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SALMONELLOSIS IN POLAND IN 2013*

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ABSTRACT

AIM. The purpose of the study was to evaluate the epidemiologic situation of salmonellosis in Poland in 2013 compared to previous years.

MATERIALS AND METHODS. The main source of data for this study are statistical overviews included in annual bulletin "Infectious Diseases in Poland in 2013", information from sanitary station laboratories as well as forms of outbreak investigations obtained from the sanitary stations. Information on deaths due to infectious and parasitic diseases registered in Poland in 2013 and earlier years is based on the data of the Department for Demographic Research of Central Statistical Office. For the purpose of surveillance cases were qualified according to the current definition.

RESULTS. In Poland in 2013, a total of 7 578 cases of zoonotic salmonellosis were reported including 7 407 cases of intestinal salmonellosis and 171 of parenteral one. The incidence was 19,7/100 000. The criteria for a confirmed case were met by more than 96% of cases. The number of reported cases was lower than in previous year, reflecting the continued downward trend in the number of cases of salmonellosis in Poland. A very high percentage (more than 72%) of hospitalizations of people infected with zoonotic *Salmonella* continues. In the outbreaks the proportion of hospitalizations accounted only for 35% of all cases. Predominantly children below 5 years of age suffer from the illness. Salmonellosis was an indicated cause of death only in 10 of the cases. In 2013 179 outbreaks were reported, in which Salmonella was found to be the etiological agent. Majority of them were small household outbreaks and they cumulated for a total number of cases of 1 218. The most common species of *Salmonella* responsible for infection in Poland is *S.* Enteritidis. For many years, up to date a slight increase is observed in reported cases of the disease, but without known serotype of *Salmonella.* In 2013 it was 16% and (as in previous year) it was the highest in pomorskie voivodeship (58%).

CONCLUSIONS. High percentage of hospitalizations for salmonellosis combined with the fact of rarely performed laboratory diagnostics of gastro- intestinal diseases indicates much underreporting of salmonellosis throughout the country. However decreasing number of cases registered yearly and also decreasing percentage of persons infected, involved in food processing leads to a conclusion of constant decreasing trend of salmonellosis prevalence.

Keywords: *salmonellosis, intestinal salmonellosis, parenteral salmonellosis, epidemiology, Poland, 2013*

INTRODUCTION

Salmonellosis in Poland is still the most frequent disease among bacterial infections presenting with gastro-intestinal symptoms, which is different from other EU countries where the main etiological agent of diseases of that kind is *Campylobacter*.

In Poland, apart from intestinal salmonellosis, also parenteral one is a subject of obligatory registration.

The aim of the study is to assess the epidemiological situation of Salmonellosis in Poland in 2013, compared with previous years.

MATERIAL AND METHODS

The analysis of the epidemiological situation of salmonellosis in Poland in 2013, was based on the

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Table I. Salmonellosis in Poland in 1985-2013. Number of cases, incidence per 100 000 population, percentage of hospitalization and number of deaths

Year	Intestinal salmonellosis [1]			Extraintestinal salmonellosis [2]			Total			
	No. of cases	Incidence rate	% hosp.	No. of cases	Incidence rate	% hosp.	No. of cases	Incidence rate	% hosp.	No. of death
1985-1989 [3]	26 622	70.7	37.9	22 726	67.5	48.7	49 242	130.7	42.9	17
1990	28 352	74.4	43.6	21 155	55.5	44.9	49 507	129.9	44.2	16
1991	31 144	81.4	46.4	20 983	54.9	47.1	52 127	136.3	46.7	12
1992	24 558	64.0	49.5	17 503	45.6	50.0	42 061	109.6	49.7	8
1993	19 220	50.0	47.4	11 934	31.0	48.8	31 154	81.0	47.9	6
1994	36 277	94.1	47.6	67	0.17	94.0	36 344	94.3	47.6	5
1995	30 029	77.8	49.7	64	0.17	85.9	30 093	78.0	49.8	3
1996	26 052	67.5	52.1	54	0.14	88.9	26 106	67.6	52.2	8
1997	23 157	59.9	53.7	49	0.13	93.9	23 206	60.0	53.8	3
1998	26 675	69.0	52.7	64	0.17	95.3	26 739	69.2	52.8	3
1999	23 381	60.5	62.7	55	0.14	83.6	23 436	60.6	62.8	7
2000	22 712	58.8	64.9	87	0.23	93.1	22 799	59.0	65.0	6
2001	19 788	51.2	66.7	93	0.24	88.2	19 881	51.5	66.8	5
2002	20 575	53.8	67.8	113	0.30	91.2	20 688	54.1	68.0	7
2003	16 496	43.2	72.5	121	0.32	90.1	16 617	43.5	72.7	6
2004	15 818	41.4	70.7	140	0.37	89.3	15 958	41.8	70.8	6
2005	15 815	41.4	70.1	191	0.50	91.1	16 006	41.9	70.3	8
2006	13 210	34.6	71.3	152	0.40	94.7	13 362	35.0	71.6	4
2007	11 568	30.3	70.4	136	0.36	93.4	11 704	30.7	70.6	1
2008	9 478	24.9	70.6	130	0.34	90.8	9 608	25.2	70.8	6
2009	8 855	23.2	69.3	117	0.31	93.2	8 972	23.5	69.6	6
2010	9 549	25.0	69.7	183	0.48	86.3	9 732	25.5	70.0	4
2011	8 652	22.5	69.4	161	0.42	93.2	8 813	22.9	69.9	3
2012	8 267	21.5	69.0	177	0.46	89.3	8 444	21.9	69.4	7
2013	7 407	19.2	72.0	171	0.44	87.7	7 578	19.7	72.4	10

1) change in registration: until 1993 only food poisoning, since 1994, food poisoning and other gastrointestinal infections
2) change in registration: up to 1993 other salmonellosis than food poisoning, since 1994, only extraintestinal infections
3) medians
Data sources: Infectious diseases and poisonings in Poland. NIPH-NIH, MoH/CSI. Warsaw. Annual Reports: 1985-2013

data from the annual bulletin "Infectious diseases and poisonings in Poland in 2013" (NIPH-NIH, GIS, Warsaw 2014). In addition, data submitted to NIPH-NIH by regional sanitary stations were used, in particular: forms of epidemiological investigations in outbreaks and information from the laboratories of sanitary stations. Classification of cases of intestinal salmonellosis is based on the case definition adapted by the European Commission in its decision of 28th April 2008 amending Decision 2002/253/EC and introduced into routine surveillance in Poland in 2009.

RESULTS

In Poland in 2013, a total of 7 578 cases of zoonotic salmonellosis were reported (incidence 19,7/100 000) (Table I). Once again this is the lowest annual number of cases ever recorded, indicating a continuation of the downward trend of salmonellosis incidence in the country. In comparison to 2012, 866 fewer cases were reported, and in relation to the median for 2007-2011 decrease of 2 030 cases. The proportion of hospitalizations among cases is still very high and continues to persist (as in the past 10 years) at nearly 70%. The percentage of hospitalizations in the early 90s was little over 40%. Increase of the fraction of hospitalized cases among cases reported is one of the indicators of decreased fraction of laboratory confirmations performed by doctors and limiting them mainly to the people who (because of their symptoms) required hospitalization.

That is why, similarly to previous years, over 96% of all salmonellosis cases felt in to "confirmed case" criteria (Table II).

As in previous years, cases were reported mainly in the summer season. In every year the increase in the number of cases is observed from May, with the peak in August, and the decrease is clearly observed in November. The lowest number of cases reported is observed from December until April.

In 2013 a significant decrease in salmonellosis incidence (5% in general) was observed overall in 5 voivodeships- the largest decrease in swietokrzyskie and mazowieckie (over almost 40%) (Table III). In warminsko-mazurskie and zachodniopomorskie

Table II. Salmonellosis in Poland in 2013. Number of cases and percentage by case definition and province

Province		Cases of salmonellosis				Total	
		probable		confirmed			
		No. of cases	%	No. of cases	%	No. of cases	%
	POLSKA	270	3.6	7 308	96.4	7 578	100.0
1.	Dolnośląskie	0	0.0	304	100.0	304	100.0
2.	Kujawsko-pomorskie	18	3.3	525	96.7	543	100.0
3.	Lubelskie	9	1.8	480	98.2	489	100.0
4.	Lubuskie	23	16.5	116	83.5	139	100.0
5.	Łódzkie	2	0.4	518	99.6	520	100.0
6.	Małopolskie	3	0.5	593	99.5	596	100.0
7.	Mazowieckie	49	4.2	1 110	95.8	1 159	100.0
8.	Opolskie	4	3.3	119	96.7	123	100.0
9.	Podkarpackie	25	4.1	584	95.9	609	100.0
10.	Podlaskie	9	2.9	299	97.1	308	100.0
11.	Pomorskie	20	3.5	558	96.5	578	100.0
12.	Śląskie	8	1.5	521	98.5	529	100.0
13.	Świętokrzyskie	8	4.6	165	95.4	173	100.0
14.	Warmińsko-mazurskie	63	12.2	453	87.8	516	100.0
15.	Wielkopolskie	20	2.9	681	97.1	701	100.0
16.	Zachodniopomorskie	9	3.1	282	96.9	291	100.0

Data sources: Annual reports on cases of infectious diseases and poisonings in Poland (MZ-56)

Table III. Salmonellosis in Poland in 2007-2013. Number of cases and incidence per 100 000 population by province

Province		Salmonellosis - total						Extraintestinal salmonellosis					
		2007-2011 (median)		2012		2013		2007-2011 (median)		2012		2013	
		No. of cases	Incidence rate	No. of cases	Incidence rate	No. of cases	Incidence rate	No. of cases	Incidence rate	No. of cases	Incidence rate	No. of cases	Incidence rate
	POLSKA	9 608	25.2	8 444	21.9	7 578	19.7	136	0.36	177	0.46	171	0.44
1.	Dolnośląskie	360	12.5	317	10.9	304	10.4	5	0.17	0	0.00	5	0.17
2.	Kujawsko-pomorskie	622	30.1	562	26.8	543	25.9	9	0.43	11	0.52	15	0.72
3.	Lubelskie	607	28.1	579	26.7	489	22.6	2	0.09	3	0.14	6	0.28
4.	Lubuskie	197	19.5	127	12.4	139	13.6	6	0.59	6	0.59	4	0.39
5.	Łódzkie	660	25.9	514	20.3	520	20.7	6	0.24	7	0.28	9	0.36
6.	Małopolskie	814	24.7	683	20.4	596	17.8	9	0.27	17	0.51	10	0.30
7.	Mazowieckie	1 689	32.6	1 874	35.4	1 159	21.8	17	0.33	17	0.32	30	0.57
8.	Opolskie	177	17.2	129	12.7	123	12.2	4	0.38	8	0.79	4	0.40
9.	Podkarpackie	805	38.3	639	30.0	609	28.6	7	0.33	12	0.56	5	0.23
10.	Podlaskie	342	28.7	403	33.6	308	25.7	5	0.42	5	0.42	7	0.59
11.	Pomorskie	667	29.3	535	23.4	578	25.2	10	0.45	14	0.61	18	0.79
12.	Śląskie	832	17.9	534	11.6	529	11.5	23	0.49	28	0.61	21	0.46
13.	Świętokrzyskie	339	26.6	288	22.6	173	13.6	4	0.31	5	0.39	1	0.08
14.	Warmińsko-mazurskie	536	37.6	362	24.9	516	35.6	4	0.28	7	0.48	7	0.48
15.	Wielkopolskie	700	20.5	684	19.8	701	20.2	17	0.50	25	0.72	16	0.46
16.	Zachodniopomorskie	381	22.5	214	12.4	291	16.9	9	0.53	12	0.70	13	0.76

Data sources: Infectious diseases and poisonings in Poland. NIPH-NIH, CSI. Warsaw. Annual Reports: 2007-2013

voivodeships a significant increase in incidence was observed (approximately 40%).

In 2013 there were 171 cases of parenteral salmonellosis reported (incidence 0,464/100 000), which is approximately the same number as in 2012 (177 cases) and over 35 cases more than the median for 2007-2011.

As in previous years, most of the cases occurred in children below five, with the highest incidence of 207 per 100 000 in children under 2 years of age (Table IV). Parenteral salmonellosis (as in the previous years) was most frequently diagnosed in children under 3 years of age. Much lower incidence (than in 2012) was observed in children of 1 and 2 years of age (Table IV).

According to Central Statistical Office in Poland in 2013, 7 deaths where the underlying cause of salmonellosis was determined, including one death from parenteral salmonellosis.

In 2013, in the course of food-borne diseases surveillance 179 outbreaks caused by *Salmonella* were reported. In those outbreaks the total number of 1 218

Table IV. Salmonellosis in Poland in 2007-2013. Number of cases, incidence per 100 000 population, and percentage of cases by age

Age group	Salmonellosis - total								Extraintestinal salmonellosis							
	2007-2011 (median)		2012			2013			2007-2011 (median)		2012			2013		
	No. of cases	Incidence rate	No. of cases	Incidence rate	%	No. of cases	Incidence rate	%	No. of cases	Incidence rate	No. of cases	Incidence rate	%	No. of cases	Incidence rate	%
Total	9 608	25.2	8 444	21.9	100.0	7 578	19.7	100.0	136	0.36	177	0.46	100.0	171	0.44	100.0
0	926	221.7	657	171.0	7.8	506	137.6	6.7	9	2.38	11	2.86	6.2	2	0.54	1.2
1	1 158	278.4	956	236.0	11.3	812	206.9	10.7	6	1.63	9	2.22	5.1	2	0.51	1.2
2	844	215.4	768	181.1	9.1	681	167.9	9.0	3	0.69	5	1.18	2.8	6	1.48	3.5
3	643	177.8	757	174.8	9.0	602	141.9	7.9	1	0.26	4	0.92	2.3	1	0.24	0.6
4	521	137.0	601	143.7	7.1	494	114.1	6.5	1	0.29	2	0.48	1.1	1	0.23	0.6
0 - 4	4 111	207.5	3 739	181.1	44.3	3 095	153.0	40.8	21	1.16	31	1.50	17.5	12	0.59	7.0
5 - 9	1 148	64.4	1 315	71.3	15.6	1 229	64.4	16.2	4	0.22	5	0.27	2.8	3	0.16	1.8
10-19	804	17.9	657	15.8	7.8	649	16.1	8.6	4	0.08	7	0.17	4.0	4	0.10	2.3
20-29	686	11.0	515	8.7	6.1	441	7.7	5.8	5	0.08	5	0.08	2.8	2	0.03	1.2
30-39	553	10.1	421	6.9	5.0	438	7.1	5.8	9	0.15	6	0.10	3.4	9	0.15	5.3
40-49	447	9.0	298	6.2	3.5	295	6.1	3.9	11	0.22	9	0.19	5.1	18	0.37	10.5
50-59	680	11.8	489	8.6	5.8	481	8.6	6.3	29	0.50	22	0.39	12.4	32	0.57	18.7
60 +	1 160	16.2	1 010	12.8	12.0	950	11.6	12.5	64	0.90	92	1.16	52.0	91	1.12	53.2

Data sources: Infectious diseases and poisonings in Poland. NIPH-NIH, CSI. Warsaw. Annual Reports: 2007-2013

Table V. Salmonellosis in Poland in 2013. Outbreaks of foodborne infections caused by Salmonella involving 30 cases and more.

Number of cases	Number of hospitalization	Etiological agent (Salmonella serotype)	Setting of outbreak occurance	Place of outbreak occurance		Month
(of which children age 0-14)				province	district	
81 (0)	7 (0)	Enteritidis	Prison	warmińsko-mazurskie	olsztyński	July
64 (19)	9 (9)	Enteritidis	Fire-station	lubelskie	lubartowski	August
59 (54)	6 (6)	Enteritidis	Kindergarten	zachodniopomorskie	Koszalin	July
50 (48)	9 (9)	Enteritidis	Kindergarten	kujawsko-pomorskie	inowrocławski	October
39 (2)	7 (1)	Enteritidis	Restaurant	mazowieckie	Warszawa	July

Data sources: Forms from the outbreaks study of food poisonings and intestinal infections sent to the Department of Epidemiology of NIPH-NIH by sanitary-epidemiological stations

people fell ill. This represents less than 16% of all registered cases of intestinal salmonellosis. Over 82% of outbreaks occurred in households. There were 6 outbreaks, in which 30 or more cases were reported, including 5 where over 50 cases were reported (Table V). In 162 outbreaks (which stands for 90% of all outbreaks reported) an etiological agent was determined as being *S*. Enteritidis, in 5 outbreaks- *S*. Typhimurium, in one- *S*. Kentucky and in the other *S*. Schleisscheim. Comparing to over 70% of all cases of Salmonellosis hospitalized in 2013, in outbreaks only 35% of sick people were hospitalized.

Information on outbreaks of food infection caused by *Salmonella* is gathered in the article "Foodborne infections and intoxications in Poland in 2013" in Epidemiological Chronicle of this issue of PE.

In 2013, among the five most common serotypes causing the disease, the main etiological factor in all voivodeships in both outbreaks and sporadic cases, remained *S. Enteritidis* (Table V, VI). This serological type caused 76% of all cases of salmonellosis (Table V, VI). In 2013 *S*. Typhimurium second most frequent isolated serotype.

In 2013 once again an increase of isolates of Salmonella was observed where no specific serotype was determined. In 2012 they amounted for 14% and in 2013 for 16%. Most alarming situation is in pomorskie voivodeship, where more than 58% of all Salmonella isolates were determined without further serotyping, and also in lodzkie voivodeship (28% of isolates). It is also observed, that in those 2 voivodeships situation in this manner is worsening with every year (Table V).

In 2013 the number of persons involved in food processing and preparation was comparable to 2012 and 2011. In 2013 the percentage of persons with positive results was 0,2% (the same as in 2012), and lower than in 2011 and 2010, when it amounted 0,3% and 0,5% respectively (table IX).

Table VI. Salmonellosis in Poland in 2012-2013. Number of cases by serotype and province

Serotype of Salmonella	Poland		Province															
	2012	2013	Dolnośląskie	Kujawsko-pomorskie	Lubelskie	Lubuskie	Łódzkie	Małopolskie	Mazowieckie	Opolskie	Podkarpackie	Podlaskie	Pomorskie	Śląskie	Świętokrzyskie	Warmińsko-mazurskie	Wielkopolskie	Zachodniopomorskie
Total	8 447	7 576	304	543	489	139	520	596	1 159	123	609	308	578	529	173	516	701	289
Enteritidis	6 536	5 746	250	336	433	110	340	524	869	91	555	255	221	354	148	424	612	224
Typhimurium	322	336	18	28	11	12	13	13	37	14	31	23	14	21	8	24	41	28
Infantis	114	82	5	4	5	1	8	16	8	4	3	6	4	5	-	10	3	-
Mbandaka	77	35	1	1	-	1	1	5	-	1	-	1	1	18	1	1	1	2
Agona	26	23	-	1	-	4	4	1	5	-	3	-	-	2	-	-	3	-
Virchow	37	23	-	1	4	-	1	-	3	-	3	5	-	3	-	3	-	-
Derby	20	18	-	-	-	1	1	3	2	-	-	3	-	-	2	3	1	2
Kentucky	5	18	-	-	7	-	-	-	-	-	-	2	1	2	-	-	4	2
Schleissheim	12	14	-	-	-	-	-	6	-	-	8	-	-	-	-	-	-	-
Saintpaul	11	10	-	-	-	-	-	-	-	1	-	-	-	7	-	-	1	1
Stanley	15	10	-	-	1	-	-	-	1	1	-	-	-	5	-	1	1	-
Hadar	7	8	-	-	-	-	2	-	-	1	1	-	1	-	-	-	2	1
Bredeney	2	6	1	-	1	-	-	-	1	-	-	1	-	1	-	-	1	-
Braenderup	17	5	-	-	-	1	1	-	-	1	-	-	-	1	-	-	1	-
Montevideo	-	5	1	-	-	-	-	1	-	-	-	1	1	-	-	-	-	1
Other	100	56	5	5	1	3	3	7	8	0	4	0	1	8	0	3	3	5
Not determined	1 146	1 181	23	167	26	6	146	20	225	9	1	11	334	102	14	47	27	23

Data sources: Annual reports on salmonellosis cases by an etiological agent and age sent to the Department of Epidemiology, NIPH-NIH by the provincional sanitary-epidemiological station

Table VII. Salmonellosis in Poland in 2013. Number of cases by serotype and age

Serotype of Salmonella	Total		Age group												
	No of cases	%	0	1	2	3	4	0-4	5-9	10-19	20-29	30-39	40-49	50-59	60 +
Total	7 576	100.0	506	811	681	602	494	3 094	1 229	649	441	438	295	481	949
Enteritidis	5 746	75.8	373	615	522	467	396	2373	1014	515	335	348	231	334	596
Typhimurium	336	4.4	18	45	20	19	18	120	41	26	18	14	11	30	76
Infantis	82	1.1	10	10	9	-	-	29	1	6	8	6	6	7	19
Mbandaka	35	0.5	9	5	1	5	1	21	2	4	-	-	1	1	6
Agona	23	0.3	1	4	3	-	-	8	2	1	4	3	-	1	4
Virchow	23	0.3	1	1	1	-	-	3	-	2	2	-	1	5	10
Derby	18	0.2	1	1	1	2	1	6	-	3	2	1	-	1	5
Kentucky	18	0.2	-	1	2	-	-	3	1	2	2	2	1	1	6
Schleissheim	14	0.2	8	-	-	-	-	8	-	1	2	-	1	1	1
Saintpaul	10	0.1	2	-	-	-	-	2	1	1	-	3	-	1	2
Stanley	10	0.1	1	4	1	-	-	6	1	-	-	-	1	-	2
Hadar	8	0.1	-	-	-	-	-	-	-	-	1	-	1	2	4
Bredeney	6	0.1	1	2	-	-	-	3	1	1	-	1	-	-	-
Braenderup	5	0.1	1	1	-	-	-	2	-	1	-	-	-	-	2
Montevideo	5	0.1	1	-	-	-	-	1	-	1	1	-	-	-	2
Other	56	0.7	8	3	3	2	3	19	2	1	9	1	1	5	18
Not determined	1 181	15.6	71	119	118	107	75	490	163	84	57	59	40	92	196

Data sources: Annual reports on salmonellosis cases by an etiological agent and age sent to the Department of Epidemiology, NIPH-NIH by the provincional sanitary-epidemiological station

Table VIII. Salmonellosis in Poland in 2013. Results of bacteriological examinations of different groups of persons: cases, convalescents, carriers, contacts, food staff and others

Tested groups	Number of tested people	Number of people positive for Sallmonella					
		Total	(%)	S. Typhi	S. Paratyphi	other Salm.	Shigella
Cases	20 358	1 241	6.1	-	-	1 241	1
Convalescents	5 906	2 450	41.5	-	1	2 449	1
Carriers	6 553	2 116	32.3	2	1	2 113	2
Contacts	10 932	900	8.2	-	-	900	3
Food handlers and other professionals	420 901	975	0.2	-	-	975	2
Other	8 840	66	0.7	-	-	66	-

Data sources: Annual reports on results of laboratory tests for Salmonella and Shigella sent to the Department of Bacteriology, NIPH-NIH by the provincional sanitary-epidemiological station

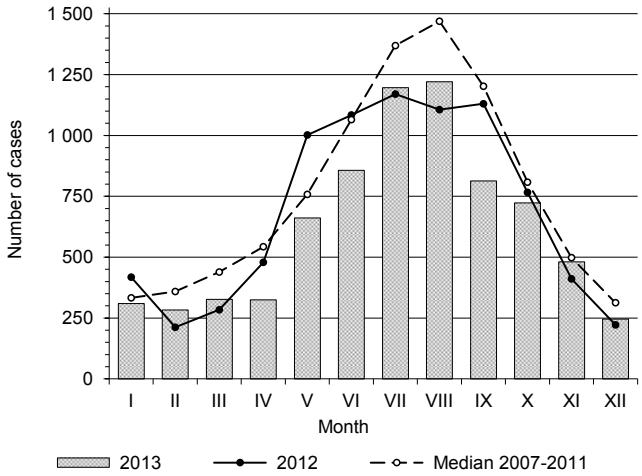

Fig. 1. Salmonellosis in Poland in 2007-2013. Number of cases by month of onset

SUMMARY AND CONCLUSIONS

1. In Poland in 2013, a total number of 7 578 cases of zoonotic salmonellosis were reported (19,7/100 000). It indicates a continuation of the downward trend in the number of cases of salmonellosis in the country.
2. The most common etiological factor throughout the country in both outbreaks and sporadic cases is *S.* Enteritidis, and the share of infections caused by this serotype (in the total number of cases) reached over 77%.
3. High percentage of cases hospitalized which lasts from 2003 (approximately 70% of all registered cases) as well as an increase in the percentage of isolates without further serotyping indicates deterioration in performing laboratory testing in the course of diagnostics of diarrheal diseases. Furthermore it suggests also that salmonellosis, as other gastro-intestinal illness in Poland, is highly underreported and underdiagnosed disease.

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