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SCARLET FEVER IN POLAND IN 2013*

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ABSTRACT

OBJECTIVE. Assessment of the epidemiological situation of scarlet fever in Poland in 2013 in comparison with previous years.
MATERIALS AND MATHODS. The evaluation was performed by reviewing surveillance data published in the bulletin, "Infectious diseases and poisonings in Poland in 2013" (Warsaw 2014, NIPH-NIH, CSI) and also in bulletins from previous years, and unpublished data collected under Statistical survey program of official statistics.
RESULTS. In 2013 did not change the general view of the epidemiological situation of scarlet fever in Poland. Analysed data did not indicate the possibility of shortening an epidemic cycle of scarlet fever, nor suggest growing rate of epidemic curve or increase of average annual incidence which was observed in last twenty years. In 2013, in the country a total of 25 115 cases were registered with corresponding incidence 65.2 per 100,000 population (in voivodeships: from 22.9 in Łódzkie to 111.1 in Pomorskie). The highest incidence was notified in 5-year-old (949.2) and 4-year-old children (916.6), and the cases among children and young people up to 15 years accounted for 87.0% of all cases. The incidence among men (78.8) was higher over 50% than incidence among women (52.5). The incidence was higher in urban areas than in rural areas and was 68.7 (in rural area 59.9). 1.04% of patients were hospitalized. No deaths related to this disease were reported.
SUMMARY. A sudden increasing incidence among men, especially in the 15-19 age group and growing proportion of cases among adults in comparison to the notified in previous years, according to authors' opinion, can be associated with compensatory epidemic of rubella (!).
It is estimated, that about 10% scarlet fever cases reported to surveillance in a year are misclassified and could be unrecognized cases of rubella. Therefore, it is important to enhance specificity of epidemiological surveillance of scarlet fever. Additionally, it will give a better opportunity to monitor and supervise measles and rubella elimination program.

Key words: *scarlet fever, infectious diseases, epidemiology, Poland, 2013*

OBJECTIVE

The aim of this study was to assess the epidemiological situation of scarlet fever in Poland in 2013 in comparison with the previous years.

MATERIALS AND METHODS

The assessment of epidemiological situation of scarlet fever in Poland in 2013 was performed by reviewing surveillance data registered in the sanitary inspection and sent to Department of Epidemiology NIPH-NIH by Voivodeship Sanitary-Epidemiological Stations under Statistical survey program of official statistics (PBSSP; reporting forms MZ-56, MZ-58).

In this article were used both data published in the bulletin, "Infectious diseases and poisonings in Poland in 2013" (Warsaw 2014, NIPH-NIH, CSI), data form bulletins from previous years and data collected within PBSSP, heretofore unpublished.

The above data refer to scarlet fever cases obligatory reported by physicians according to legal act „Rozporządzenie Ministra Zdrowia w sprawie zgłoszeń podejrzenia lub rozpoznania zakażenia, choroby zakaźnej lub zgonu z powodu zakażenia lub choroby zakaźnej (Dz. U., 2013, poz. 848).

During the whole period of registration of scarlet fever cases in Poland, i. e. since 1963., the reports include all cases reported by physicians. This allows for direct comparison of long-term data, providing exclusion of

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case classification adopted by the Polish surveillance system in 2005 and comparing the overall number of registered cases.

RESULTS AND DISCUSION

In 2013 in Poland to sanitary inspection 25 115 cases of scarlet fever were reported corresponding to incidence rate of 65.2 per 100,000 population. Basically, it means that the very high incidence remains – in comparison to 2012 the number of cases and the incidence were lower only about 1% (Fig. 1).

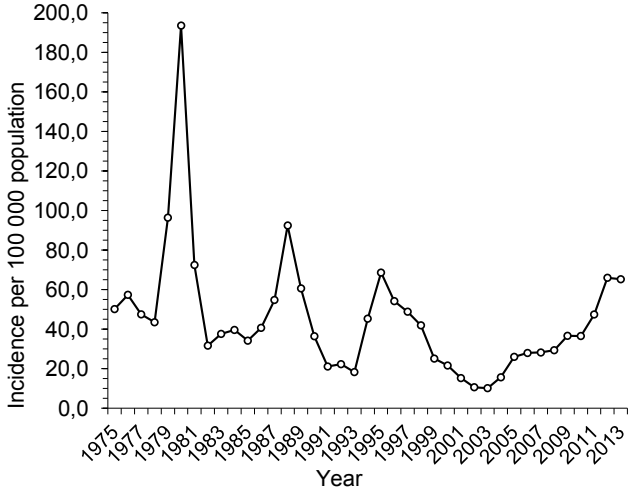

Fig. 1. Scarlet fever in Poland 1975-2013 Incidence per 100 000 population

The most cases occurred in March, in a month in which we can typicaly observe the illnesses peak over the past twenty years (3 423 cases, tj. 13.8% cases registered in the whole year), and in April (3 137; 12.6%). Consistently with previous years, the least number of cases were registered in August (453; 1.8%).

Relatively high contribution of cases, which occur in fourth quarter (6 658; 26.8%), do not indicate significant improvement of situation and rapid incidence decrease in next year. Incidentally, the lesser dynamic of annual changes in level of scarlet fever incidence is characteristic feature of epidemiological situation of this disease in Poland in the last several years, what was previously pointed in Epidemiological Review (Fig. 2).

In 2013, holding up a general incidence of scarlet fever on high level was correlated with relatively small - in comparison with 2012 - incidence changes recorded in the particular voivodeships. In over than half of the voivodeships differences between incidence rates in those two years were in the range +/- 25%.

Significant (in percentage) increase in the number of cases and incidence of scarlet fever in 2013. was recorded only in two voivodeships - Lubuskie (from 57.1 to 97.0 per 100,000, i.e. about 70,0%) and Opolskie (from 73.4 to 103.7, i.e. about 41.3%). The largest decrease of incidence - compared to the previous year - was reported in Warmińsko-mazurskie voivodeship (from 68.3 to 44.1, i.e. about 35.5%) and Dolnośląskie (from 59.9 to 38.9 i. e. about 35.0%) of (Tab I.).

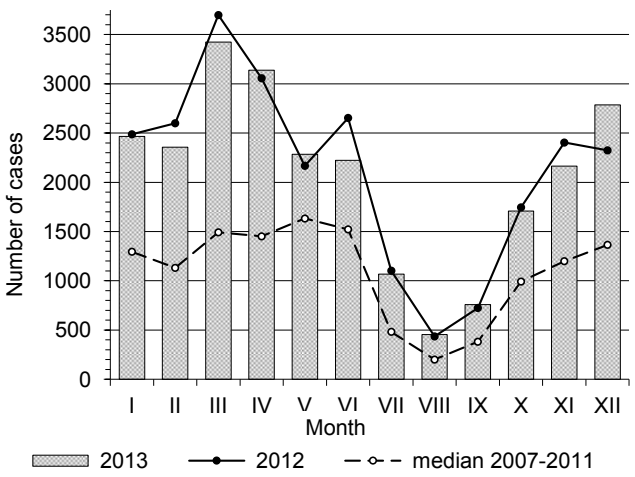

Fig. 2. Scarlet fever in Poland 2007-2013. Number of reported cases by month

Differentiation in incidence of scarlet fever in the particular voivodeships - evaluated by comparing the highest incidence rates in the voivodeships to the lowest rates - was in 2013 similar to that observed a year earlier, and it was expressed by ratio 4.8:1 (in 2012 4.4:1).

It corresponds with the typical (average) difference which is observed every year between the voivodeships created in 1999.

The highest incidence was observed in Pomorskie voivodeship (second year in succession) where incidence rate was 111.1 per 100,000 and was higher than the overall incidence across the country about 70.3%.

In relation to nationwide rates, high incidence was reported in opolskie voivodeship (respectively: 103.7; 58.9%) and Mazowieckie (102.1; 56.5%). The lowest incidence rates were registered in voivodeship Łódzkie (22.9; 64.9% under overall country incidence), Podkarpackie (27.3; -58.1%), Świętokrzyskie (30.9; -52.6%) and Lubelskie (31.7; -51.5%).

In the other nine voivodeships incidence rates ranged from +48.8% to -40.3% of the total incidence across the country (Tab.1). The situation in Łodzkie voivodeship is drawing attention where for the fourth year in succession were reported the lowest scarlet fever incidence rate in the country.

As in previous years, in 2013, incidence of scarlet fever in the urban areas (68.7 per 100,000) was significantly higher (by 14.8%) than the incidence in the rural areas (59.9) but that difference tends to decrease (in 2012 was 30.6%) in accordance with the trend observed in Poland at least since 1995.

Within particular voivodeships incidence rates in urban areas ranged from 20.9 in Łódzkie voivodeship

Table I. Scarlet fever in Poland 2007-2013. Number of cases and incidence per 100 000 population by voivodeship

Voivodeship	Median 2007-2011		2012		2013	
	Number of cases	Incidence	Number of cases	Incidence	Number of cases	Incidence
POLAND	13 940	36.5	25 421	66.0	25 115	65.2
1. Dolnośląskie	830	28.9	1 745	59.9	1 133	38.9
2. Kujawsko-pomorskie	920	44.5	1 608	76.7	1 727	82.5
3. Lubelskie	541	25.1	972	44.8	684	31.7
4. Lubuskie	428	42.4	584	57.1	992	97.0
5. Łódzkie	464	18.2	652	25.8	577	22.9
6. Małopolskie	1 141	34.7	2 123	63.4	2 462	73.3
7. Mazowieckie	1 931	37.0	4 385	82.8	5 419	102.1
8. Opolskie	526	51.8	743	73.4	1 044	103.7
9. Podkarpackie	387	18.4	685	32.2	582	27.3
10. Podlaskie	314	26.3	521	43.4	642	53.7
11. Pomorskie	931	41.8	2 611	114.2	2 546	111.1
12. Śląskie	2 149	46.3	4 328	93.7	3 139	68.1
13. Świętokrzyskie	371	29.0	452	35.4	393	30.9
14. Warmińsko-mazurskie	447	31.3	991	68.3	638	44.1
15. Wielkopolskie	1 246	36.6	1 886	54.5	2 324	67.1
16. Zachodniopomorskie	355	21.0	1 135	65.9	813	47.3

Source: Infectious diseases and poisonings in Poland. NIPH-NIH, CSI. Warsaw. Annals 2007-2013

to 119.7 in Pomorskie and in rural areas - from 21.0 in the Świętokrzyskie to 98.5 in Mazowieckie. Higher incidence in urban areas (in total) than in rural areas (at least about 5%) was observed in 11 voivodeships, while in 1 voivodeship - Świętokrzyskie - the difference was more than twice (respectively: 43.2 i 21.0 per 100,000). However, in two voivodeships incidence of scarlet fever in the urban areas was clearly lower than in rural areas: in Łódzkie voivodeship about 20.5% (respectively: 20.9 and 26.3) and in Śląskie voivodeship about 14.9% (respectively: 65.6 and 77.0).

Regarding for the size of the urban areas it should be noted that the incidence in urban areas was strongly diversified. In 2013, higher incidence in urban areas than in rural areas was determined by the incidence in the biggest urban areas with above 100,000 inhabitants (77.2 per 100,000) and in the urban areas with 20-49 thou. inhabitants (69.6).

However, the incidence rate in urban areas with 50-99 thou. inhabitants (54.6) was clearly lower (about 8.7%) from the incidence rate in rural areas and the incidence rate in the urban areas with less than 20 000 inhabitants (58.8) was comparable to it (Tab. II.).

Higher incidence of scarlet fever in urban areas than in rural areas clearly pronounced among the youngest age groups (Tab. III). Almost twofold difference was observed among 2-year-old children (incidence in urban areas 32.8 per 100,000 children in this age, in rural areas 234.8), among 3-year-old children (respectively: 904.7; 486.8) and 4-year-old children (1 127.4; 629.5).

Just as the year before most of the cases and the highest incidence were reported among 5-year-old children (incidence 949.2) and 4-year-old children (916.6). Interestingly, the number of cases in the whole country was identical for both groups and amounted to 3 969 cases (Tab. III).

The highest incidence among 5-year-old children was recorded in eleven voivodeships and among 4-year-old children – in five. Incidence rates noted in the particular voivodeships in the group of 5-year-old children ranged from 338.3 in Podkarpackie voivodeship to 2 192.1 in Opolskie and in a group of 4-year-old children from 308.9 in łódzkie to 1 711.3 in Opolskie.

Draws attention a significant number of cases among the population 15-19 years (1 975 cases) and 20-29 years (902). More than 3 times higher than in the

Table II. Scarlet fever in Poland 2007-2013. Number of cases and incidence per 100 000 population by location (urban/rural)

Location	Median 2007-2011		2012		2013	
	Number of cases	Incidence	Number of cases	Incidence	Number of cases	Incidence
Urban areas	9 426	40.5	16 975	72.7	16 010	68.7
Towns < 20 thous.	1 627	32.9	2 980	60.0	2 899	58.8
Towns 20-49 thous.	1 618	38.8	2 933	68.8	2 969	69.6
Towns 50-99 thous.	1 138	35.5	2 294	70.7	1 766	54.6
Towns ≥ 100 thous.	4 970	45.3	8 768	80.6	8 376	77.2
Rural areas	4 318	29.0	8 446	55.7	9 105	59.9
Total	13 940	36.5	25 421	66.0	25 115	65.2

Source: Infectious diseases and poisonings in Poland. NIPH-NIH, CSI. Warsaw. Annals 2007-2013

Table III. Scarlet fever in Poland 2013. Number of cases, incidence per 100 000 population, and percentage of cases by age, gender, and location (urban/rural)

Age, years	Gender						Location						Total		
	Male			Female			Urban			Rural					
	Number of cases	Incidence	%	Number of cases	Incidence	%	Number of cases	Incidence	%	Number of cases	Incidence	%	Number of cases	Incidence	%
0 - 4	5 227	503.1	35.6	4 188	425.6	40.2	6 675	569.6	41.7	2 740	321.9	30.1	9 415	465.4	37.5
0	94	49.7	0.6	70	39.2	0.7	102	48.0	0.6	62	39.9	0.7	164	44.6	0.7
1	412	204.0	2.8	357	187.4	3.4	511	224.1	3.2	258	156.9	2.8	769	196.0	3.1
2	789	378.4	5.4	630	319.6	6.0	1 020	432.8	6.4	399	234.8	4.4	1 419	349.8	5.7
3	1 714	787.4	11.7	1 380	668.0	13.2	2 227	904.7	13.9	867	486.8	9.5	3 094	729.3	12.3
4	2 218	1 000.4	15.1	1 751	828.7	16.8	2 815	1 127.4	17.6	1 154	629.5	12.7	3 969	916.6	15.8
5 - 9	5 746	587.5	39.1	4 996	537.8	47.9	6 819	636.5	42.6	3 923	469.5	43.1	10 742	563.3	42.8
5	2 192	1 023.1	14.9	1 777	871.6	17.0	2 681	1 121.3	16.7	1 288	719.4	14.1	3 969	949.2	15.8
6	1 495	739.7	10.2	1 402	730.6	13.4	1 863	833.0	11.6	1 034	606.9	11.4	2 897	735.2	11.5
7	996	515.7	6.8	841	458.3	8.1	1 118	527.9	7.0	719	436.2	7.9	1 837	487.7	7.3
8	628	336.6	4.3	589	332.7	5.6	705	348.8	4.4	512	317.1	5.6	1 217	334.7	4.8
9	435	239.0	3.0	387	224.2	3.7	452	232.2	2.8	370	231.3	4.1	822	231.8	3.3
10 - 14	931	98.0	6.3	764	84.7	7.3	893	90.2	5.6	802	93.0	8.8	1 695	91.5	6.7
15 - 19	1 784	160.7	12.1	191	18.0	1.8	942	81.2	5.9	1 033	102.2	11.3	1 975	91.0	7.9
20 - 29	796	27.2	5.4	106	3.8	1.0	460	13.6	2.9	442	18.7	4.9	902	15.7	3.6
30 - 39	141	4.5	1.0	100	3.3	1.0	147	3.8	0.9	94	4.0	1.0	241	3.9	1.0
40 +	62	0.7	0.4	83	0.8	0.8	74	0.6	0.5	71	1.0	0.8	145	0.8	0.6
Total	14 687	78.8	100.0	10 428	52.5	100.0	16 010	68.7	100.0	9 105	59.9	100.0	25 115	65.2	100.0

Source: Infectious diseases and poisonings in Poland. NIPH-NIH, CSI. Warsaw, 2013

previous year incidence observed in these age groups resulted that cases of scarlet fever in group of children and adolescents up to the age of 15 accounted in 2013 for only 87.0% of all cases reported to the sanitary inspection (table III). In previous years the participation of cases in this age group was around 95% and not dropped below the 91%.

In 2013 the incidence among men (Tab. III) was higher by more than 50% from the incidence among women (respectively: 78.8 per 100,000 and 52.5).

Growing overrepresentation of men among cases were observed in Poland for years, however, the magnitude of difference between the incidence rates for men and women has never been so large and has never grown so rapidly during the year (Fig. 3.).

Among children and adolescents up to the age of 15 the differences of incidence rates between boys and girls were in 2013 comparable to the differences observed in previous years. In particular years (age groups) they were in the range of 1% (8-year-old) to 27% (infants). However, in the age group 15-19 years the incidence of men was higher than the incidence of women nearly ninefold (respectively: 160.7 and 18.0) and in the group aged 20-29 years – more than sevenfold (27.2 and 3.8).

High total number - 2 877 cases of scarlet fever registered in 2013 in these two age groups tends to look for other explanations of this phenomenon other than randomness. According to the authors' opinion, presumably, this could be associated with occurrence in Poland in 2013 compensatory epidemic of rubella (!). At

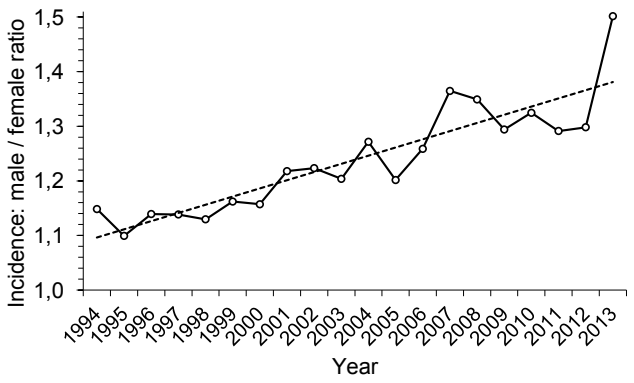

Fig. 3. Scarlet fever in Poland 1994-2013. Incidence per 100 000 population: male/female ratio

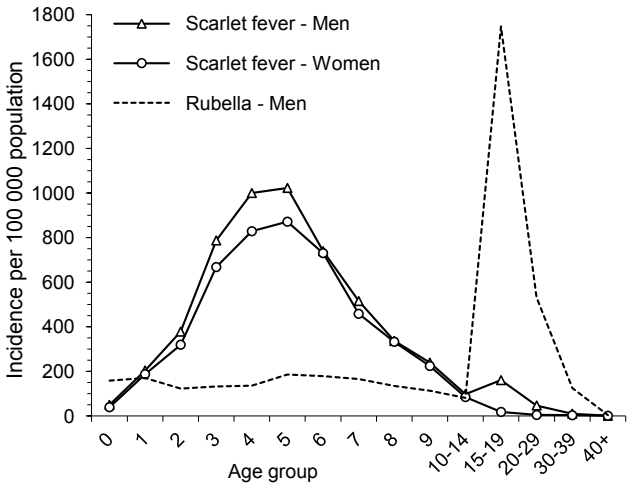

Fig. 4. The incidence of scarlet fever by sex and age, and the incidence of rubella among men by age in Poland in 2013

the time of this epidemic across the country more than 38,5 thou. people became ill with rubella, among whom nearly 90% were males. They were mostly men in age group 15-29 years and cases among this group constitute more than half of all cases of rubella registered in 2013. This outbreak reflects the history of immunization policies, when boys in childhood as opposed to girls did not receive the vaccination at the age of 13.

Many times higher scarlet fever incidence of men than women recorded among adolescents and adults in 2013 and increase in proportion of cases among people over 14 years old in this year is a "trace" left by the epidemic of rubella (Fig.4). This is all more likely because 99,89% of all cases of scarlet fever registered in 2013 (25 088 cases) were classified as "possible" cases, identified solely on the basis of clinical symptoms, only 0.02% (4 cases) as "probable" cases, epidemiologically linked to laboratory-confirmed cases and only 0.09% (23) as "confirmed" cases in which the clinical diagnosis was confirmed by isolation of streptococcus A or detection of the antigen from the throat swab.

As a side note, it should be noted that such low percentage of confirmations shown by the inspection in routine reports of scarlet fever cases, must raise doubts as to the completeness of the data collected by sanitary-epidemiological stations. Because of the fact that the case-based reports are not send to the central surveillance level, probably poviat stations do not collect additional data on reported cases, including e.g., laboratory tests ordered by the doctor after submitting the notification to the station and they restrict themselves to qualifying cases solely on the basis of the data contained in the notification.

In 2013 in Poland due to scarlet fever were hospitalized 262 persons - 1.04% of all persons who become ill and was reported to the sanitary inspection.

In the particular voivodeships the percentage of hospitalized persons ranged from 0.10% in Lubuskie (at 992 cases and incidence 97.0 per 100 000) to 2.95% in Lódzkie (respectively: 577 and 22,9).

No deaths, according to data from the Demographic Surveys and Labour Market Department-CSO, were registered. The last death related to scarlet fever was reported in Poland in 1993.

SUMMARY AND RESULTS

In 2013, the overall picture of the epidemiological situation of scarlet fever in Poland has not changed. Analyzed data has not pointed to the possibility of shortening the epidemic cycle, changing on growth of epidemic curve or an increase in the average annual incidence which can be observed from the over 20 years.

In comparison with the situation in 2012, the only one and clear change in the epidemiological situation that took place in 2013, is the dramatic increase of the incidence among men, especially in the age group 15-19 years. According to the authors' opinion, presumably this could be associated with an occurrence in Poland in 2013 the compensatory epidemic rubella (!).

The number of misclassified rubella cases reported incorrectly to the surveillance system as scarlet fever (estimated at approximately 2.5 thou. i. e. 10% of all scarlet fever cases reported in year) indicates the need to improve (increase) the specificity of the epidemiological surveillance of scarlet fever, which we propound for years. This postulate is of crucial importance because enhancing specificity of epidemiological surveillance of scarlet fever will allow for better monitoring and supervising measles and rubella elimination program.

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