



CATCHING GAPS WITH HEALTHCARE MAPS
CARDIOLOGY AND ONCOLOGY



A Map of Healthcare Needs for Mazowieckie Voivodeship – Cardiology

Summary

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Background information

1. In this report, in accordance with the decision of the Team for the development of maps of healthcare needs in the field of cardiology and cardiac surgery appointed by the Minister of Health, cardiological diseases are defined as diseases belonging to the following groups of diagnoses according to the ICD-10 classification: ischaemic heart disease (I20, I21, I24, I25), heart failure (I50), atrial fibrillation and flutter (I48), other rhythm and conduction disturbances (I44-I47, I49), cardiomyopathies (I42, I43), congenital heart defects (Q20-Q26), acquired heart defects (I05-I09, I34-I37), pulmonary embolism (I26).
2. To determine the incidence of cardiological diseases and the provision of healthcare services in the field of cardiology, the Polish National Health Fund (NFZ) database¹ for the years 2009-2014 was used, while the number of new cases was determined for the years 2010-2013 (2009 and 2014 were used to verify if the patient is a first-time patient). However, it is important to bear in mind that the NFZ data is used to settle accounts with the healthcare provider and may contain errors, e.g. in terms of ICD-10 diagnoses. Therefore, for the purpose of, for example, determining the date of diagnosing the disease in a patient, it was necessary to apply decision rules. Patients who appeared in the hospital or ER were automatically included in the determination of incidence as first-time patients. If the patient appeared for the first time at a Specialist Outpatient Care facility (AOS) and did not reappear in the system within the next 365 days, the products reported under this visit were analysed. Based on this, the probability that the patient is a first-time patient was assigned. For example, if the product was a post-hospital visit and the patient was not recorded in the hospital, the patient was included in the "New patient" category, assuming that the hospitalisation may have been due to a different (dominant) cardiological cause, but in the course of the disease they were also diagnosed with the analysed disease, while in the case of a W11 visit (outpatient counselling without indicating tests from the list qualifying for a higher payment - the simplest outpatient counselling), the patient was classified with 100% probability as a follow-up patient. In addition, patients with the first appearance at AOS with a diagnosis of myocardial infarction and pulmonary embolism were excluded from the incidence analysis².

¹ In the case of cardiological diseases, 3 medical registries are kept in Poland: Polish Registry of Acute Coronary Syndromes (PL-ACS), National Registry of Cardiac Surgery Procedures (KROK) and Polish Registry of Invasive Cardiology Procedures (ORPKI). None of these registries is sufficient to prepare information on the incidence of cardiological diseases and to forecast this value. The PL-ACS differs, in quantitative terms, from the values observed in the NFZ reports. A preliminary comparative analysis shows that not all facilities report their cases to the register. In addition, the submission to PL-ACS is carried out as soon as possible, while reporting to the NFZ is being prepared at the end of the hospitalisation, when the doctors have a more complete clinical picture of the patient. Moreover, acute coronary syndromes belong to only one of the groups of disease entities under cardiological diseases, so even with a full registry, the necessary prognostic information could not be obtained. KROK is, in turn, a registry of cardiac surgeries and covers only one of the methods of treatment of cardiac patients. The third of these registers, ORPKI, does not include patient IDs that would allow to combine the information coming therefrom with the NFZ reporting data. What is more, ORPKI also applies only to some cardiological diseases, which makes it unusable while designing a standardised method of analysis

² These disease entities, due to their acute course, cannot be treated in the outpatient care (hospitalised patients, life-threatening state). It was considered that a visit at AOS with this diagnosis is a continuation of the hospital treatment process.



- Information on cardiac surgical treatment for adults and children was prepared on the basis of data from the KROK registry due to the fact that not all procedures (e.g. highly specialist ones) were reported in the NFZ database.

Part I

Demographic and Epidemiological Aspects

Population Breakdown

In 2013, Mazowieckie Voivodeship was inhabited by 5.3 million people, which constitutes 13.8% of the country's population. It was the largest Polish region in terms of population. The population of Mazowieckie Voivodeship was, in demographic sense, older than the population of Poland.

Demographics of Mazovian Counties (poviats)

- The city of Warsaw was characterised by the largest population (1.7 million, 32.4% of the entire region's population). The lowest number of people (32 thousand, 0.6% of the entire region's population) inhabited Łosice County.
- As to the population ageing, the highest share of people aged 65 and 65+ was observed in the following Mazovian counties: the capital city of Warsaw (18.3%), Lipsko (17.3%), Sokołów Podlaski (17%) and Łosice (16.6%), while the lowest in: Wołomin (11.9%), Radom (12.2%), Ostrołęka City (12.2%), Legionowo (12.4%), Piaseczno (12.5%) and Ostrołęka (12.6%).

New Cases of Cardiological Diseases

In 2013, in Mazowieckie Voivodeship, 52.1 thousand new cases of cardiological diseases were diagnosed - this was the highest value among all Polish provinces. In other words, there were 981 diagnoses per 100,000 inhabitants, which equals to the 4th highest number in Poland. The most common diagnoses in the region were: ischaemic heart disease (569 diagnoses per 100,000 inhabitants) and other rhythm and conduction disturbances (398 diagnoses per 100,000 inhabitants).

Death Rate due to Cardiological Diseases

- Cardiac diseases are the first most frequent cause of death of the inhabitants of Mazowieckie Voivodeship (as it was the case in other regions of Poland). In the analysed period, they were responsible for 33.5% of deaths in Mazowieckie Voivodeship (31.2% in the case of men and 35.9% in the case of women), and these values are higher than those recorded for Poland in general (28%, 27% and 29.1% respectively). The actual mortality rate due to the total of cardiac diseases in Mazowieckie Voivodeship amounts to 341/100 thousand inhabitants and is by 22.7% higher than the national one (278/100 thousand inhabitants). The actual rates for women and men



are also higher than the national ones (26.6% and 18.7% respectively). After the standardization of rates according to age (SMR values), the difference in mortality of Mazowieckie Voivodeship inhabitants in relation to the national scale is decreasing. The adjusted rates are higher than the national ones by 13.8% for the total population and by 17.1% for women and 10.4% for men.

2. The most common causes of death in Mazowieckie Voivodeship were heart failure and cardiomyopathies, which together accounted for 45.3% of all deaths due to cardiac diseases. This value is higher than the national one, which is at the level of 36.9%. The SMR for heart failure and cardiomyopathy is higher by 38.8% in comparison with the national level. The highest values were recorded in the following counties: Radom, Siedlce, Żyrardów, and Radom City.
3. The second most frequent cause of death in Mazowieckie Voivodeship was ischaemic heart disease, which was responsible for 36.9% of all deaths due to cardiac diseases. The SMR for ischaemic heart disease is higher by 2.8% than the national one, and the highest values were recorded in the following counties: Mława, Grójec, Maków Mazowiecki, Koziences and Szydłowiec.
4. Pulmonary embolism was the cause of 1.8% of all deaths due to cardiac diseases in Mazowieckie Voivodeship. This value is higher than the national one, which oscillates at the level of 2.2%. The SMR for pulmonary embolism is lower by 8.2% in comparison with the national level. Due to the relatively small number of deaths in particular counties, the differences between the values of rates for counties should be interpreted with great caution. However, it should be noted that in Otwock County mortality is 2.5 times higher than the average for Mazowieckie Voivodeship.
5. Atrial fibrillation and flutter caused 1.2% of all deaths due to cardiac diseases in Mazowieckie Voivodeship. This value is slightly lower than the national one, which oscillates at the level of 1.5%. However, the regional SMR is lower by 12.6% in comparison with the national SMR. Low number of deaths due to atrial fibrillation and flutter does not allow a reliable analysis of the mortality diversification in Mazovian counties.

Part II

Status and Use of Resources: the Analysis

Inpatient Healthcare

1 Hospitals Providing Cardiological Treatment

1. In 2013 in Poland, 575 hospitals provided cardiological treatment, 72 of which were located in Mazowieckie Voivodeship. The majority of healthcare providers were located in city counties, of



which 28 in Warsaw, 3 in Otwock County, and 2 in each: Siedlce, Radom, Pruszków and Płock. Out of all hospitals settling cardiological healthcare services, 263 healthcare providers treated 80% of patients with cardiological diagnoses.

2. The region has 1,388 hospital beds at its disposal in cardiology wards, 245 in cardiology intensive care wards, 121 in cardiological rehabilitation wards and 184 in cardiac surgery wards (these are beds located in entities that have performed over 1% of hospitalisations in the region). The largest cardiology unit is The Cardinal Wyszyński Institute of Cardiology in Warsaw with 363 hospital beds.
3. The largest number of patients in Mazowieckie Voivodeship was admitted to Cardinal Wyszyński Institute of Cardiology in Warsaw - 12,431 patients (13.5% of all patients treated in the region) during 15,886 thousand hospitalisations (14.1% of hospitalisations in the region). The second facility, Central Clinical Hospital of the MSWiA in Warsaw, treated 4,962 patients (5.3% of all patients treated in the region) during 6,427 hospitalisations (5.7% of hospitalisations in the region).
4. There were 29 (out of 72) healthcare providers who treated more than 1.0% of patients regionwide, and 27 healthcare providers whose share of hospitalisations exceeded 1% of all hospitalisations in the region. In 2013, taking into consideration the entire Mazowieckie Voivodeship, 989,467 patients were treated due to cardiac reasons during 109,453 hospitalisations. On average, the number of hospitalisations per patient in Mazowieckie Voivodeship amounted to 1.2.
5. In internal wards, in hospitals where over 1.0% of patients regionwide were treated, over 14 thousand patients with cardiological diagnoses were treated in internal medicine wards (18.5% of all cardiological patients), in cardiology wards - over 59.3 thousand patients (78% of all cardiological patients), while in cardiac surgery wards - 3.7 thousand patients (3.7% of all cardiological patients). In hospitals with cardiology and internal medicine wards, 66% to 97.1% of patients with cardiological diagnoses are treated in cardiological wards.
6. Most patients (28.1 thousand) were hospitalised with the diagnosis "Other forms of coronary heart disease" , which accounts for 31% of all cardiological hospitalisations in the region. The second most frequent diagnosis is heart failure (19.3 thousand hospitalisations, which accounts for 21% of all cardiological hospitalisations in the region). The next most common disease entities were: Acute coronary syndrome (ACS) (13.5 thousand hospitalisations, which accounts for 13.5% of all cardiological hospitalisations in the region), other rhythm and conduction disturbances (9.6 thousand hospitalisations - 10%), acquired heart defects (7.3 thousand - 8% of hospitalisations), atrial fibrillation and flutter (9.3 thousand hospitalisations - 10%), pulmonary embolism (1.5 thousand - 2% of hospitalisations) and congenital heart defects (1.4 thousand - 1% of hospitalisations).



7. The largest number of in-patients suffering from coronary heart disease were admitted to the Cardinal Wyszyński Institute of Cardiology in Warsaw - 7.9 (6 thousand - other forms of ischaemic heart disease, 1.8 thousand - ACS), which altogether accounts for 49.6% of hospitalisations due to cardiac reasons in this hospital. The Independent Public Central Clinical Hospital in Warsaw holds the second position with about 3 thousand admissions (2.1 thousand - other forms of coronary heart disease, 858 - ACS), which altogether accounts for 46% of hospitalisations due to cardiological reasons. The next place belongs to the Military Institute of Medicine - 2.6 thousand admissions (1.7 thousand - other forms of coronary heart disease, 870 - ACS), which altogether accounts for 60% of hospitalisations due to cardiological reasons.
8. There are two hospitals in Mazowieckie Voivodeship where the number of hospitalisations due to acute coronary syndromes exceeds 1000. More than 800 and less than 1000 hospitalisations yearly due to ACS are recorded in 5 hospitals in the region.
9. Among the entities in Mazowieckie Voivodeship that admitted over 1% of in-patients, 20 reported the performance of coronary angiography (a total of 24.5 thousand) and 25 - the performance of coronary angioplasty (a total of 16 thousand). Pacemaker implantations were performed in 2013 in 19 hospitals (a total of 5.2 thousand), Implantable Cardioverter Defibrillator (ICD) implantations (a total of about 1 thousand procedures) in 17 hospitals, Cardiac Resynchronisation Therapy (CRT) implantations (a total of 449) in 12 hospitals, ablation of arrhythmia (a total of 2,000 procedures) in 14 hospitals, and heart valve surgery (a total of 927) in 6 hospitals.
10. In 2013, around 4% of patients from Mazowieckie Voivodeship were treated outside the region. Most patients (1,523) were treated in Lubelskie Voivodeship, as well as in the following voivodeships: Świętokrzyskie (524), Łódzkie (415), Śląskie (226) and Warmińsko-Mazurskie (201). In 2013, 9% of patients hospitalised in Mazowieckie Voivodeship originated from another region. Most of them came from Lubelskie Voivodeship (1794 patients), Łódzkie Voivodeship (1541), Podlaskie Voivodeship (893) and Kujawsko-Pomorskie Voivodeship (756).
11. The data indicates that in each diagnosis of ACS (STEMI infarction, NSTEMI infarction, UA) and in each age group the mortality among patients who weren't cardiologicaly rehabilitated was clearly higher than the mortality in the rehabilitated group (regardless of the number of months passing from the coronary angioplasty). The differences reach up to 123% (STEMI infarction). These results should trigger changes in the field of cardiological rehabilitation in Poland.

2 Adult Cardiac Surgery

There are six centres of adult cardiac surgery in Mazowieckie Voivodeship: 1. The Independent Public Central Clinical Hospital in Warsaw, Cardiac Surgery Ward, Department of Internal Medicine and



Cardiology, Medical University of Warsaw; 2. The Military Institute of Medicine; 3. Cardiology Institute, Cardiac Surgery Clinic in Warsaw; 4. Allenort Hospital, Cardiac Surgery Clinic; 5. The Central Clinical Hospital of the MSWiA in Warsaw, Cardiac Surgery Clinic; 6. Mazovian Specialist Hospital in Radom, Cardiac Surgery Ward. The facilities have a total of 162 cardiosurgical beds, 11 operating theatres and 69 ICU positions. In 2013, cardiac surgery was performed 3921 times in total, coronary bypass surgery - 2098 times, acquired heart defects (valvular) surgery - 947 times, combined operations - 351 times, thoracic aortic aneurysms - 277 times, aortic dissection type A - 82 times and infective endocarditis - 56 times.

3 Paediatric Cardiac Surgery

There are two centres of paediatric cardiac surgery in Mazowieckie Voivodeship, in Warsaw: The Children's Memorial Health Institute and The Independent Public Paediatric Clinical Hospital. The Children's Memorial Health Institute, the centre with the highest referral level, has at its disposal a total of 24 cardiosurgical beds, 2 operating theatres and 10 ICU positions. In 2013, the following procedures were performed: surgery of congenital heart defects: 415 times, including 277 procedures with and 30 procedures without extracorporeal circulation; neonatal surgery: 95 times, including 65 procedures with and 30 procedures without extracorporeal circulation; 139 infant and 180 children's operations. The centre treats patients from both neighbouring voivodeships and from Poland in general. The Independent Public Clinical Hospital, the centre with the second referral level, has at its disposal a total of 15 cardiosurgical beds, 2 operating theatres and 7 ICU positions. In 2013, the following procedures were performed: surgery of congenital heart defects: 137 times, including 92 procedures with and 45 procedures without extracorporeal circulation; neonatal surgery: 24 times, including 2 procedures with and 22 procedures without extracorporeal circulation; 83 infant and 30 children's operations.

Specialist Outpatient Care

1. In 2013, in Poland there were 2,424 Specialist Outpatient Care Facilities (AOS) where cardiological treatment was provided. Of these, 254 were situated in the analysed voivodeship. Among the Mazovian counties, the greatest number of SOCFs were located in Warsaw (106).
2. The largest number of cardiological patients was admitted to the Cardinal Wyszyński Institute of Cardiology in Warsaw (22.5 thousand patients that is 11.7% of all individual patients in the analysed region).

Primary Care

In May 2015, Mazowieckie Voivodeship maintained 678 registered primary care centres. An average number of treatments per one inhabitant of Mazowieckie Voivodeship amounted to 4.3. Women



benefited from them more often than men (5.3 and 3.42 respectively). The distribution of services per primary care unit showed large variations between counties. The highest number of primary healthcare services was provided in Gostynin County (57.8 thousand), whereas the lowest in Lipsko County (16.1 thousand).

Part III

Healthcare Needs Forecasts

Demographic Forecast

1 Projected Population Breakdown

In the years 2014-2029, the number of inhabitants of Mazowieckie Voivodeship will increase by 84 thousand, i.e. by 1.6%, while the Polish population will decrease in this period by 1.17 million people. Mazowieckie Voivodeship population breakdown according to age and gender will be changing along with the Polish population breakdown according to the same factors.

2 Projected Demographics of Mazovian Counties

It is expected that by 2029 the population of individual Mazovian counties will have changed to different extent. The highest decrease is expected in Lipsko County (by 12%) and the highest increase is expected in the following counties: Piaseczno (by 20%), Wołomin (by 18%), Legionowo (by 16%) and Grodzisk Mazowiecki (by 15%).

Incidence Forecast

Taking into account demographic processes only, it is estimated that in 2015-2025 the incidence in Mazowieckie Voivodeship will increase from 53.4 thousand to 60.8 thousand. (+7,4 thousand; +14%; the highest number in Poland). In terms of the dynamic of incidence growth, Mazowieckie Voivodeship places itself at the 9th position in Poland.

Projected Number of Healthcare Services

1 Cardiological Treatment



Over the projected years (2016-2029), the changes in Mazowieckie Voivodeship population breakdown according to age, sex and place of residence alone will increase the demand for procedures performed in haemodynamic laboratories by 21.6%. Considering the above, the demand for haemodynamic tables will systematically increase. However, when comparing the current resources (32 tables in the region according to the data available in the resources of the national and regional consultants) to the desired resources, it should be stated that in the projected period there is no urgent need for increasing the number of haemodynamic tables in the region.

2 Adult Cardiac Surgery

In Mazowieckie Voivodeship, one should expect an increasing demand for cardiosurgical procedures, and the demand will be the highest among all voivodeships. Nevertheless, assuming the maximum number of procedures per one operating theatre at 569 (this is the maximum number of surgeries performed in one operating theatre in 2014), it can be concluded that there is no need for building a new cardiosurgical facility in the region.

3 Paediatric Cardiac Surgery

Considering the decline in the number of births in Mazowieckie Voivodeship forecast by the Central Statistical Office, the number of children born with congenital heart defects will also decrease. Currently, the patients' needs are secured by child-based cardiac surgery centres located in the region, and the demographic and epidemiological forecasts do not show the need for building a new facility in the future.