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PERTUSSIS IN POLAND IN 2013*

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ABSTRACT

INTRODUCTION. The epidemiological situation of pertussis in recent years has changed dramatically. There is a high percentage of cases of pertussis among adolescents and adults. Infected adults can be a source of infection for non-immune individuals such as infants. The best strategy to prevent illness remains the implementation of vaccination in accordance with the applicable schedule.

THE AIM OF THE STUDY. To assess the epidemiological situation of pertussis in Poland in 2013 in comparison to previous years and evaluation of vaccine coverage of children.

MATERIALS AND METHODS. Assessment of the epidemiology of pertussis in Poland was based on analysis of individual reports of suspected cases of pertussis sent to the NIPH-NIH by the Regional Sanitary-Epidemiological Stations, data from the bulletin "Infectious diseases and poisonings in Poland in 2013" and bulletin "Immunizations in Poland in 2013" (MP Czarkowski et al. Warsaw 2014, NIPH-NIH, GIS).

RESULTS. In 2013, number of registered cases of whooping cough was 2182. The incidence was 5.7 per 100 000 population, which was approximately two times lower in comparison with last year (12.2 cases per 100 000 population). The majority of cases was among adolescents above 15 years of age (92%). Number of hospitalized persons was 705 (32.3%), of reported cases. In 2013, there were no deaths from whooping cough

SUMMARY AND CONCLUSIONS. Observed in 2013, the decrease in the incidence of pertussis in comparison with previous year, indicates periodicity in incidence, circulation of bacteria in the environment and remaining high sensitivity of the population to infection.

Key words: *pertussis, epidemiology, Poland, 2013*

INTRUCTION

The epidemiological situation of pertussis in recent years has changed dramatically. There is high percentage of cases of pertussis among adolescents and adults. Infected adults can be a source of infection for non-immune individuals such as infants. The best strategy to prevent illness remains the implementation of vaccination in accordance with the applicable schedule.

Serological diagnosis of any suspected cases, including the designation of specific antibodies to pertussis toxin IgA and IgG should be a routine diagnostic procedure in both clinical and epidemiological surveillance purposes.

THE AIM OF THE STUDY

The aim of the study was to assess the epidemiological situation of pertussis in Poland in 2013 in comparison to previous years and evaluation of vaccine coverage of children.

MATERIALS AND METHODS

Assessment of the epidemiology of pertussis in Poland was based on analysis of individual reports of possible and confirmed cases of pertussis which were sent to the NIPH-NIH by the Regional Sanitary-Epidemiological Stations, data from the bulletin "Infectious diseases and poisonings in Poland in 2013" and bulletin

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“Immunizations in Poland in 2013” (MP Czarkowski et al. Warsaw 2014, NIPH-NIH, GIS). Classification of pertussis cases were based on the case definition (“Case definitions for infectious disease surveillance”, 2013, Department of Epidemiology NIPH-NIH). According to the above definition clinical criteria meets a person with a cough lasting at least two weeks, with at least one of the symptoms: bouts of apnea after coughing or vomiting occurring immediately after coughing or any person with whom the doctor recognized pertussis or attacks of apnea in infants. Laboratory criteria include at least one of three criteria: the isolation of *Bordetella pertussis*, or nucleic acid detection of *Bordetella pertussis* in a clinical specimen or a significant increase in the detection of specific antibodies against *Bordetella pertussis*. Epidemiological criteria are met when there is a transfer of infection from person to person. Based on the clinical, laboratory and epidemiological criteria, classification was established: possible case (person meeting the clinical criteria), probable case (person meeting the clinical and epidemiological criteria) and confirmed case (person meeting the clinical and laboratory criteria).

RESULTS

In 2013 the number of cases of whooping cough decrease. There was 2182 cases, i.e 46.6% less than in previous year, but more by 1-42% than in 2010-2011. Incidence rate in 2013 in Poland was 5.7/100 000, which was approximately two times lower in comparison with last year (12.2 cases per 100 000 population) (Tab.I. Pertussis in Poland in 2008-2013. Number of cases, incidence rate per 100 000 population and distribution of cases according to age).

In 2013, as in previous years, wide variation between provinces was observed. Most cases (about 50% of all recorded cases), occurred in the Mazowieckie, Podlaskie, Łódzkie (respectively: 546, 329 and 228 cases). The lowest number of cases was reported in Warmińsko-Mazurskie: 12 cases. Such large differences in incidence between provinces may be due to low surveillance sensitivity in some of them. Low surveillance

Table II. Pertussis in Poland in 2013. Number of cases and incidence per 100 000 population, according to province

Province	2012		2013	
	Number of cases	Incidence rate	Number of cases	Incidence rate
Poland	4684	12.16	2182	5.67
1. Dolnośląskie	221	7.58	98	3.37
2. Kujawsko-Pomorskie	260	12.39	120	5.73
3. Lubelskie	123	5.67	21	0.97
4. Lubuskie	23	2.25	19	1.86
5. Łódzkie	673	26.62	329	13.07
6. Małopolskie	419	12.51	133	3.96
7. Mazowieckie	805	15.21	546	10.29
8. Opolskie	58	5.73	14	1.39
9. Podkarpackie	134	6.29	95	4.46
10. Podlaskie	407	33.92	228	19.06
11. Pomorskie	163	7.13	156	6.80
12. Śląskie	395	8.55	153	3.32
13. Świętokrzyskie	92	7.21	32	2.52
14. Warmińsko-Mazurskie	81	5.58	12	0.83
15. Wielkopolskie	767	22.17	191	5.51
16. Zachodniopomorskie	63	3.66	35	2.04

sensitivity was confirmed by the results of Nationwide Pertussis Epidemiology Study (BEKi) (Tab. II. Pertussis in Poland in 2013. Number of cases and incidence rate per 100 000 population, according to province).

Surprisingly high percentage of cases - 22.4% was observed among youngest age group 0-4 years. In addition, in 2013, over half of cases occurred among adolescents above 15 years of age (Tab.I. Pertussis in Poland in 2008-2013. Number of cases, incidence rate per 100 000 population and distribution of cases according to age).

The incidence among women in 2013, as in previous years, was higher than among men (6.4 vs 4.9/100 000). Higher incidence was recorded in urban areas (6.6/100 000), than in rural areas (4.2/100 000) (Tab III. Pertussis in Poland in 2013. Number of cases, incidence rate per 100 000 and distribution of cases according to sex and age in urban and rural population).

Table I. Pertussis in Poland in 2008-2013. Number of cases, incidence per 100 000 and distribution of cases according to age

Age in years	2008			2009			2010			2011			2012			2013		
	cases	inc.	%															
0	86	21.6	4.0	78	18.4	3.3	38	9.1	3.0	78	19.6	4.7	164	42.7	3.5	87	23.7	4.0
1	61	16.1	2.8	69	17.2	2.9	30	7.2	2.4	35	8.3	2.1	92	22.7	2.0	56	14.3	2.6
2	44	12.0	2.0	78	20.5	3.3	34	8.5	2.7	46	10.6	2.8	118	27.8	2.5	89	21.9	4.1
3	56	15.6	2.6	140	38.1	5.8	78	20.5	6.2	87	20.8	5.2	173	39.9	3.7	148	34.9	6.8
4	71	20.2	3.3	115	32.1	4.8	74	20.1	5.8	66	16.7	4.0	165	39.4	3.5	108	24.9	4.9
0-4	318	17.2	14.7	480	24.9	20.1	254	12.8	20.1	312	15.1	18.7	712	34.5	15.2	488	24.1	22.4
5-9	214	11.6	9.9	311	17.2	13.0	161	9.0	12.7	134	7.4	8.0	358	19.4	7.6	254	13.3	11.6
10-14	818	37.7	37.8	723	34.7	30.3	280	13.9	22.1	397	20.3	23.8	1073	56.5	22.9	303	16.4	13.9
15 i >	813	2.5	37.6	876	2.7	36.6	571	1.8	45.1	826	2.5	49.5	2541	7.8	54.2	1137	3.5	52.1
Total	2163	5.7	100.0	2390	6.3	100.0	1 266	3.3	100.0	1 669	4.3	100.0	4684	12.2	100.0	2182	5.7	100.0

Table III. Pertussis in Poland in 2013. Number of cases, incidence per 100 000 and distribution of cases according to sex and age in urban and rural population

Age groups	Men			Women			City			Country			Total		
	cases	inc.	%	cases	inc.	%	cases	inc.	%	cases	inc.	%	cases	inc.	%
0	46	24.3	5.1	41	23.0	3.2	64	30.1	4.2	23	14.8	3.6	87	23.7	4.0
1	33	16.3	3.6	23	12.1	1.8	36	15.8	2.3	20	12.2	3.1	56	14.3	2.6
2	40	19.2	4.4	49	24.9	3.8	54	22.9	3.5	35	20.6	5.4	89	21.9	4.1
3	61	28.0	6.7	87	42.1	6.8	97	39.4	6.3	51	28.6	7.9	148	34.9	6.8
4	56	25.3	6.2	52	24.6	4.1	71	28.4	4.6	37	20.2	5.7	108	24.9	4.9
0-4	236	22.7	26.0	252	25.6	19.8	322	27.5	20.9	166	19.5	25.7	488	24.1	22.4
5-9	132	13.5	14.5	122	13.1	9.6	176	16.4	11.5	78	9.3	12.1	254	13.3	11.6
10-14	121	12.7	13.3	182	20.2	14.3	203	20.5	13.2	100	11.6	15.5	303	16.4	13.9
15-19	127	11.4	14.0	141	13.3	11.1	174	15.0	11.3	94	9.3	14.6	268	12.3	12.3
20 i >	292	2.0	32.2	577	3.6	45.3	662	3.5	43.1	207	1.8	32.1	869	2.8	39.8
Total	908	4.9	100.0	1 274	6.4	100.0	1537	6.6	100.0	645	4.2	100.0	2 182	5.7	100.0

In 2013, number of people who got ill in outbreaks was 243- fourfold less than in previous year, however 172 persons (8.1% of all recorded cases) have been in contact with people coughing more than 14 days. About half of the cases (1024 people) had moderate course of disease and 30 severe. Burden of the disease was unknown in 43% of cases. In 2013, 705 persons were hospitalized due to pertussis.

In 2013, on 2035 patients laboratory diagnosis of pertussis was performed- Elisa tests and immunoassays and in one case PCR. There was no positive culture of *Bordetella pertussis*. 147 patients were diagnosed on the basis of clinical symptoms only. In 2013 there were no deaths from pertussis.

According to the case definition, in 2013, there were: 1375 (63%) possible cases, 42 (2%) probable cases and 765 (35%) confirmed cases.

Vaccination against pertussis in 2013. In 2013 vaccine coverage of 2 years old remains on high level: from 98% to 99.6%, across the country. In 2013, among 2 182 reported cases of pertussis 394 people were not vaccinated, as they were born before the introduction of mandatory vaccination or received a temporary/permanent exemption from vaccination (18% of non vaccinated). In 478 cases (22%) the vaccination status was unknown. Among the remaining cases, 833 patients received basic vaccination (4 doses), and 335 got primary vaccination (5 doses), 96 patients received 3 doses of vaccination, and 46 people did not complete the course of primary vaccination.

According to the Immunization Program, each child should receive a total of 5 doses of DTP vaccine at 2, 3-4, 5-6 and 16-18 months of age (basic vaccination with whole cell pertussis) and a booster dose of acellular one at the age of 6. Pertussis vaccine used in Poland is combined with the vaccine against diphtheria and tetanus (DTP). In the country is also available DTP vaccine combined with the vaccine against Hib, inactivated poliomyelitis vaccine and the vaccine against hepatitis B.

SUMMARY AND CONCLUSIONS

Lower incidence of pertussis observed in 2013 as compared with the previous year, can be interpret as inter-epidemic period. It indicates the circulation of bacteria in the environment and growing population of people vulnerable to infection (people over 20 years old). The best prophylaxis of the infection is vaccination of high risk groups- currently also older age groups.

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