

Regional differences in the frequency of diabetes occurrence and its treatment costs during the years 2008–2013, based on the NFZ (National Health Fund) database

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In the European region in 2013 the International Diabetes Federation (IDF) estimated the number of patients with diabetes at 56 million [1]. The costs of treatment in Europe were estimated at 140 million Euro. Recently Tamayo *et al.*, when presenting the data for Poland in the updated IDF Diabetes Atlas report, estimated the morbidity at approx. 6.5% [2]. This number was estimated based on the “Wieloośrodkowe Ogólnopolskie Badanie Stanu Zdrowia (WOBASZ)” project of 2003–2005 and earlier analyses from 1998–2001 [3]. Other studies include: Screen-Pol, Polish Multicenter Study on Diabetes Epidemiology (PMSDE) and “Nadciśnienie Tętnicze w Polsce Plus Zaburzenia Lipidowe i Cukrzyca (NATPOL-PLUS)” [4–6]. These analyses were partially local or were based on relatively small groups of patients. In 2004 the total cost of diabetes treatment in Poland was estimated at approx. PLN 6 billion [7]. High social costs of diabetes necessitate uninterrupted preventive activities, enabling the restriction of morbidity and public expenses for its treatment. The studies dedicated to regional variability of diabetes prevalence may help to identify specific risk factors and differences in management. In the region of Europe the differences of morbidity are very high, within the range from 2.4% in Moldavia up to 14.9% in Turkey [2]. In addition to the actual differences in the frequency of occurrence, they certainly are related to uneven and not fully reliable method of data calculation in individual countries [2]. Within Poland, the regional data concerning the frequency of diabetes occurrence in the years 2003–2005 ranged from 4.2% in women in Małopolska province up to 9.0% in men in Wielkopolska province [3]. Current data on regional differences may form the basis for future more detailed analyses on social, epidemiological and economic reasons for the variability of diabetes occurrence frequency in Poland.

The database of the National Health Fund enables the diabetes occurrence frequency assessment with unified methodology for the entire population of Poland divided by regions. This report presents the results of an abbreviated analysis of the general Polish NFZ (National Health Fund) database concerning the diabetes regional occurrence, based on the assessment of: (1) services provided according to ICD-10 codes:

E10 – insulin-dependent diabetes mellitus; E11 – non-insulin-dependent diabetes mellitus; E12 – malnutrition-related diabetes mellitus; E13 – other specified diabetes mellitus; E14 – unspecified diabetes mellitus; (2) filled prescriptions for oral diabetes medication, insulin and test strips for blood glucose meters. The patient population size (morbidity) along with territorial indicators was calculated using an anonymised individual patient number (PESEL). Morbidity indicators per 100,000 inhabitants of a given province were calculated based on demographic data obtained from the Chief Statistical Office website for each year separately.

In the years 2008–2013 each year on the average approx. 2.3 million patients were treated for diabetes (morbidity: 5.97%). Small variations in the number of diabetes cases were observed between the years 2008 and 2009 as well as between 2011 and 2012. They may be attributed to the launch of the system and the legal changes introduced in 2011. There were no other significant differences in the number of diabetes volume in the subsequent years. In particular, no significant increase in diabetes prevalence was noted when years 2009 and 2013 were compared. Therefore based on the presented data it may be concluded that diabetes prevalence is in general stable in Poland. The regional morbidity indicators per 100,000 inhabitants in the years 2008–2013 sorted in descending order of frequency of occurrence

in the year 2013 are presented in Table I, and the regional indicators of health care costs (total: services and medication and test strips for glucose meters) in Poland in the years 2008–2013 sorted in descending order, calculated per patient, are presented in Table II.

Average diabetes occurrence frequency in a given province in successive years of the studied period were not significantly statistically different (average 5,845 ±591 persons/100,000 inhabitants). However, the average diabetes occurrence frequency in the 8 provinces with the lowest morbidity indicators was statistically significantly lower than in the 8 provinces with the highest morbidity indicators (6,454 ±335 vs. 5,625 ±391 patients per 100,000 province inhabitants; $p = 0.002$; independent samples Student's *t*-test). The difference between the province with the highest (Śląskie) and lowest (Podkarpackie) morbidity was 14%.

The average diabetes therapy cost per patient over the studied period was PLN 648 ±26. There were statistically significant differences in the financing of diabetes therapy between the 8 provinces with the lowest and the 8 provinces with the highest cost of treatment (PLN per person 676.88 ±13.2 vs. 619.25 ±25.27; $p < 0.0001$; independent samples Student's *t*-test). The difference between the province with the highest (Podlaskie) and lowest (Dolnośląskie) average diabetes treatment cost was 8.5%.

Table I. Average diabetes occurrence frequency in individual provinces in the years 2008–2013, calculated per 100,000 inhabitants, sorted in a descending order by frequency of occurrence for 2013

Ranking	Province	2008	2009	2010	2011	2012	2013
1	Śląskie	6,609	7,203	7,483	7,798	6,759	7,062
2	łódzkie	6,055	6,846	7,165	7,801	6,733	6,919
3	Opolskie	5,517	6,189	6,474	7,131	6,492	6,710
4	Dolnośląskie	5,814	6,467	6,769	7,157	6,353	6,611
5	Zachodniopomorskie	5,454	6,222	6,579	7,032	6,159	6,384
6	Pomorskie	5,275	5,873	6,338	6,790	6,091	6,284
7	Kujawsko-pomorskie	5,630	6,192	6,596	7,015	6,002	6,259
8	Świętokrzyskie	5,515	6,093	6,403	6,852	5,910	6,128
9	Wielkopolskie	5,294	5,887	6,184	6,568	5,841	6,088
10	Lubuskie	4,883	5,389	5,701	6,149	5,728	6,053
11	Małopolskie	5,564	5,933	6,173	6,609	5,655	5,878
12	Mazowieckie	5,439	5,810	6,082	6,387	5,584	5,833
13	Lubelskie	5,050	5,691	5,854	6,220	5,289	5,483
14	Warmińsko-mazurskie	4,924	5,268	5,449	5,766	5,157	5,410
15	Podlaskie	4,376	4,859	5,088	5,442	4,919	5,182
16	Podkarpackie	4,463	5,100	5,324	5,670	4,897	5,074

Table II. Average expenditures in PLN (Polish zlotys) in Poland calculated per patient (health care services) in individual provinces, in the years 2008–2013, sorted in descending order according to the amount of expenses for the year 2013

Ranking	Province	2008	2009	2010	2011	2012	2013
1	Podlaskie	530	582	612	760	677	693
2	Lubuskie	611	640	684	815	645	689
3	Śląskie	530	575	598	764	659	687
4	Podkarpackie	521	561	583	731	635	682
5	Małopolskie	510	556	586	724	635	675
6	Mazowieckie	489	548	595	734	657	669
7	Łódzkie	490	557	587	732	620	665
8	Kujawsko-pomorskie	517	571	623	759	608	655
9	Świętokrzyskie	486	535	539	686	609	655
10	Wielkopolskie	526	546	587	753	601	650
11	Lubelskie	491	523	563	700	579	622
12	Pomorskie	525	558	581	709	579	621
13	Opolskie	525	558	600	706	579	617
14	Zachodniopomorskie	489	535	569	710	574	613
15	Warmińsko-mazurskie	451	518	560	688	566	599
16	Dolnośląskie	476	490	526	673	542	577

The presented results indicate significant variation both in the diabetes occurrence frequency indicators and diabetes treatment costs – interestingly, for different pairs of provinces. The WOBASZ analysis for the years 2003–2005 noted an even larger difference between the province with the highest diabetes occurrence frequency – up to 41.1% for men and 44.0% for women [3]. From the first 8 provinces with the highest diabetes occurrence frequency (for men) in the WOBASZ 2003–2005 study, the Śląskie, Opolskie, Zachodniopomorskie, Pomorskie and Kujawsko-pomorskie provinces remained in the top 8. However, provinces where the diabetes occurrence frequency was previously relatively low – Świętokrzyskie, Łódzkie and Dolnośląskie – have now moved to the top 8. Łódzkie province is now in the second highest position, and Dolnośląskie province has moved from the last but one position to the fourth highest. In WOBASZ the highest morbidity was noted in Wielkopolskie province, where, according to the current analysis, morbidity is now moderate [3]. In the same province in WOBASZ the highest frequency of metabolic syndrome (in men) was also noted [8]. In the years 2003–2005 the frequency of metabolic syndrome in Śląskie province, which is now at the top position in diabetes prevalence, was relatively low [8]. On the other hand, in Łódzkie province, currently in second position,

metabolic syndrome was relatively frequent [8]. These numbers clearly require further analyses, especially as the average anticipated lifespan is the shortest in Łódzkie and significantly shorter than average in Śląskie province [9].

The highest diabetes treatment costs per patient were noted in Podlaskie province, where the diabetes occurrence frequency is rather low (last but one position in the ranking). Śląskie province has the highest morbidity and high treatment costs. Dolnośląskie province is in fourth position according to the prevalence of diabetes, but costs of treatment per capita are the lowest. Of note, 5 out of 8 provinces with the highest treatment costs are provinces with the lowest diabetes prevalence. This significant regional differences of diabetes prevalence and treatment costs require further analyses aimed at identifying the factors responsible for the presented variability. This will help to modify the local diabetes prevention and treatment programmes and to rationalise the expenses.

Conflict of interest

The authors declare no conflict of interest.

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