Justyna Rogalska

RUBELLA IN POLAND IN 2012

Department of Epidemiology, National Institute of Public Health
- National Institute of Hygiene in Warsaw

ABSTRACT

BACKGROUND. In 2004, Poland has adopted the WHO goal of rubella elimination and congenital rubella syndrome prevention. Participation in the rubella elimination program requires clinical diagnosis of rubella to be confirmed with laboratory test. In Poland, until 2003, national vaccination recommendation included a dose of rubella vaccine only for girls aged 13 years. Among men, the incidence of measles remained high creating a risk of infection of non-immune pregnant women which may lead to the development of congenital rubella syndrome in the child.
AIM. To assess epidemiological situation of rubella in Poland in 2012, including vaccination coverage in Polish population.
METHODS. The descriptive analysis was based on data retrieved from routine mandatory surveillance system and published in the annual bulletins "Infectious diseases and poisonings in Poland in 2012" and "Vaccinations in Poland in 2012".
RESULTS. In 2012, there was a significant increase in the number of cases of rubella - 6 263 cases (in 2011, 4 290 cases) - and the increase in incidence (from 11.1 per 100 thousand. 16.3). The highest incidence rate, regardless of gender and the environment, was observed among adolescents aged 15-19 years (118.0 per 100,000). As in 2011, the incidence of rubella in boys and men was higher than the incidence in girls and women (25.6 versus 7.5). In 2012, no cases of congenital rubella syndrome were registered.
SUMMARY AND CONCLUSIONS. The proportion of laboratory tests confirming/excluding rubella infection is still very low in Poland. In 2012, only 0.2% of rubella cases were laboratory confirmed.

Keywords: *rubella, congenital rubella syndrome, infectious diseases, epidemiology, Poland, 2012*

INTRODUCTION

Since 2004, Poland has been participating in the Rubella Elimination Program, coordinated by the World Health Organization (WHO). The main goals of the program are interruption of rubella virus transmission and prevention of congenital rubella syndrome in children. Rubella elimination is possible when very high coverage level (>95%) with at least one dose of rubella-containing vaccine is maintained. In Poland in 1988-2003 only girls were vaccinated (one dose in 13 year of age). In November 2003, a compulsory vaccination with MMR vaccine was introduced to the national vaccination schedule - in 1988-2003 only recommended. In Poland, rubella is notifiable since 1966, and congenital rubella syndrome since 1997.

The aim of the study was to assess epidemiological situation of rubella in Poland in 2012, including vaccination coverage in Polish population.

MATERIAL AND METHODS

The descriptive analysis of epidemiological situation of rubella was based on data retrieved from routine mandatory surveillance system and published in the annual bulletin "Infectious diseases and poisonings in Poland in 2012". Vaccination coverage was assessed based on data published in the annual bulletin "Vaccinations in Poland in 2012".

Rubella cases were classified according to the criteria of surveillance case definition implemented in the European Union (Commission Decision of 28 April 2008

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Table I. Rubella in Poland 2006 - 2012. Number of cases and incidence per 100 000 population by voivodeship

Voivodeship		Median 2006-2010		2011		2012	
		number	incidence per 100 000	number	incidence per 100 000	number	incidence per 100 000
	POLAND	13 146	34.5	4 290	11.1	6 263	16.3
1.	Dolnoslaskie	452	15.7	552	18.9	138	4.7
2.	Kujawsko-pomorskie	372	18.0	257	12.2	323	15.4
3.	Lubelskie	278	12.9	232	10.7	1 766	81.4
4.	Lubuskie	201	19.9	254	24.8	117	11.4
5.	Lodzkie	333	12.9	243	9.6	169	6.7
6.	Malopolskie	645	19.7	181	5.4	743	22.2
7.	Mazowieckie	1 288	24.8	323	6.1	285	5.4
8.	Opolskie	344	33.2	89	8.8	109	10.8
9.	Podkarpackie	461	22.0	610	28.7	364	17.1
10.	Podlaskie	464	38.8	91	7.6	74	6.2
11.	Pomorskie	872	39.5	139	6.1	361	15.8
12.	Slaskie	903	19.4	322	7.0	1 005	21.8
13.	Swietokrzyskie	730	57.3	99	7.7	56	4.4
14.	Warminsko-mazurskie	282	19.8	63	4.3	146	10.1
15.	Wielkopolskie	1 227	36.1	441	12.8	320	9.3
16.	Zachodniopomorskie	296	17.5	394	22.9	287	16.7

amending Decision 2002/253/EC). Rubella cases were categorized into confirmed, probable and possible cases.

RESULTS

Epidemiological situation of rubella in 2012. In 2012 6 263 cases of rubella were registered in Poland - incidence 16,3/100 000, higher by 46.8% in comparison to the previous year and lower by 52.8% in comparison to median incidence in 2006-2010 (Table I). In 2012, no congenital rubella syndrome was registered.

Seasonality of rubella in 2012 was similar to the seasonality observed in previous years. Most cases occurred in the period from March to May with a peak in April - 1,155 cases (18.1% of all cases in the year). The lowest number of cases was registered in September (162, ie 2.5%).

A higher rubella incidence in 2012 compared to 2011 was noted in 7 voivodeships (Table I). The largest, more than 7-fold increase compared to 2011, occurred in lubelskie voivodeship (from 10.7 to 81.4 per 100,000 population), and in Małopolskie voivodeship (4-fold increase). Among the nine provinces, where the incidence decreased in comparison to 2011, the biggest drop in incidence was recorded in Dolnośląskie voivodeship, where there was 4-fold decrease (from 18.9 to 4.7).

The highest incidence of rubella in the country was reported in Lubelskie voivodeship – 81.4 (incidence of almost 5 times higher than the total in the country). The lowest incidence – 4.4 per 10,000 - was noted in Świętokrzyskie voivodeship (almost 4 times lower than the total in the country).

As in 2010 and 2011, the incidence of rubella in girls and women (7.5 per 100,000) was lower than the incidence in boys and men (25.6 per 100,000) (Table II). The incidence in boys and men was almost three times higher. Vaccination against rubella for only girls in 13 years of age, carried out in order to prevent congenital rubella syndrome, caused the incidence of rubella in young men aged over 15 years to be significantly higher compared to the incidence in girls. The biggest difference in the incidence between men and women was noted in age groups 15-19 years (225.9 vs. 5.1 per 100,000) and 20-24 years (40.1 vs. 2.1) (Table II). The higher incidence in males in comparison to females was also recorded in individuals aged 3 to 9 years, and in age groups 25-29 years and 40-34 years. The difference ranged between 4.7% to 74.4%. In other age groups, especially among adults aged 30 to 54 years, a higher incidence was observed among women. The period that passed since the introduction of compulsory vaccination of all children against rubella (2003 - the first dose; 2005 - the second dose in 10 years of age) is too short to stop a long-term trend towards increasing the difference between incidence in men and women (Fig. 1).

The incidence in the cities varied in 2012 from 9.9 per 100,000 population in the largest cities with population of ≥ 100,000 to 20.2 in cities with population of 20-49,000 (Table III). The incidence of rubella in rural areas (20.5/100 000) was higher than the incidence in the cities (13.5/100 000). Despite lower overall incidence in the cities, among children aged 0-4 years, as in the previous years, higher incidence was reported in the cities. As in 2011, among children aged 5-9 years higher incidence was reported in 2012 in rural areas than in the cities. Of the total number of rubella cases reported in 2012, 42% involved children and young people under the age of 15, 21% children aged 0-4 years and 16% children aged 5-9 years (Table II). In contrast to 2011, when the highest

Table II. Rubella in Poland 2012. Number of cases, incidence per 100 000 population, and percentage of cases by age, gender and location

Age (years)	Gender						Location						Total		
	males			females			urban areas			rural areas					
	number of cases	incidence per 100 000	%	number of cases	incidence per 100 000	%	number of cases	incidence per 100 000	%	number of cases	incidence per 100 000	%	number of cases	incidence per 100 000	%
0 - 4	652	61.5	13.6	676	67.3	45.5	805	67.4	25.5	523	60.1	16.8	1 328	64.3	21.2
0	154	77.8	3.2	181	97.1	12.2	206	92.6	6.5	129	79.7	4.2	335	87.2	5.3
1	150	72	3.1	155	78.7	10.4	177	75.1	5.6	128	75.5	4.1	305	75.3	4.9
2	98	45	2.1	116	56.2	7.8	133	54	4.2	81	45.5	2.6	214	50.5	3.4
3	108	48.7	2.3	98	46.4	6.6	127	50.7	4	79	43.2	2.5	206	47.6	3.3
4	142	66.2	3	126	61.8	8.5	162	67.4	5.1	106	59.5	3.4	268	64.1	4.3
5 - 9	556	58.8	11.6	443	49.3	29.8	521	50.5	16.5	478	58.9	15.4	999	54.2	16
5	164	81.1	3.4	122	63.5	8.2	144	64	4.6	142	84	4.6	286	72.5	4.6
6	140	72.4	2.9	114	62.1	7.7	153	71.6	4.8	101	61.8	3.3	254	67.4	4.1
7	100	53.6	2.1	85	48	5.7	81	39.7	2.6	104	65	3.3	185	50.8	3
8	80	43.9	1.7	62	35.9	4.2	77	39.3	2.4	65	41	2.1	142	40	2.3
9	72	39.7	1.5	60	34.9	4	66	34.3	2.1	66	41	2.1	132	37.4	2.1
10 - 14	174	17.9	3.6	100	10.8	6.7	134	13.2	4.2	140	15.8	4.5	274	14.4	4.4
15 - 19	2 617	225.9	54.8	57	5.1	3.8	1 150	94.9	36.4	1 524	144.5	49.1	2 674	118	42.7
20 - 24	560	40.2	11.7	28	2.1	1.9	295	18.7	9.3	293	25.2	9.4	588	21.5	9.4
25 - 29	133	8.2	2.8	33	2.1	2.2	111	5.6	3.5	55	4.5	1.8	166	5.2	2.7
30 - 34	39	2.4	0.8	32	2.1	2.2	43	2.2	1.4	28	2.4	0.9	71	2.2	1.1
35 - 39	21	1.4	0.4	40	2.8	2.7	41	2.3	1.3	20	1.8	0.6	61	2.1	1
40 - 44	8	0.6	0.2	42	3.5	2.8	30	2.1	1	20	2	0.6	50	2	0.8
45 - 49	5	0.4	0.1	20	1.7	1.3	14	1	0.4	11	1.1	0.4	25	1	0.4
50 - 54	4	0.3	0.1	8	0.6	0.5	3	0.2	0.1	9	0.8	0.3	12	0.4	0.2
55 - 59	3	0.2	0.1	1	0.1	0.1	3	0.2	0.1	1	0.1	0	4	0.1	0.1
60-64	1	0.1	0	4	0.3	0.3	5	0.3	0.2	0	0	0	5	0.2	0.1
65-74	4	0.3	0.1	1	0.1	0.1	1	0.1	0	4	0.4	0.1	5	0.2	0.1
75+	0	0	0	1	0.1	0.1	0	0	0	1	0.1	0	1	0	0
Total	4 777	25.6	100	1 486	7.5	100	3 156	13.5	100	3 107	20.5	100	6 263	16.3	100

Table III. Rubella in Poland 2006-2012. Number of cases and incidence per 100 000 population by year, gender and location

Gender	Location	Median 2006-2010		2011		2012	
		number of cases	incidence per 100 000	number of cases	incidence per 100 000	number of cases	incidence per 100 000
Females	urban areas	1 865	15.2	1 067	8.7	874	7.1
	town < 20 000 population	511	20.0	297	11.5	204	7.9
	town 20-49 000 population	354	16.1	345	15.5	205	9.2
	town 50-99 000 population	420	25.0	111	6.5	124	7.3
	city ≥ 100 000 population	580	9.9	314	5.4	341	5.9
	rural areas	1 727	23.2	844	11.1	612	8.0
	total	3 592	18.2	1 911	9.6	1 486	7.5
Males	urban areas	2 632	23.9	1 263	11.4	2 282	20.6
	town < 20 000 population	1 308	55.4	348	14.4	541	22.6
	town 20-49 000 population	940	47.1	371	18.3	656	32.2
	town 50-99 000 population	966	61.6	216	13.8	351	22.6
	city ≥ 100 000 population	1 364	26.5	328	6.4	734	14.4
	rural areas	4 884	66.3	1 116	14.8	2 495	33.0
	total	4 897	26.6	2 379	12.8	4 777	25.6
Total	urban areas	6 535	28.0	2 330	10.0	3 156	13.5
	town < 20 000 population	1 819	37.0	645	12.9	745	15.0
	town 20-49 000 population	1 294	30.9	716	16.9	861	20.2
	town 50-99 000 population	1 478	46.0	327	10.0	475	14.6
	city ≥ 100 000 population	1 944	17.7	642	5.9	1 075	9.9
	rural areas	6 611	44.6	1 960	13.0	3 107	20.5
	total	13 146	34.5	4 290	11.1	6 263	16.3

incidence - regardless of gender and the environment - was among children 5 and 6 years, in 2012 it was among people aged 15-19 years (118.0 per 100 000) and infants (87,2). Total number of cases in these two age groups constituted 48% of all cases registered in 2012.

A total of 42 persons was hospitalized due to rubella, i.e 0.67% of all reported patients (the proportion ranged from 0.31% in wielkopolskie voivodeship to 3.48% in zachodniopomorskie voivodeship). According to preliminary data of the Central Statistical Office, there were no deaths from rubella recorded in 2012.

Laboratory diagnosis of rubella. The diagnosis of rubella should be based on the result of the laboratory testing. In 2009 a new rubella case definition was introduced and therefore the classification criteria for confirmed and probable cases were changed. According to the new definition, probable case is defined as a patient in whom, in addition to having an epidemiological link to a confirmed case, presence of specific IgM antibodies against rubella in the serum was detected. To confirm a rubella case, more specific virological tests, including virus isolation, PCR, or demonstration of significant increase in IgG antibodies in serum or saliva are required. Laboratory diagnosis for each reported suspected rubella case is of particular importance because the symptoms are similar to symptoms of many childhood diseases. According to the law on control of infections and infectious diseases in humans (Act of 5 December 2008 on prevention and control of infections and infectious diseases in humans, Dz.U.08.234.1570 with further amendments) laboratory testing of suspected rubella cases can be performed in sanitary-epidemiological stations. According to the WHO Rubella Elimination Program, each confirmed case of rubella should additionally be tested in the National Laboratory accredited by WHO. In Poland, a reference center is Laboratory of Department of Virology NIPH - NIH.

The sensitivity and specificity of rubella diagnosis in Poland in 2012. In Poland, confirmation of clinical diagnosis of rubella with laboratory tests is still insufficient and makes an assessment of the impact of introduced in 2003 universal vaccination of all children against rubella difficult. In 2012, only 14 (0.2%) cases were classified as confirmed and 26 (0.4%) as probable. The remaining 99.4% of cases (6223) were reported on the basis of clinical symptoms. This may explain a significant number of rubella cases registered among vaccinated individuals (tab. IV). In 2012, the percentage of rubella cases for whom the vaccination status was unknown (27%) increased compared with previous years (12% in 2010 and 2011). In children aged 1-9 years, vaccination status was unknown for 16% of cases.

Vaccinations against rubella in 2012. Rubella vaccination in 2012 included the administration of two doses of MMR vaccine. The vaccination schedule hasn't been changed since 2005 and consists of administration of primary dose in 13-14 months and a booster dose at 10 years of age.

In 2012, rubella vaccine coverage among children aged 3 years was 97.9 (ranged from 96.4% in mazowieckie to 99.7% in warminsko-mazurskie voivodeship). Vaccine coverage among girls aged 13 years

Table IV. Rubella in Poland 2012. Number of cases and incidence per 100 000 population by immunisation status and age

Age (years)	Vaccinated			Not vaccinated			Unknown vaccination status	
	number of vaccinated*	number of cases	incidence per 100 000	number of un-vaccinated*	number of cases	incidence per 100 000	number of cases	%
0	.	1	.	.	281	.	53	15.8
1	318 126	174	54.7	62 312	91	146.0	40	13.1
2	395 336	165	41.7	8 305	12	144.5	37	17.3
3	404 820	160	39.5	4 407	10	226.9	36	17.5
4	403 615	210	52.0	2 921	9	308.1	49	18.3
5	377 818	230	60.9	1 953	7	358.4	49	17.1
6	361 874	207	57.2	1 405	10	711.7	36	14.2
7	350 307	152	43.4	1 037	4	385.7	28	15.2
8	339 846	105	30.9	736	10	1358.7	23	16.7
9	331 580	61	18.4	1 700	13	764.7	31	29.5
10-14	.	125	.	.	25	.	54	26.5
15 +	.	98	.	.	2 327	.	1 227	33.6
Total	.	1 688	.		2 799	.	1 663	27.0

* vaccination against measles, rubella and mumps (based on "Vaccinations in Poland in 2012", NIPH-NIH, Warsaw 2013)

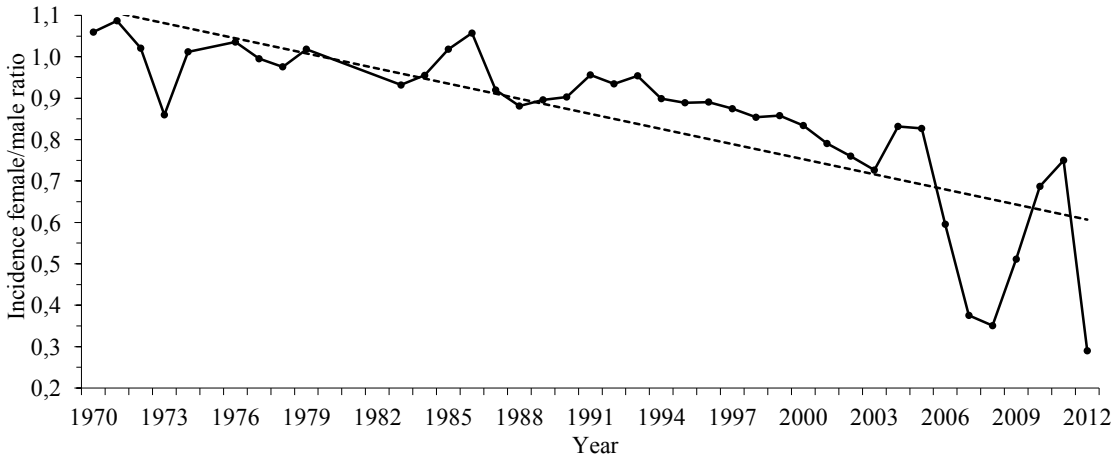

Fig. 1. Rubella in Poland 1970-2012. Incidence (per 100 000 population) female/male ratio

was 99.4% (ranged from 98.7% in Mazowieckie to 99.9% in Kujawsko-pomorskie, Świętokrzyskie and Warmińsko-mazurskie voivodeships) and among girls aged 14 years - 99.4% (from 98.6% in Mazowieckie to 100.0% in Warmińsko-mazurskie voivodeship).

SUMMARY AND CONCLUSIONS

High rubella vaccination coverage effectively prevents congenital rubella syndrome. Among adolescents the risk of rubella in Poland is higher among boys than among girls; however, among persons >30 years of age, women are at a higher risk than men. Taking into account the higher incidence of rubella among men in the age at which they have contact with women of childbearing age, vaccination coverage among girls below 100% and the fact that approximately 50% of rubella infection are subclinical, there is still a risk of rubella infection for women of childbearing age and the occurrence of congenital rubella syndrome in newborns.

In 2012, only 0.2% of rubella cases were confirmed with laboratory test, the remaining 99.8% of the cases were reported solely on the basis of the clinical picture. This situation requires rapid improvement. Polish participation in the Rubella Elimination Program requires a clinical diagnosis to be confirm with laboratory tests. The high percentage of missing data on vaccination status of rubella cases makes it difficult to interpret the impact of vaccination on epidemiological situation of the disease.

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Address for correspondence:
Justyna Rogalska
Department of Epidemiology
National Institute of Public Health
– National Institute of Hygiene
24 Chocimska Street, 00-791 Warsaw, Poland
e-mail: jrogalska@pzh.gov.pl