



## Wzrastająca zapadalność na cukrzycę typu 1 w Polsce południowo-wschodniej. Badania populacji od 0 do 29. roku życia w latach 1980–1989

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### Streszczenie

**Wstęp:** Badania przeprowadzone w ostatnich latach dostarczają informacji o wzroście zapadalności na cukrzycę typu 1 w różnych regionach świata, w tym także w krajach sąsiadujących z Polską.

Celem badania było określenie długoterminowych trendów zapadalności na cukrzycę typu 1 w latach 1980–1999 i porównanie zapadalności między dwoma dekadami tego okresu, przyjmując 1989 rok za początek ekonomicznej i politycznej transformacji w Polsce.

**Materiał i metody:** Rejestr zapadalności na cukrzycę typu 1 prowadzono zgodnie z rekomendacjami DERI, używając 3 źródeł danych o chorych. Wyliczono standaryzowaną zapadalność w 5-letnich przedziałach wiekowych oraz określono długoterminowy trend zapadalności na cukrzycę typu 1 w południowo-wschodniej Polsce.

**Wyniki:** Wykazano znamienne trend wzrostowy w populacji od 0 do 29. roku życia zamieszkującej byłe województwo rzeszowskie w latach 1980–1999. Średnia zapadalność standaryzowana według wieku wynosiła 6,1/100 000 oraz istniała statystycznie znamienna różnica zapadalności pomiędzy dekadą lat 80. i 90., odpowiednio 5,3 (95% CI 4,5–6,0) i 6,8 (95% CI 5,9–7,6). Zapadalność była statystycznie znamienne wyższa u mężczyzn w porównaniu do kobiet i wynosiła odpowiednio 6,7 i 5,5/100 000. Zapadalność była

wyższa w grupie od 0 do 14. roku życia w porównaniu z grupą osób w wieku 15–29 lat, odpowiednio 6,4 i wobec 5,8/100 000. Najwyższą zapadalność zarejestrowano u chłopców w wieku 10–14 lat — 11,5/100 000, ponadto stwierdzono znamienne rosnący trend zapadalności u dzieci w wieku 0–4 lat.

**Wnioski:** Podsumowując, można stwierdzić, że zapadalność na cukrzycę typu 1 w badanej populacji była niska. Niemniej wykazano rosnący trend zapadalności w czasie 20-letniej obserwacji. Zapadalność w dekadzie lat 90. zarówno ogólna, jak i wśród mężczyzn była znamienne wyższa w porównaniu do dekady lat 80.

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**Słowa kluczowe:** cukrzyca typu 1, zapadalność, epidemiologia, Polska



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## The rising incidence of type 1 diabetes in south-eastern Poland. A study of the 0–29 year-old age group, 1980–1999

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### Abstract

**Introduction:** Studies carried out over the last few years have provided information about the increase in the incidence of type 1 diabetes in different parts of the world including the European countries bordering Poland.

**The aim of study:** The aim of this study was to determine the long-term trends in the incidence of type 1 diabetes over the 20 years between 1980 and 1999 and to compare the incidence during the decades preceding and following the 1989 economic and political transformation in Poland.

**Material and methods:** The registration of type 1 diabetes among people aged 0–29 was drawn up according to the DERI recommendations using three data sources. We calculated the age-standardised incidence rates for five-year age groups and determined the long-term trend in the incidence of type 1 diabetes in south-eastern Poland.

**Results:** A significant growth in the incidence of type 1 diabetes was observed among people aged 0–29 in the Rzeszów Province in the period between 1980 and 1999. The mean age-standardised incidence rate was 6.1/100 000, and a statistically significant difference was noted between the 1980s and the 1990s (5.3 [95% CI 4.5–6.0] and 6.8 [95% CI 5.9–7.6]). The male incidence of 6.7 significantly exceeded that for females — 5.5/100 000. There was also a higher in-

cidence in the group aged 0–14 in comparison with the group aged 15–29 (6.4 and 5.8/100 000 respectively). The highest incidence was found in boys aged 10–14 (11.5/100 000) and a significantly rising trend was observed in children of 0–4 years old.

**Conclusions:** The mean incidence of type 1 diabetes among the study population was low. Nevertheless, we demonstrated a significantly increasing trend in the incidence during the 20-year observation period. The incidence in the 1990s, both in general and for males, was significantly higher when compared to the 1980s.

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**Key words:** type 1 diabetes, incidence, epidemiology, Poland



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### Introduction

Studies carried out over the last few years have provided information about the increase in the incidence of type 1 diabetes in different parts of the world [1] including the European countries bordering Poland [2, 3]. Polish epidemiological registers also show a growing incidence of type 1 diabetes in children [4]. The economic and social changes launched in 1989 in this country may, potentially, be responsible for this phenomenon. We present here the results of 20 years of observation of the 0–29 age group within the same geographical area as described in a previous study [5], which now, following the boundary and administrative changes of 1 January 1999, composes the main part of the Podkarpackie region. These 20 years cover two equal but different stages in the social development of the country

and would appear to be long enough to determine potential trends in the incidence of type 1 diabetes among the 0 to 29 year-old population.

### Material and methods

The area of the former Rzeszów Province is 4400 km<sup>2</sup>. The population is ethnically homogenous, of Slavic origin and totalled 804 326 inhabitants in 1999 (according to data from the Provincial Statistical Office of Rzeszów). Rzeszów, with 162 433 inhabitants comprising (20.2%) of the total population, is the capital of the Province. We report here the incidence of type 1 diabetes in the population aged 0–29, from 1 January 1980 to 31 December 1999. The cases were registered according to the Diabetes Epidemiology Research International Group (DERI) criteria [6]. Three data sources were charac-

terised in the previous publication [5]. Registration was performed retrospectively from 1980–1989 and prospectively from 1990–1999. For each patient the record included name, sex, date of birth, date of first insulin injection and home address at the time of diagnosis.

The incidence rate was expressed as the number of new cases of type 1 diabetes estimated annually per 100 000 of the population by sex and age, adjusted to the world population. A 95% confidence interval was derived by the Poisson method. The case ascertainment was calculated by the capture-recapture method [4] and estimated at 99%. A trend analysis was performed using a linear regression model, with occurred incidence evolution as a function of time.

## Results

The total of 430 new cases of type 1 diabetes, 239 males (55.6%) and 191 females (44.4%), were registered in the area of the former Rzeszów Province between 1 January 1980 and 31 December 1999. In the two age groups, the 0–14 group and the 15–29 group, we identified 237 and 193 cases respectively. In the first decade (1980–1989), 185 cases were registered, whereas in the next (1990–1999) the number rose to 245. The mean standardised incidence rate over 20 years was 6.1 per 100 000 of the population aged 0–29 (95% CI 5.5–6.7). The mean increase in the incidence rate was calculated with 0.21 ( $p = 0.002$ ) a year for the above-mentioned population. This corresponds to an annual increase of 3.4%.

Table I shows the incidence rate in the population as a whole and the values related to each sex and age

group (0–14 and 15–29). In the population as a whole the incidence in males was significantly greater statistically and in the male population aged between 15 and 29 it was greater than in females of the same age.

A statistically significant difference was observed between younger and older girls, with a greater incidence in the younger 0–14) age group. There were no statistically significant differences in the incidence rate between different five-year age groups. In the 0–14 age group, which is most frequently the object of study worldwide, the highest incidence was observed typically in the 10–14 year range, with a greater incidence evident among males — 11.5/100 000, whereas 0–4 years old females were characterised by the lowest incidence of 3.03/100 000.

When the two decades were compared we concluded that the incidence of type 1 diabetes in the 0–29 year-old population as a whole was significantly higher in the period 1990–1999, reaching 6.8/100 000 [95% CI 5.9–7.6], than in 1980–1989, where it was 5.3/100 000 [95% CI 4.5–6.0], and also in males, where it was 7.5/100 000 [95% CI 6.2–8.8] vs. 5.8/100 000 [95% CI 4.7–6.9] respectively.

We observed a trend towards a rising incidence in the population aged 0–29 in the former Rzeszów Province from 1980 to 1999. This was statistically significant in general (the mean annual incidence rate difference was 0.21;  $p = 0.002$ ), and for males (0.28;  $p = 0.004$ ), females (0.17;  $p = 0.008$ ) and the 0–14 age group (0.27;  $p = 0.003$ ). In the first decade, it appeared significant for the whole population 0–29 years (0.44;  $p = 0.008$ ), males (0.61;  $p = 0.011$ ), and the 0–14 age group (0.406;  $p = 0.033$ ).

**Table I**

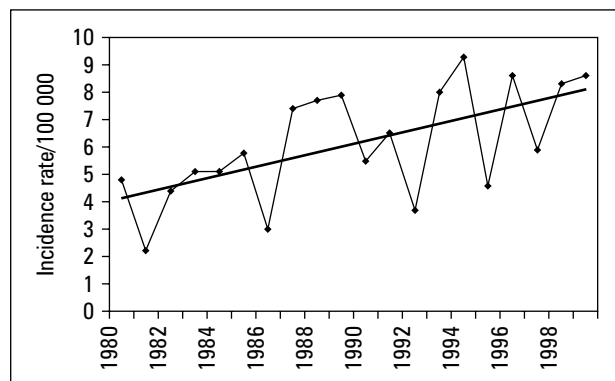
*The age-standardised incidence rate of type 1 diabetes in the Rzeszów Province per 100 000 population/year during 1980–1999*

**Tabela I**

*Standaryzowany współczynnik zapadalności na cukrzycę typu 1 w województwie rzeszowskim na 100 000 populacji w latach 1980–1999*

Age ranges	No. of cases	Mean population at risk/year	Incidence rate (95% CI)
<b>Both sexes</b>			
0–29	430	351 836	6.1 (5.5–6.7)
0–14	237	184 823	6.4 (5.6–7.2)
15–29	193	167 012	5.8 (5.0–6.6)
<b>Males</b>			
0–29	239	179 261	6.7 (5.8–7.5) <sup>#</sup>
0–14	121	94 465	6.5 (5.4–7.7)
15–29	118	84 796	6.8 (5.6–8.1) <sup>§</sup>
<b>Females</b>			
0–29	191	172 574	5.5 (4.7–6.3) <sup>#</sup>
0–14	114	90 358	6.3 (5.1–7.4) <sup>*</sup>
15–29	77	82 216	4.7 (3.7–5.8) <sup>§*</sup>

<sup>##</sup> — differences significant statistically; <sup>#</sup> $p = 0.04$ ; <sup>§</sup> $p = 0.01$ ; <sup>\*</sup> $p = 0.03$



**Figure 1.** Rising incidence of diabetes type 1 in population 0–29 years in Rzeszów Province 1980–1999

**Rycina 1.** Wzrastająca zapadalność na cukrzycę typu 1 w populacji 0–29 lat w województwie rzeszowskim w latach 1980–1999

The second decade, however, marks a continuing increase in the incidence only in the 0–14 age-group (0.79;  $p = 0.007$ ), whereas for young females aged 15–29 the incidence figures show a decline in type 1 diabetes cases (minus 0.82;  $p = 0.019$ ). The analysis of separate five-year age subgroups reveals a significantly rising trend in the 0–4 year-old group (0.29;  $p = 0.016$ ).

Figure 1 shows a linear rise in the incidence of type 1 diabetes in each year over the period 1980–1999 in the study population as a whole.

## Discussion

The registry drawn up by us is based on one of the longest studies of type 1 diabetes incidence in Poland and thus allows us to make a comparison between the pre- and post-transformation periods of 1980–1989 and 1990–1999 respectively. It showed an incidence rise from 5.31 (1980–1992) [6] to 6.1 (1980–1999), which amounts to 14.9%. The incidence rate in the 0–14 age group meets the criteria for a low incidence rate and is slightly lower than that found in other better developed regions of the country [4]. The group aged 15–29 showed an insignificantly lower incidence compared to the 0–14 group, as in Belgium [7] in the 15–39 age group, where, however, the difference was statistically significant, and in eight other European countries [8].

Our male/female ratio of 1.53 for the 0–29 age group corresponds to the one noted by Weets–1.6 [7], but corresponds only to the oldest group, aged 25–29, in the study by Kyvik et al. [8]. A mean annual incidence growth of 3.4% was 0.4% higher than the result from pooled data for 37 populations in the 0–19 age group [1]. In the 0–14 age group the highest incidence rate occurred at puberty (10–14 years), which is similar to the observations from the neighbouring Czech Republic [3] and other European countries [8]. Admittedly,

the 0–4 age group marked the lowest incidence rate, but an upward trend was observed, as in the rest of the world except for Belgium [7], where such an increase is believed to be an early clinical manifestation with the incidence remaining generally at the same level.

In the decade 1990–1999 the incidence rose by 60 cases, which makes a 32.4% growth in comparison with the period 1980–1989. The 1990s were characterised by a growing incidence rate in the 0–14 age group and a diminishing number of new cases in the female group aged 15–29. The unemployment rate in Poland exceeded 15% and social stratification was becoming increasingly evident at that time. The tendency towards rising childhood obesity in the Podkarpacie region, which averaged 7.0% for boys and 11% for girls in 2000, appeared significantly higher than the data recorded nationwide in the mid 1990s [9]. This might suggest a correlation between the rising incidence in children and an accelerator hypothesis. According to Patterson [10], a type 1 diabetes incidence rise in children may be wealth-related. Poland, whose GDP is between two and four times lower than that in the neighbouring Czech Republic [3] and Germany [8] boasts a correspondingly lower (by half) incidence rate in relation to these countries.

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