most common causes varied by year: in 2017, they were diseases of the digestive system; in 2018 and 2019, diseases of the genitourinary system; and from 2020 onwards,

neoplasms, which in 2017 had ranked only fifth among the leading causes of hospital treatment. The frequency of hospitalisations due to neoplasms has shown a strong upward trend, with only a slight (especially compared to other diseases) slowdown recorded in 2020. This result confirms that during the COVID-19 pandemic, cancer care was treated as a particular priority by the healthcare system despite restrictions imposed on hospitalisation for other causes. For most of the analysed diagnostic categories, a marked decline in hospitalisation frequency was observed in 2020.

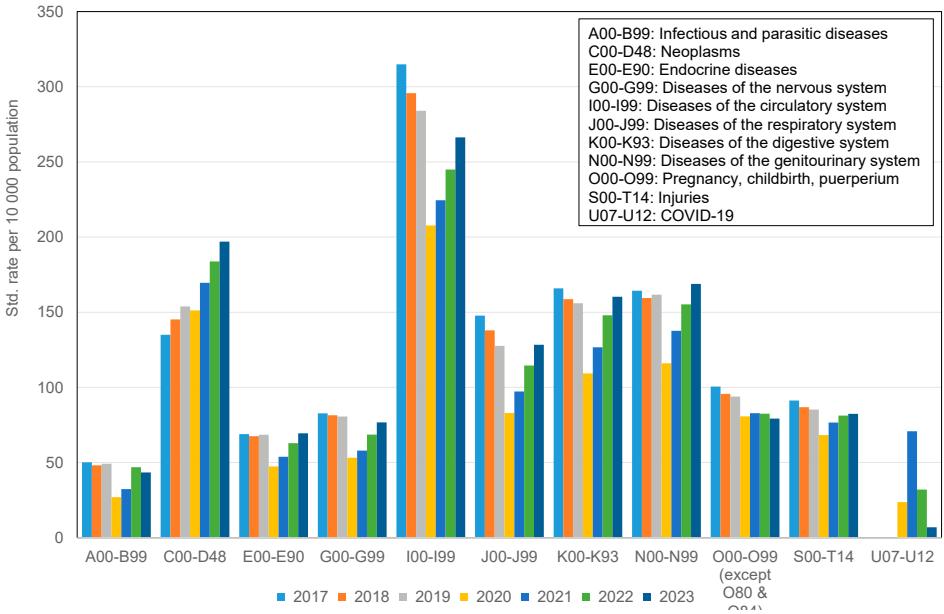

Fig. 4.2. Age-standardised hospitalisation rates for selected groups of causes (per 10,000 population) in 2017–2023 (data: NIPH NIH – NRI)

Table 4.4 compares hospitalisation frequencies in 2020 and 2023 with those in the last year before the COVID-19 pandemic for selected groups of causes.

The greatest decline in hospitalisation frequency in 2020 was observed for infectious and parasitic diseases (A00–B99 according to ICD-10), where the age-standardised hospitalisation rate dropped by 45%, followed by diseases of the respiratory system (down by 35%) and diseases of the nervous system (down by 34%). The smallest reduction was recorded for neoplasms (less than 2%) and pregnancy-related issues (14%). In 2023, the frequency of hospitalisations for

certain causes exceeded the 2019 level, including a substantial 28% increase for neoplasms, a 4% increase for diseases of the genitourinary system, and nearly 3% for diseases of the digestive system. Despite a rising trend for infectious diseases, diseases of the circulatory system, diseases of the nervous system, and injuries, the frequency of hospital treatment remained lower than in 2019. Hospitalisation rates for pregnancy-related conditions decreased not only in comparison to 2019 but also to the pandemic period.

Table 4.4. Percentage changes in the age-standardised hospitalisation rate for selected groups of causes in 2020 and 2023 compared to 2019

Year	Certain infectious and parasitic diseases (A00–B99)	Neoplasms (C00–D48)	Endocrine, nutritional and metabolic diseases (E00–E90)	Diseases of the nervous system (G00–G99)	Diseases of the circulatory system (I00–I99)	Diseases of the respiratory system (J00–J99)	Diseases of the digestive system (K00–K93)	Diseases of the genitourinary system (N00-N99)	Pregnancy, childbirth and the puerperium (000–099 excluding 080 and 084)	Injuries (S00–T14)
2020	-45.0	-1.7	-30.8	-34.0	-26.9	-35.1	-30.0	-28.3	-14.0	-19.9
2023	-11.6	28.0	1.4	-4.8	-6.2	0.6	2.8	4.4	-15.6	-3.3

Source: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

Based on an analysis of the sex structure of hospitalised patients by cause, two groups were identified: "male" diseases (with a higher proportion of hospitalised men) and "female" diseases (with a predominance of women). The results are shown in Figure 4.3. The first group includes, above all, injuries and poisoning (with the share of men in 2017–2023 on average 3.7 percentage points higher than that of women), diseases of the circulatory system (difference: 3.4 pp), diseases of the respiratory system (2.1 pp), and diseases of the digestive system (1.0 pp). The second group includes diseases of the genitourinary system (with women accounting for 4.8 pp more hospitalisations on average), diseases of the musculoskeletal system (1.7 pp), eye diseases (1.3 pp), and neoplasms (1.2 pp). From 2017 to 2023, gender differences increased notably in the case of diseases of the circulatory system (reaching 4.6 pp in 2023) and, to a lesser extent, diseases of the digestive system (up to 2.2 pp). A reduction in the difference in hospitalisation frequency between women and men was observed for neoplasms (to 0.4 pp), eye diseases (to 0.8 pp), and diseases of the musculoskeletal system (to 1.1 pp in 2023).

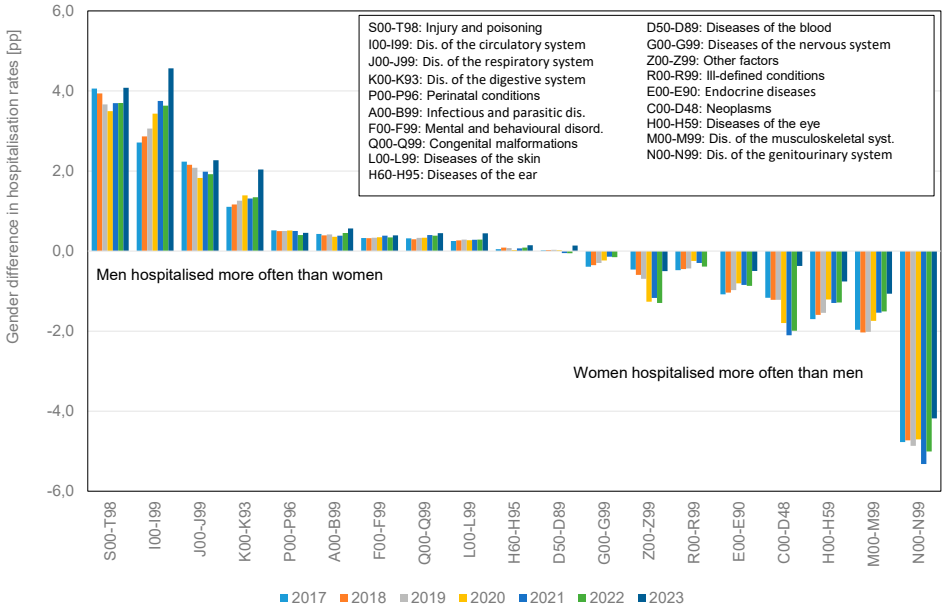

Fig. 4.3. Percentage differences in hospitalisation frequency between men and women in 2017–2023 for major groups of hospitalisation causes according to ICD-10 (data: NIPH NIH – NIR)

Structure of hospitalisation caused by patient age

To deepen the understanding of the causes of hospital treatment in Poland, an analysis was conducted for 2023, broken down into 5-year age groups, separately for women and men.

Among children under the age of 5, a high proportion of hospitalisations (over 20% of all cases) is due to factors influencing health status and contact with health services (Z00–Z99 according to ICD-10) – this category includes normal births (coded Z38 in ICD-10). A significant percentage of the youngest patients (nearly 20%) are hospitalised due to conditions originating in the perinatal period (P00–P96 according to ICD-10).

In addition to the above causes, boys up to 10 are most often treated for diseases of the respiratory system (18%) and infectious diseases (7%), and from the age of 5, also for injuries and poisoning. By ages 5–9, these already account for 15% of hospitalisations, with their share increasing rapidly with age (Fig. 4.4). Until the age of 50, these problems remain the leading cause of hospitalisation for men (accounting for over 30% of hospitalisations among men aged 20–29). At the same time, the

prevalence of diseases of the digestive system increases steadily, reaching 13% in the 35–44 age group. From the age of 50 onwards, diseases of the circulatory system become the predominant cause of hospitalisation for men, with their share rising consistently up to the oldest age group (85 years and over), where they account for 30% of hospital treatment cases. Neoplasms also become more significant, peaking in the 65–69 age group, where they make up 16% of hospitalisation causes, although this never surpasses the frequency of circulatory system disease-related hospitalisations. A relatively high share of eye diseases after age 70 (8%) is linked to the widespread use of cataract surgery with intraocular lens implantation.

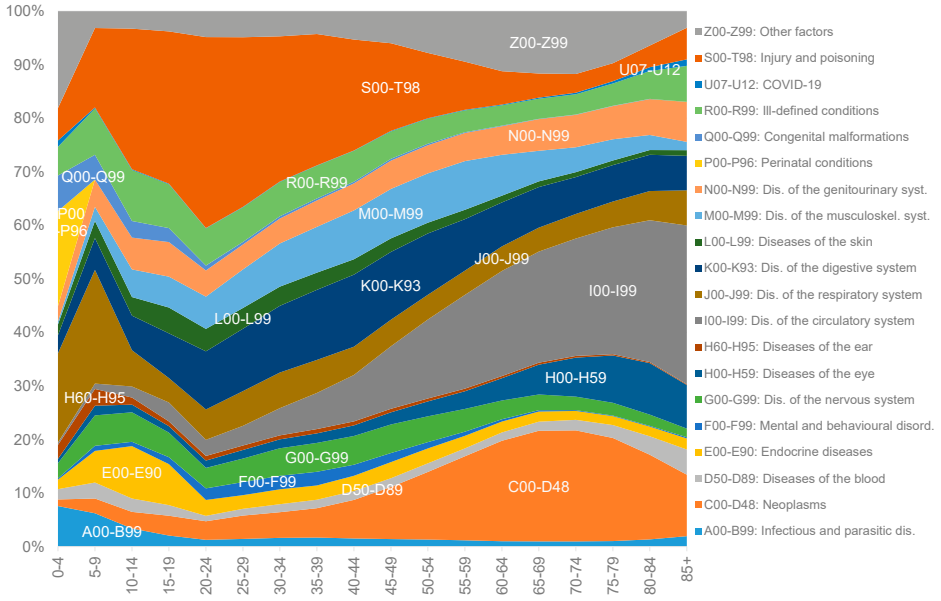

Fig. 4.4. Structure of hospitalisation causes among men in Poland in 2023 by patient age (data: NIPH NIH – NRI)

The structure of hospitalisations for women (Fig. 4.5) looks different. However, for girls under the age of 10, it resembles that observed in boys – alongside births and treatments for perinatal conditions, diseases of the respiratory system (16%) and infectious diseases (7%) dominate. It should be noted that, for the youngest patients (of both sexes), the hospitalisation rate for infectious diseases is significantly higher than in other age groups. As with boys, the share of injuries and poisoning in the hospitalisation structure is already high in the 5–9 age group (14%) and remains the most important cause of hospitalisation among girls over the following 10 years. From the age of 20, events related to pregnancy,

childbirth, and the puerperium become most prevalent (in the 25–34 age group, they account for over half of all hospitalisations), while the frequency of diseases of the genitourinary system steadily increases, reaching 21%, a much higher level than in men. In the 40–49 age group, these diseases are the main cause of hospital treatment among women. After age 40, hospitalisations due to neoplasms increase noticeably, becoming the leading cause of hospital treatment between the ages of 50 and 74. The highest proportion of neoplasms in the structure of hospitalisations among Polish women occurs in the 60–64 age group, thus earlier than in men. Hospitalisation rates for diseases of the circulatory system also rise steadily with age, reaching 10% in the 60–64 age group (i.e. 15 years later than among men). These diseases are the main reason for hospital treatment in women over the age of 75 (in men, over age 50), and in the oldest group (85 years and over), they account for 31% of all hospitalisation cases.

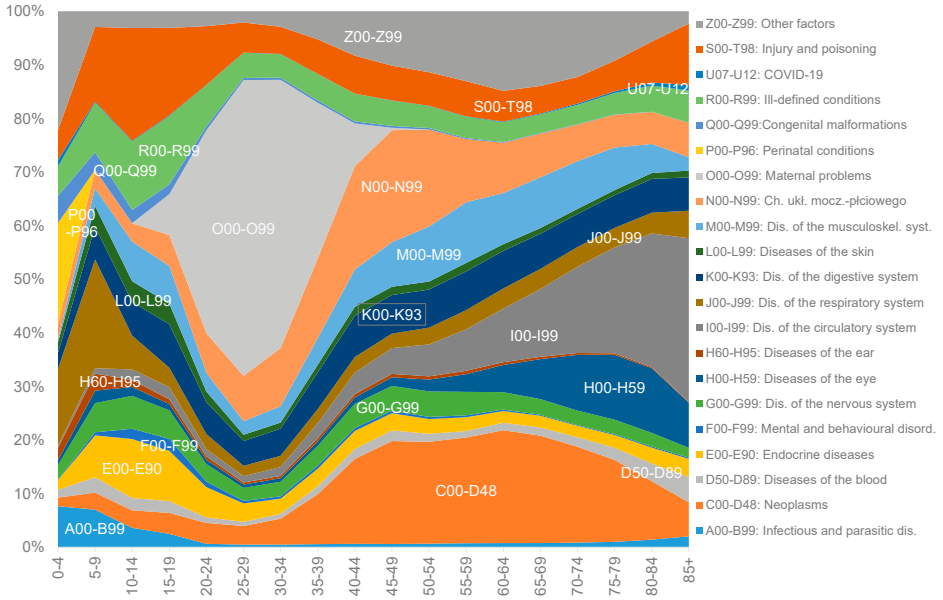

Fig. 4.5. Structure of hospitalisation causes among women in Poland in 2023 by patient age (data: NIPH NIH – NRI)

A significant difference should be noted between men and women in hospitalisation due to injuries and poisoning. Among children up to age 10, the proportion treated for this reason is nearly the same for both sexes. A similar pattern is seen in the 60–69 age group. However, between the ages of 15 and 59, injuries requiring hospital treatment are a much greater issue among men, which is attributed to their greater tendency to engage in risky behaviours. By contrast, among

people aged 70 and older, the proportion of women hospitalised due to injuries is nearly twice that of men, which may indicate higher levels of physical activity among older Polish women.

The percentage of patients hospitalised for ill-defined conditions (R00–R99 according to ICD-10) averages 6% for both sexes, with the highest values observed in children and adolescents aged 5–19. Within this group, the share is significantly higher for girls than for boys (12% *vs* 9%).

Hospital treatment of older adults – aged 60 and over

The number of people using healthcare services naturally increases with the biological ageing of the population, which in Poland has been intensifying due to low fertility and increased life expectancy. The next section of the chapter on hospital morbidity is dedicated to the hospitalisation of older adults.

Figure 4.6 presents the hospitalisation frequency among men and women aged 60 and over from 2017 to 2023. As with the general population, hospitalisation rates dropped significantly in 2020 and gradually returned to pre-pandemic levels. However, they have not reached the values observed in 2017.

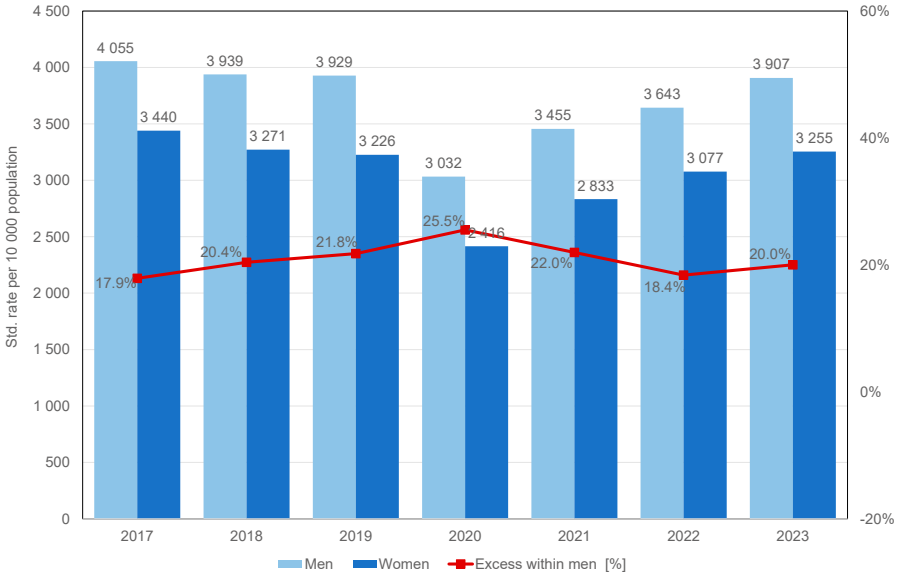

Fig. 4.6. Age-standardised hospitalisation rates (per 10,000 population) of men and women aged 60 and over in 2017–2023 and the percentage excess for men (data: NIPH NIH – NRI)

Throughout the entire period analysed, a considerable excess in male hospitalisation was observed. It ranged from 18% to 26% in individual years and was highest in the first year of the pandemic in Poland (2020). It is worth noting that these differences are significantly greater than those observed in the general population.

Figures 4.7. and 4.8. show the leading causes of hospitalisation among men and women aged 60 and over in 2017–2023. For both sexes, the most common cause of hospital admission was diseases of the circulatory system, followed by neoplasms.

Differences in hospitalisation frequency by sex for specific disease groups (measured by the excess of male over female standardised hospitalisation rates) are presented in Figure 4.9.

In all years, men were hospitalised more frequently than women for most of the analysed causes. The largest differences were related to diseases of the respiratory system, with male hospitalisation surpluses exceeding 95% from 2017 to 2020, although these gradually declined to 67% in 2023. The second group of causes for which men were hospitalised significantly more often than women were diseases of the circulatory system. In this case, the excess increased from 2017 to 2021 (by up to 71%) and declined slightly after the pandemic (to 68% in 2023).

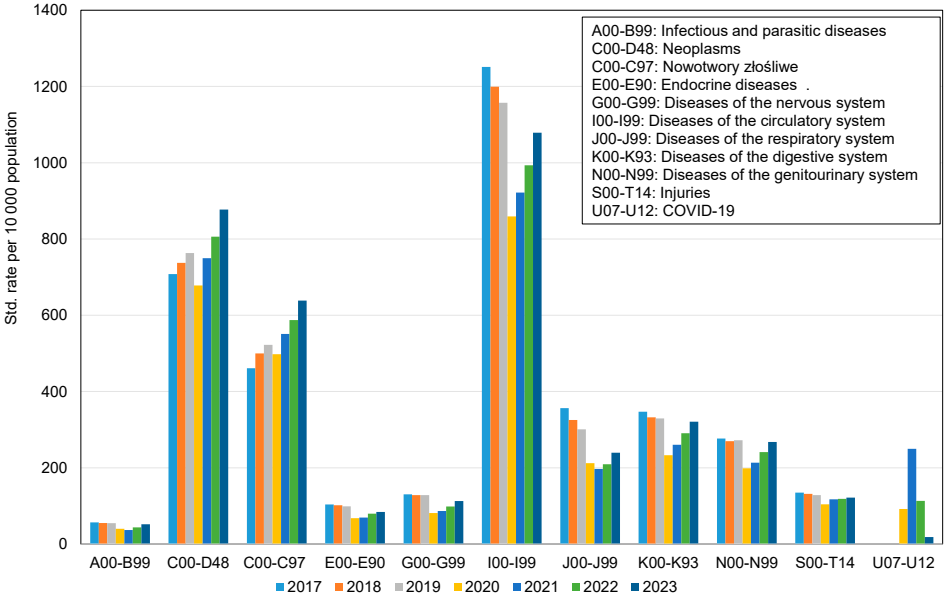

Fig. 4.7. Age-standardised hospitalisation rates of men aged 60 and over (per 10,000 population) in 2017–2023 for the leading causes of hospital treatment (data: NIPH NIH – NRI)

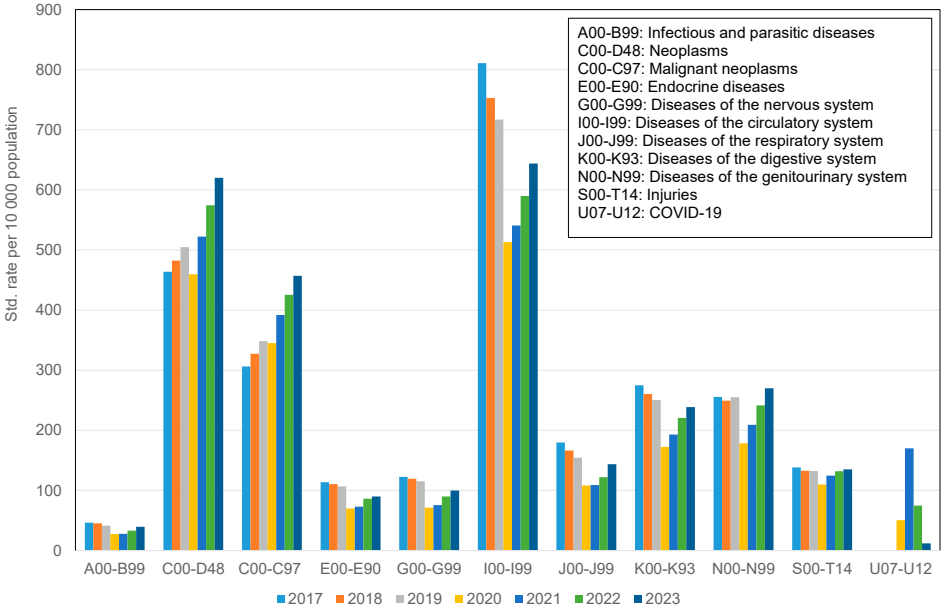

Fig. 4.8. Age-standardised hospitalisation rates of women aged 60 and over (per 10,000 population) in 2017–2023 for the leading causes of hospital treatment (data: NIPH NIH – NRI)

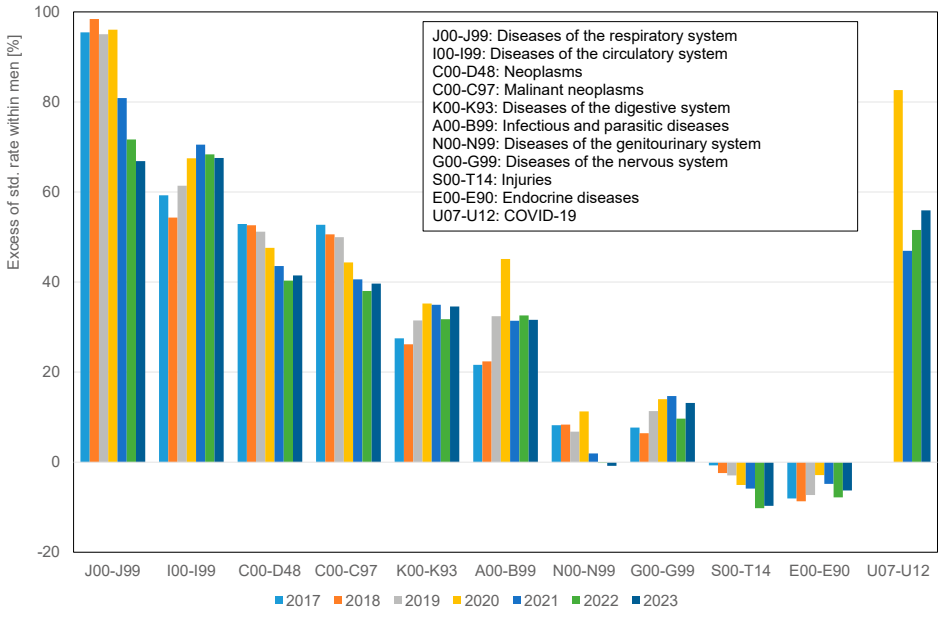

Fig. 4.9. Percentage excess of standardised hospitalisation rates for men compared to women aged 60 and over, by main cause groups, 2017–2023 (data: NIPH NIH – NRI)

An increasing trend in hospital treatment rates among men compared to women was also observed for diseases of the digestive and nervous systems. The opposite trend was noticed for neoplasms (including malignant neoplasms), where the male hospitalisation excess decreased from 53% in 2017 to 42% in 2023 (for malignant neoplasms, from 51% to 40%). A similar trend was observed for diseases of the genitourinary system – after a period of higher male hospitalisation, the rates for both subpopulations practically levelled off (with a slight predominance among women) in 2022–2023. Only two health problem groups had consistently higher hospitalisation rates among women than men throughout the analysed period – endocrine, nutritional, and metabolic diseases and injuries. The latter result significantly differs from findings for the general population, where men are more often hospitalised due to injuries. It is also worth highlighting the high hospitalisation excesses among men in the pandemic year 2020, not only due to COVID-19 (83%) but also other infectious diseases (45%).

The scale of hospital treatment among individuals aged 60 and over is illustrated in Figure 4.10. It shows the excesses of crude hospitalisation rates for those aged 60 and over compared with the entire population in 2017–2023. As expected, due to biological factors, hospitalisation frequency for older adults is significantly higher for almost all causes except infectious and parasitic diseases, where the situation is less clear. The most pressing issue for people aged 60 and over is diseases of the circulatory system, which, during the period analysed, were hospitalised at a rate more than three times that of the general population. Although this surplus has been steadily declining, it still exceeded 200% in 2023, indicating that the rate remained three times higher than the overall population rate. The second most significant issue for older adults was COVID-19, which disproportionately affected this group. From 2020 to 2022, people aged 60 and over were hospitalised for COVID-19 more than 2.5 times as often as the general population (2.1 times in 2023). The third major concern was neoplasms – hospitalisation for these causes among older adults was about 2.5 times more frequent than in the total population. For diseases of the digestive and genitourinary systems, the hospitalisation surplus among older individuals exceeded 50% throughout the entire period analysed. It is worth noting that the differences between most disease groups have narrowed in recent years, with injuries being a notable exception.

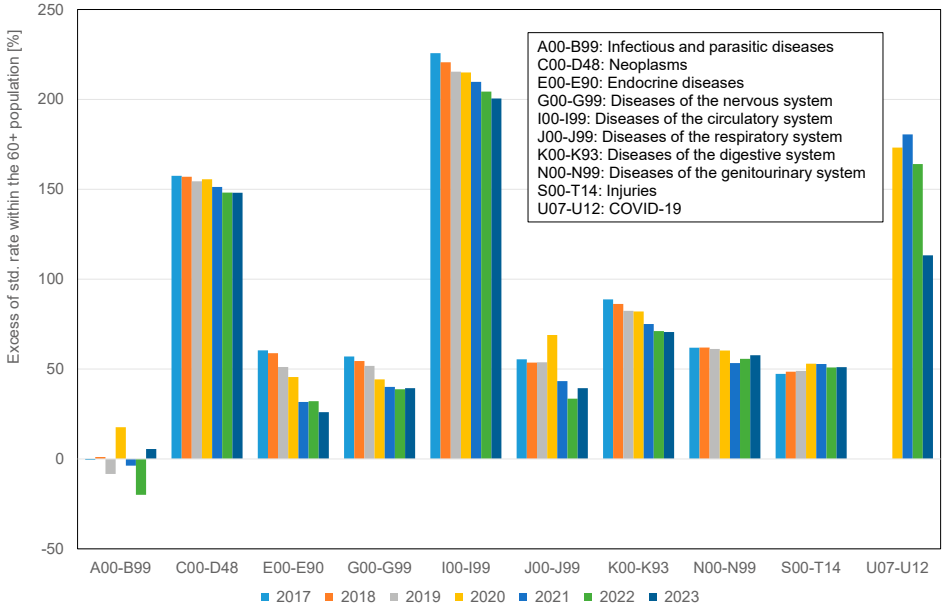

Fig. 4.10. Excesses of hospitalisation rates among people aged 60 and over compared to the total population by main disease groups, 2017–2023 (data: NIPH NIH – NRI)

Hospitalisation of urban and rural residents in 2017–2023

Urban residents were hospitalised slightly more often than rural residents, likely due to easier access to hospital treatment. Throughout the analysed period, the difference in hospitalisation rates remained relatively stable – the excess in urban population hospitalisations ranged from 5.3% in 2019 to 8.5% in 2021 and 2022 (Fig. 4.11).

Hospitalisation frequency for selected causes in the compared subpopulations is shown in Figure 4.12. For most disease groups analysed, urban residents were hospitalised more frequently than rural residents. The largest differences were observed in the case of neoplasms (an average annual excess of 20%) and endocrine, nutritional and metabolic diseases (18%). Exceptions included pregnancy and childbirth-related conditions (with a 6% average annual excess among rural residents) and diseases of the circulatory system (4%). Regarding the former, it is worth noting that the birth rate in rural areas from 2019 to 2023 was, on average, 6.0% higher than in urban areas.

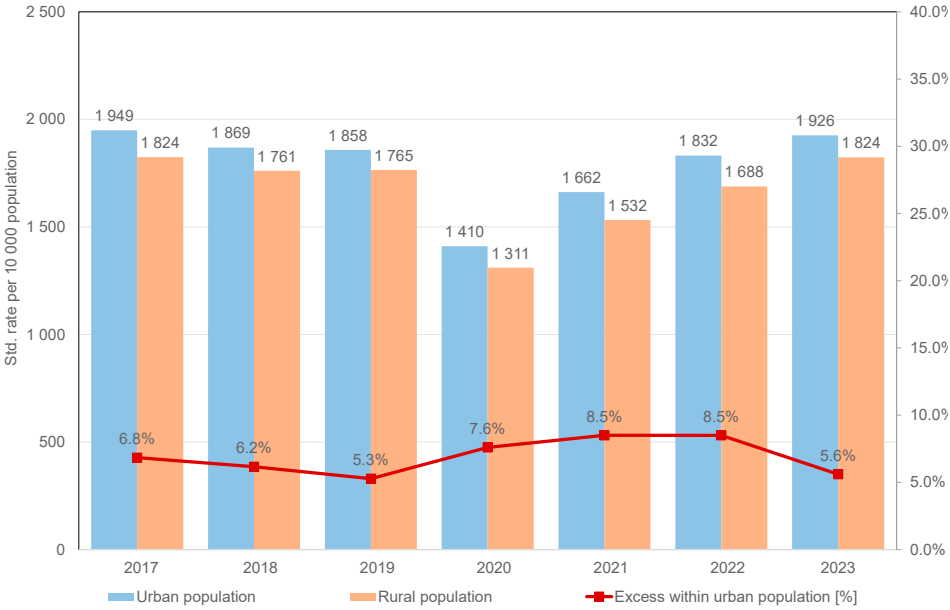

Fig. 4.11. Age-standardised hospitalisation rates for all causes among urban and rural residents (per 10,000 population) in 2017–2023 (data: NIPH NIH – NRI)

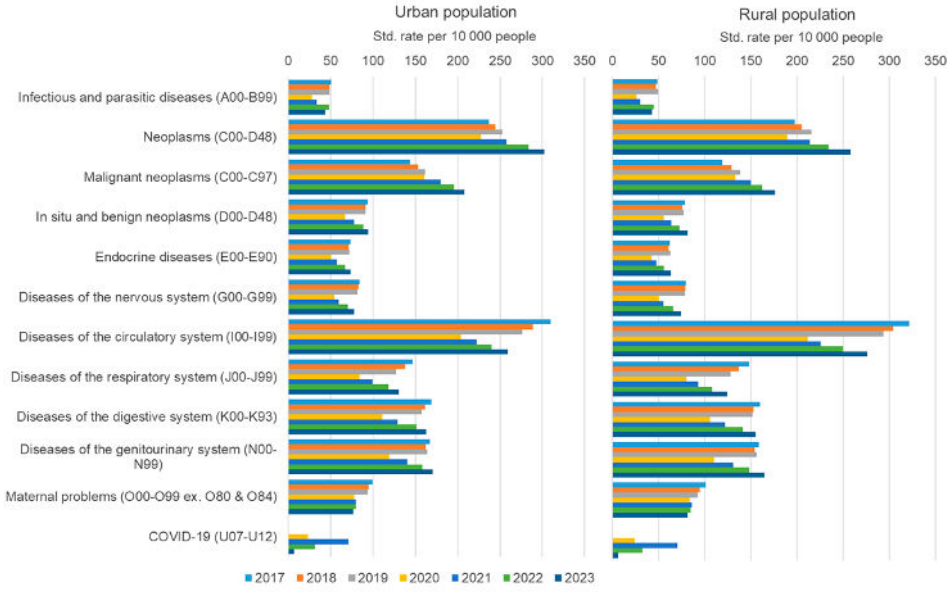

Fig. 4.12. Age-standardised hospitalisation rates among urban and rural residents (per 10,000 population) by cause in 2017–2023 (data: NIPH NIH – NRI)

In-hospital mortality

In-hospital mortality is a highly significant indicator in public health analyses. It provides information on both the severity of the diseases being treated and the quality of hospital care.

The presented analysis covers the period from 2019 to 2023. Table 4.5 presents in-hospital mortality rates (percentages) broken down by sex for each year, both for all patients and for those hospitalised for specific causes corresponding to the main ICD-10 disease groups.

Table 4.5. In-hospital mortality in Poland in 2019–2023 by sex and cause of hospitalisation (percentages)

Diagnosis (ICD-10)	Men					Women				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Infectious diseases (A00–B99)	3.3	6.3	5.0	4.4	5.3	3.4	6.2	5.6	4.7	5.8
Malignant neoplasms (C00–C97)	3.2	3.1	2.8	2.7	2.5	2.2	2.1	1.8	1.8	1.8
Diseases of the blood (D50–D89)	2.0	2.6	2.8	3.4	3.5	2.1	2.6	2.8	3.3	3.3
Endocrine, nutritional and metabolic diseases (E00–E90)	2.2	2.9	2.5	2.2	1.8	2.0	2.5	2.2	1.8	1.6
Diseases of the nervous system (G00–G99)	0.7	1.0	1.0	0.8	0.7	0.5	0.7	0.7	0.6	0.5
Diseases of the circulatory system (I00–I99)	5.3	6.9	6.3	5.6	4.9	6.4	8.2	7.7	6.8	5.9
Diseases of the respiratory system (J00–J99)	4.0	6.8	5.7	4.1	4.0	4.0	6.3	5.8	4.2	3.9
Diseases of the digestive system (K00–K93)	2.3	3.2	2.9	2.4	2.1	2.2	3.2	2.9	2.3	2.1
Diseases of the skin (L00–L99)	1.2	1.6	1.6	1.3	1.1	1.6	2.5	2.3	1.8	1.5
Diseases of the musculoskeletal system (M00–M99)	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Diseases of the genitourinary system (N00–N99)	2.5	3.3	2.8	2.6	2.5	1.3	1.7	1.4	1.4	1.3
Certain conditions originating in the perinatal period (P00–P96)	0.7	0.8	0.8	0.8	0.9	0.8	0.8	0.7	0.7	0.7
Congenital malformations (Q00–Q99)	0.5	0.6	0.5	0.4	0.3	0.6	0.6	0.6	0.4	0.4
Ill-defined conditions (R00–R99)	2.9	4.3	3.5	3.1	2.9	2.5	3.4	3.0	2.4	2.4
COVID-19 (U07–U12)		24.3	22.9	16.9	10.9		19.1	19.9	15.5	9.7
Injuries and poisoning (S00–T98)	1.0	1.2	1.0	0.8	0.8	1.0	1.2	1.1	0.9	0.8
Other factors (Z00–Z99)	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Total	2.3	3.4	3.5	2.6	2.2	1.8	2.4	2.6	2.0	1.7

Source: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

The data indicate that 2020 saw a sharp increase in mortality. Compared with the previous year (2019), mortality rates rose by 1.1 percentage points for men (a 50% increase in the risk of in-hospital death) and by 0.6 percentage points for women (a one-third increase). The peak in-hospital mortality occurred in 2021 when 3.5% of male patients and 2.6% of female patients died during hospitalisation. This high level of mortality was caused by the COVID-19 epidemic. In 2020 and 2021, nearly one in four men and one in five women hospitalised for COVID-19 died. The high life-threatening nature of this disease is further confirmed by the elevated mortality rates even after the epidemic ended – in 2023, these stood at 10.9% for men and 9.7% for women.

In-hospital mortality decreased in 2022, although it remained slightly above the 2019 level (by 0.3 percentage points among men and 0.2 among women). Only in 2023 did mortality rates drop below pre-pandemic levels, amounting to 2.2% for men and 1.7% for women.

Differences in male and female mortality were related to the cause of hospitalisation. However, it is important to consider differences in the age structure of hospitalised men and women – women tend to be older on average.

Among all the causes of hospitalisation analysed, the highest in-hospital mortality rate was associated with COVID-19; its rates remained significantly higher than those for other disease groups even after the pandemic ended. The decreases in COVID-19 mortality observed in 2022 and 2023 can be attributed to increased population immunity through vaccination, resulting in a milder course of the disease.

Figure 4.13 illustrates the data presented in Table 4.5. Information concerning COVID-19 has been omitted for clarity, allowing for a better presentation of mortality from other causes. Among these, regardless of changes in rates across the years, the highest in-hospital mortality is associated with diseases of the circulatory and respiratory systems and infectious diseases. The relatively high mortality of patients admitted for ill-defined conditions (ICD-10: R00–R99) is also notable, potentially indicating insufficient diagnostic evaluation.

There are distinct groups of diseases for which in-hospital mortality levels differ by sex. Throughout the entire analysed period, men died more often than women during hospitalisations for the following causes: diseases of the genitourinary system (male mortality rate excesses ranged from 86% to 100%), malignant neoplasms (39% to 56%), diseases of the nervous system (33% to 43%), endocrine nutritional and metabolic diseases (10% to 22%), and ill-defined conditions (16% to 29%). As previously noted, men also had higher COVID-19 mortality

rates (9% to 27%). Conversely, women had higher mortality rates than men for hospitalisations due to diseases of the circulatory system (19% to 22%) and skin diseases (36% to 56%).

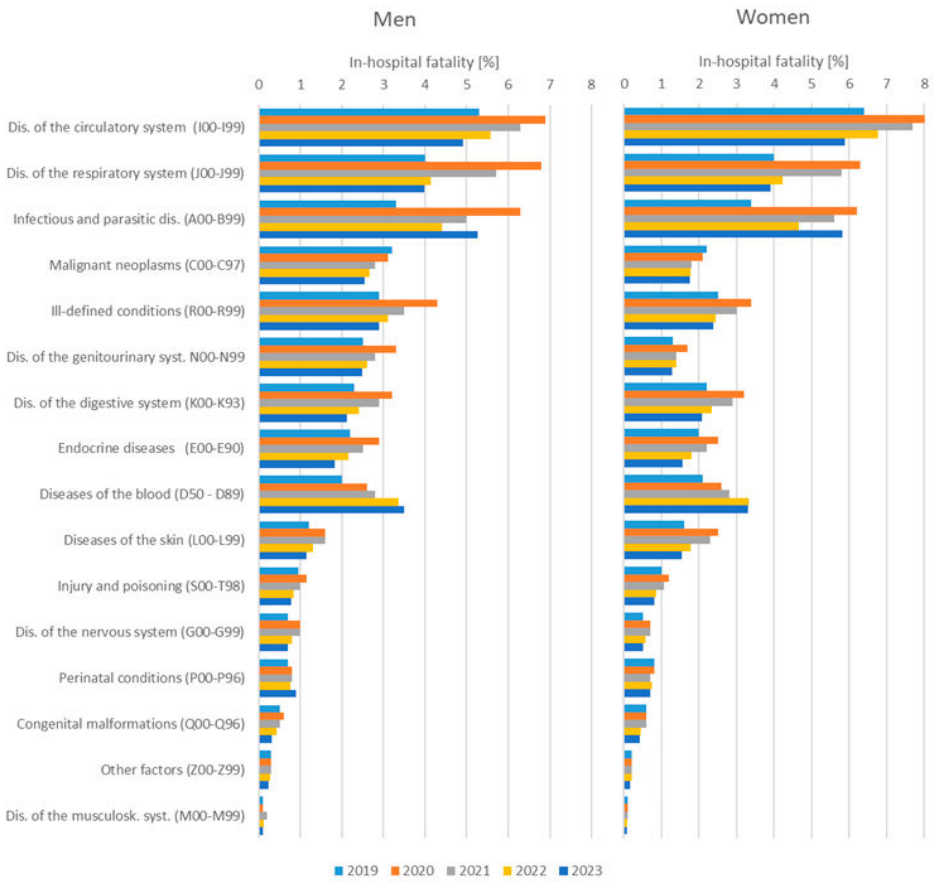

Fig. 4.13. In-hospital mortality in Poland in 2019–2023 by sex and cause of hospitalisation (data: NIPH NIH – NRI)

For almost all causes analysed, in-hospital mortality for both sexes increased significantly in the first year of the pandemic (2020). This phenomenon was due to multiple causes: admission restrictions, hospitalised patients tended to be in more severe condition than in previous years, and the need to organise and provide care for COVID-19 patients negatively affected the quality of care for others. They amplified the overall increased in-hospital mortality, primarily driven by deaths among COVID-19 patients. From 2021 onwards, mortality from causes

other than COVID-19 began to decline. An unfavourable exception is diseases of the blood – mortality related to these conditions increased steadily from 2019 to 2023 for both men and women.

Hospitalisation due to COVID-19

As demonstrated above, the COVID-19 epidemic significantly altered the landscape of hospital morbidity in Poland. The emergence of this disease disrupted long-term trends in observed health phenomena. The specific circumstances of that period (the state of the epidemic in Poland lasted from 20 March 2020[3] to 15 May 2022[4]), including changes in the functioning of the healthcare system, contributed to the accumulation of the so-called health debt, understood as the cumulative delay in the provision of healthcare services. As in other countries, the pandemic also affected the overall health condition of the population. Deaths due to COVID-19 reduced the proportion of elderly individuals in the population, as well as those in poor health, measured at the time in part by the presence of comorbidities. On the other hand, having contracted COVID-19, especially in severe cases or in instances of repeated infection, may have long-term consequences for the health of survivors. In the future, they may require hospital treatment more frequently than their peers in previous years. This issue is particularly relevant given that the long-term health effects of COVID-19 are still not fully understood and remain the subject of extensive research worldwide.[5,6]

As of April 2025, COVID-19 is no longer the most severe health and life threat to the Polish population. Nevertheless, it is still present in the community, continuing to cause hospitalisations and deaths. As shown earlier, it was the disease with the highest in-hospital mortality in 2023. The most important characteristics of hospitalisation due to COVID-19 during the four-year observation period (2020–2023) are discussed below.

[3] Regulation of the Minister of Health of 20 March 2020 on the declaration of an epidemic state in the territory of the Republic of Poland [Journal of Laws 2020, item 491]

[4] Regulation of the Minister of Health of 12 May 2022 on the cancellation of an epidemic state in the territory of the Republic of Poland [Journal of Laws 2022, item 1027]

[5] Lopez-Leon S. et al. More than 50 long-term effects of COVID-19: a systematic review and meta-analysis. Sci Rep (2021) 11, 16144. https://doi.org/10.1038/s41598-021-95565-8

[6] Elneima O et al. Cohort Profile: Post-Hospitalisation COVID-19 (PHOSP-COVID) study. Int. J. Epidemiol., (2024) 53, 1, dyad165, https://doi.org/10.1093/ije/dyad165

The peak of hospitalisation due to COVID-19 in Poland was in 2021 (Tables 4.1, 4.2, 4.3). By 2023, hospitalisation rates had decreased significantly – the crude rate had fallen elevenfold, while the age-standardised rate was ten times lower.

In all years, older individuals were the group most at risk of contracting the disease. However, since 2022, there has been a noticeable increase in hospitalisation rates among children aged 0–4 years (Fig. 4.14). Among adults, the frequency of hospitalisation increased rapidly with age, especially in those over 50. This increase followed a pattern that was nearly exponential. In 2020, the risk of hospitalisation due to COVID-19 for men over the age of 85 was four times higher than for those aged 60–64 and seven times higher than for those aged 50–54. For women, the corresponding figures were four and five times, respectively. In 2023, when the overall population risk had decreased, the hospitalisation rate in the oldest age group was nine times higher than for the 60–64 age group (for both sexes) and more than 20 times higher than for the 50–54 age group. The hospitalisation rate for men was significantly higher than for women.

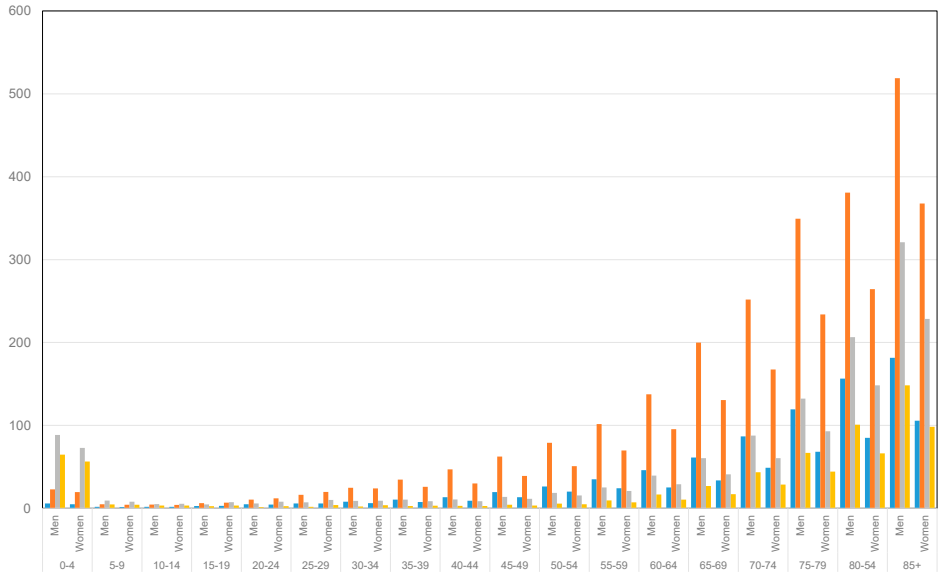

Fig. 4.14. Hospitalisation rates due to COVID-19 in 2020–2023 by sex and age group (data: NIPH NIH – NRI)

The age structure of patients hospitalised for COVID-19 between 2020 and 2023 is shown in Figure 4.15. The distribution in each year followed a similar pattern, though a gradual decrease in the age of treated patients is evident. In 2020,

people over the age of 50 accounted for 80% of hospitalised men and 82% of hospitalised women. Their share gradually declined in the following years, reaching 69% and 72% in 2023, respectively.

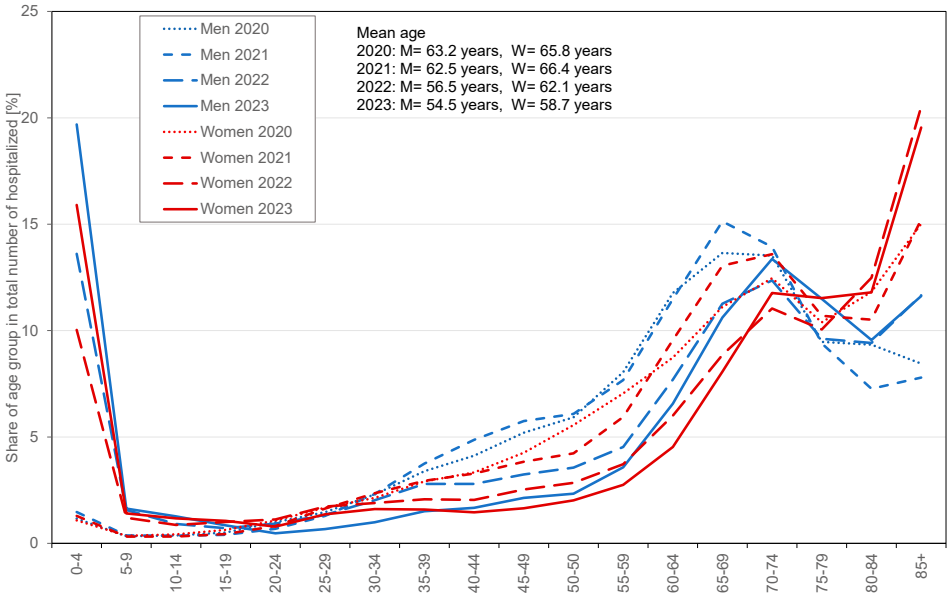

Fig. 4.15. The age structure of patients hospitalised for COVID-19 in 2020–2023 by sex (data: NIPH NIH – NRI)

Throughout the analysed period, men hospitalised with COVID-19 were, on average, younger than women. The average age of patients for both sexes decreased over the years – for men, from 63 in 2020 to 55 in 2023, and for women, from 66 to 59 in the same period. At the same time, the proportion of the youngest patients (aged 0–4) increased. They represented around 1% of COVID-19 patients in 2020 and 2021, rising to over 15% in 2023. Individuals aged 5–30 made up only a small portion of hospitalised patients – the share of any five-year age group within this range did not exceed 2%.

In every year analysed, the proportion of patients aged 40–74 was higher for men than for women, with an average difference of 1.3 percentage points (pp) in each five-year age category. In older age groups, the trend was reversed – the share of the oldest patients among all treated women was higher than among men, and this gap widened with age. The differences were 0.7 pp in the 75–79 age group, 2.8 pp in the 80–84 age group, and 7.7 pp in those aged 85 and over.

The average length of hospital stay for male COVID-19 patients (Fig. 4.16) ranged from 9.7 days in 2023 to 11.3 days in 2021. It was slightly longer each year than for females, whose stays ranged from 9.2 days in 2023 to 10.5 days in 2021. The length of hospital stay was strongly age-dependent, increasing steadily from 4.3 days among children under 10 years to 11.8 days for people aged 60–69. In the oldest age groups, this time slightly decreased to an average of 11.4 days (70–79 years) and 10.6 days (over 80 years).

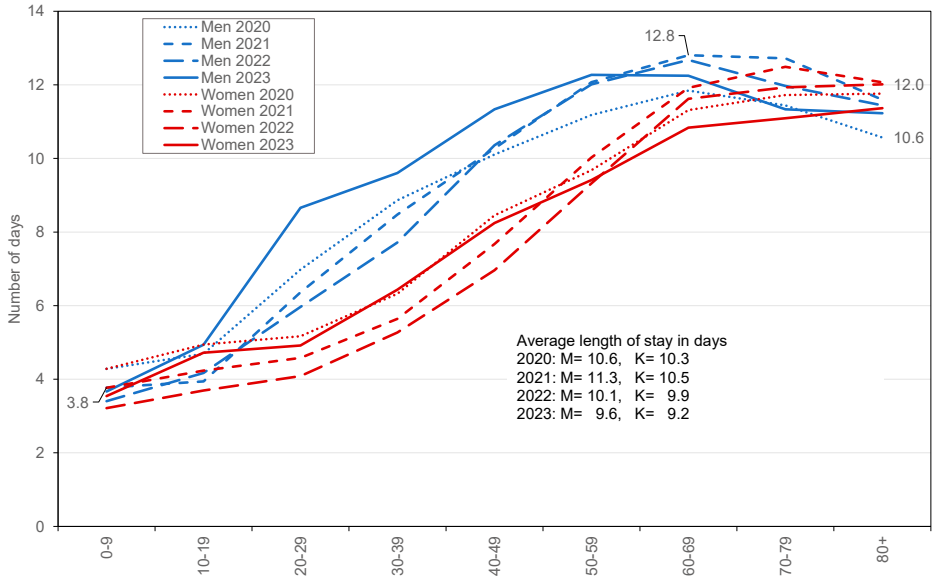

Fig. 4.16. Length of hospital stay for patients hospitalised for COVID-19 by sex and age in 2020–2023 (data: NIPH NIH – NRI)

Hospital mortality due to COVID-19 was very high in the first two years of the epidemic (Fig. 4.17). In 2021 and 2022, nearly one-quarter of hospitalised men died from the disease (24.3% and 22.9%, respectively). Among patients aged 85 and over, more than half died (52.9% and 53.3%). These rates were slightly lower for women – 19.1% and 19.9% overall, and 39.7% and 41.1% in the 85 and over age group. In the following years, mortality declined, likely as a result of increased population immunity through vaccination and improvements in treatment methods. Differences in the risk of death between men and women also narrowed. In 2022, mortality rates were 16.9% (38.1% in those aged 85+) for men and 15.5% (31.4%) for women. In 2023, these figures were 10.9% (28.1%) for men and 9.7% (23.3%) for women.

Across the entire observation period, in-hospital mortality for both sexes was close to zero for patients under 25 years of age. In older age groups, it increased rapidly and steadily, reaching the levels described above for people aged 85 and over. In general, male mortality was higher than female mortality – for people over the age of 25, in-hospital mortality rates were higher for men in every year and every age group analysed.

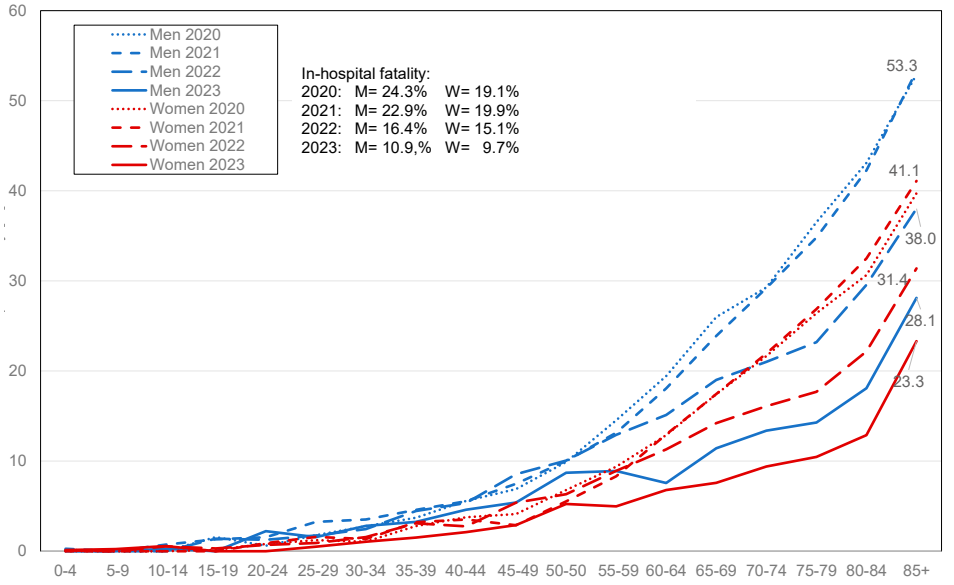

Fig. 4.17. In-hospital mortality due to COVID-19 by sex and age of patients in 2020–2023 (data: NIPH NIH – NRI)

The age structure of urban and rural residents hospitalised for COVID-19 in 2020–2023 was similar. In both subpopulations, a consistent increase in hospitalisation rates with age was observed from age 10 onwards. The average age of patients in both groups was comparable between 2020 and 2022 (differences did not exceed one year). However, in 2023, hospitalised urban residents were, on average, almost five years older than those from rural areas (58.3 versus 53.4 years). In-hospital mortality in both subpopulations decreased more than twofold over the four years, though mortality rates among the urban population were approximately one percentage point higher. Differences in the average length of hospital stay by year did not exceed 0.5 days.