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## FOODBORNE INFECTIONS AND INTOXICATIONS IN POLAND IN 2013\*

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### ABSTRACT

**AIM.** The purpose of the study is to assess the epidemiological situation of food poisonings and infections in Poland in 2013.

**MATERIALS AND METHODS.** The evaluation was based on the analysis of information from reports of epidemiological investigations in outbreaks of food poisonings and infections, submitted by the sanitary-epidemiological stations to the Department of Epidemiology, NIZP-PZH annual bulletins (Czarkowski MP et al. "Infectious diseases and poisonings in Poland", 2006 - 2013. Warsaw, NIPH-NIH and GIS).

**RESULTS.** In 2013 a further decrease in the number of infections and intoxications with bacterial etiology and an increase in the infections of viral etiology was observed. Furthermore 2013 is another year with low number of cases of trichinellosis (9 cases in total).

In 2013 a total number of 491 foodborne infections and intoxications outbreaks were reported in which there were 29 179 persons exposed and 5 664 (including 2 193 children up to 14 years of age) persons ill. Hospitalization was required for 1 445 persons. The most frequent etiological agent in those outbreaks was *Salmonella* spp. – which was responsible for 36,3 % of outbreaks and 21,5 % of cases. Viruses were responsible for 29,7 of outbreaks and 45,7 cases, in 19,3 % of outbreaks no etiological agent was established. Like in 2012 the most frequent vehicle were dishes made from eggs and milk combined with eggs (9,4% of outbreaks). In 65% of outbreaks reported no vehicle could be found. Moreover in 2013 a total number of 3 outbreaks in which more than 100 cases were reported.

**CONCLUSIONS.** The increase in the number of foodborne outbreaks of viral etiology shows the need of adjustment some aspects of epidemiological investigations especially such features as: laboratory confirmation of etiological agent of ill persons as well as persons involved in the food processing and meals preparing and the aspect of food samples testing.

**Keywords:** *food poisonings and infections, foodborne outbreaks, epidemiology, Poland, 2013*

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The registry of foodborne outbreaks is carried out in Poland at the National Institute of Public Health - NIH since 1988. Based on the data collected within the registry, it is performed annual assessment of the epidemiology of foodborne diseases in Poland. It is designed to track changes in the number of outbreaks, involving various etiological factors and the characteristics of other specific features of outbreaks. For the purpose of surveillance the outbreak is defined as the occurrence, under specific conditions, of two or more cases caused by the same etiological factor.

### MATERIAL AND METHODS

The assessment of the epidemiological situation of outbreaks of foodborne disease in Poland in 2013, was based on analysis of data from the annual bulletins (Czarkowski MP et al. "Infectious diseases and poisonings in Poland" - 2006-2013. Warsaw, NIPH-NIH and GIS) and the data from the reports of foodborne outbreaks submitted to the Department of Epidemiology, NIPH-NIH by the Sanitary-Epidemiological Stations from all over the country.

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## RESULTS

Numbers of cases and the incidence of registered food poisonings and infections in Poland in the years 2006 - 2013 with regard to their etiology are summarized in Table I. In 2013, of food poisonings and infections caused by bacterial factors, in the case of identified disease entities, the number of cases and the incidence of 100 000 population, were lower or at the same level as in 2011 and much lower than the median for the years 2007-2013. Only in the number of cases of typhoid and paratyphoid fever a slight increase was observed. In 2013 a group called “bacterial food poisoning” (caused by zoonotic *Salmonella* types - A02.0, staphylococci - A05.0, *Clostridium botulinum* - A05.1, *C. perfringens* - A05.2, other specified bacteria, *Vibrio parahaemolyticus* in this and *Bacillus cereus* - A05.3-A05.8, and the factors unspecified - A05.9) recorded 9 053 incidence (incidence 23,5 per 100 000). As in previous years, the number of these cases shows a continuous downward trend. The number of cases was lower than the year before and significantly lower than the median for 2007-2011. Apart from warminko-mazurskie voivodship (where incidence was 43,7/100 000) in all other voivodships incidence was below 30 per 100 000 (Table IIA). The incidence among men and women was similar- respectively 23,2 and 23,8 per 100 000 (Table IIIB).

the number of cases and incidence of foodborne infections of viral etiology, classified as “viral, and other intestinal infections” was higher than the year 2012 and much higher than the median of incidence per 100 000 for the years 2007-2011. Comparing with the year 2012 a decrease in the number of viral hepatitis A was observed. Epidemiological situation of hepatitis A has been discussed in a separate article.

Regarding infections with parasitic etiology it is very important to note that for the second consecutive year the small number of trichinellosis cases is recorded- 9 in total, however more cases of echinococcosis was reported than in 2012, which will be discussed in another chapter.

In 2013 a comparable to previous years number of mushrooms poisonings were reported- 44 cases, with the incidence of 0,11 (Table IIB).

According to data from the Central Statistical Office in 2013 due to infections caused by *Salmonella* 10 persons died. Inflammation of the small intestine and colon due to *Clostridium difficile* – caused 210 deaths, and due to other bacterial and not specified causes - 77. Because of food poisoning caused by *Clostridium botulinum* 2 persons died, and due to other bacterial and not specified causes – 3. Rotavirus infection resulted in two deaths and other and unspecified viral infection of the intestine caused 14 deaths.

Table I. Foodborne infections and intoxications registered in Poland in 2007-2013. Number of cases and incidence per 100 000 population

Foodborne infections and intoxications	Median 2007-2011		2012		2013	
	number of cases	incidence rate	number of cases	incidence rate	number of cases	incidence rate
bacterial						
Typhoid/paratyphoid fever	6	0.02	2	0.01	8	0.02
Shigellosis	30	0.08	18	0.04	19	0.05
Salmonellosis	9 478	24.9	8813	22.9	7578	19.70
Staphylococcus aureus	217	0.6	283	0.73	128	0.33
Clostridium botulinum	35	0.1	35	0.09	24	0.06
Clostridium perfringens	4	0.0	24	0.062	18	0.05
Other bacterial - specified	125	0.3	53	0.14	49	0.13
Listeriosis	43	0.11	64	0.17	54	0.14
Leptospirosis	5	0.01	4	0.01	0	0.00
Other bacterial - unspecified	1 800	4.7	1800	4.70	1427	3.70
viral						
Viral intestinal infections	32 723	85.70	39462	102.4	42699	110.90
children under 2 yeras old	15 853	1901.70	18066	2288.4	18530	2437.40
Hepatitis A .	155	0.41	71	0.18	48	0.12
parasitical						
Trichinellosis	36	0.09	1	0	9	0.02
Echinococcosis	28	0.07	28	0.07	39	0.10
other						
Acute diarrhoea in children under 2 years	11 581	1428.40	14201	1798.9	17564	2310.40
mushroom poisonings	73	0.19	30	0.08	44	0.11
Berries or other parts of plants poisonings	9	0.02	3	0.008	5	0.01
Pesticide poisonings	29	0.08	30	0.08	16	0.04

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOS / GIS. Warsaw, Annual Reports:2007 -2013

Table II A. Bacterial foodborne infections and intoxications registered in Poland in 2007-2013. Number of cases and incidence per 100 000 population by province.

Province	Median 2007-2011		2012		2013	
	number of cases	incidence rate	number of cases	incidence rate	number of cases	incidence rate
Poland	11 464	30.0	10054	26.1	9053	23.5
Dolnośląskie	642	22.3	616	21.1	451	15.5
Kujawsko-pomorskie	635	30.7	577	27.5	573	27.4
Lubelskie	711	32.9	628	29	516	23.9
Lubuskie	242	23.9	150	14.7	139	13.6
Łódzkie	743	29.1	518	20.5	520	20.7
Małopolskie	991	30.1	783	23.4	676	20.1
Mazowieckie	1 873	35.8	1888	35.7	1252	23.6
Opolskie	220	21.3	134	13.2	131	13
Podkarpackie	802	38.1	636	29.9	607	28.5
Podlaskie	444	37.3	442	36.8	332	27.7
Pomorskie	827	37.3	644	28.2	614	26.8
Śląskie	1 565	33.7	1326	28.7	1241	26.9
Świętokrzyskie	402	31.6	374	29.3	267	21
Warmińsko-mazurskie	538	37.7	377	26	633	43.7
Wielkopolskie	739	21.6	687	19.9	697	20.1
Zachodniopomorskie	591	34.9	274	15.9	404	23.5

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOŚ / GIS. Warsaw, Annual Reports:2007 -2013

Table II B. Mushroom poisonings in Poland in 2007-2013. Number of cases and incidence per 100 000 population by province.

Province	Median 2007-2011		2012		2013	
	number of cases	incidence rate	number of cases	incidence rate	number of cases	incidence rate
Poland	73	0.2	30	0.08	44	0.11
Dolnośląskie	2	0.1	1	0.03	-	-
Kujawsko-pomorskie	4	0.2	-	-	2	0.1
Lubelskie	8	0.4	14	0.65	2	0.09
Lubuskie	6	0.6	-	-	3	0.29
Łódzkie	7.5	0.3	-	-	-	-
Małopolskie	4	0.1	4	0.39	-	-
Mazowieckie	3	0.1	-	-	2	0.04
Opolskie	1	0.1	-	-	5	0.5
Podkarpackie	5	0.2	1	0.03	1	0.05
Podlaskie	1.5	0.1	2	0.09	3	0.25
Pomorskie	2	0.1	-	-	-	-
Śląskie	2	0.0	2	0.17	4	0.09
Świętokrzyskie	4.5	0.4	4	0.09	2	0.16
Warmińsko-mazurskie	1	0.1	1	0.07	4	0.28
Wielkopolskie	5	0.2	-	-	7	0.2
Zachodniopomorskie	5	0.3	1	0.06	9	0.52

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOŚ / GIS. Warsaw, Annual Reports:2007 -2013

## OUTBREAKS OF FOODBORNE DISEASES

In 2013 a total number of 491 outbreaks of foodborne diseases were reported, with 29 179 exposed persons, 5 664 ill persons, including 2 193 ill children up to 14 years of age.

Most of the outbreaks were caused by zoonotic *Salmonella* serotypes – (36,3% of the outbreaks and 21,5% of the cases) and viruses (29,7% of the outbreaks and 45,7% of the cases). In 19,3% of foodborne

outbreaks no etiological agent was found (Table IV). *Salmonella enteritidis* was an etiological agent in 89,8% of outbreaks causing 92,7 % of cases in the group of zoonotic *Salmonella* outbreaks (Table V). There were also 3 parasitic outbreaks (respectively 0,6% outbreaks and 0,2% cases).

In recent years there has been significant increase in the number of outbreaks caused by *Clostridium difficile*. In 2013 48 of such outbreaks (more than 18 times than in 2012 and above 5 times more than in 2011 and above

Table III. Bacterial foodborne infections and intoxications registered in Poland in 2013. Number of cases, percentage and incidence by age, gender and residence (urban/rural)

A. urban and rural areas									
Age group	Urban area			Rural area			Total		
	number of cases	%	incidence rate	number of cases	%	incidence rate	number of cases	%	incidence rate
0 - 4	2 113	38.1	180.3	1 328	37.9	156.0	3 441	38.0	170.1
0	278	5.0	130.9	259	7.4	166.7	537	5.9	146.0
1	507	9.1	222.4	334	9.5	203.1	841	9.3	214.3
2	495	8.9	210.0	283	8.1	166.5	778	8.6	191.8
3	450	8.1	182.8	252	7.2	141.5	702	7.8	165.5
4	383	6.9	153.4	200	5.7	109.1	583	6.4	134.6
5 - 9	907	16.3	84.7	528	15.1	63.2	1 435	15.9	75.2
10 - 19	514	26.8	23.9	395	11.3	21.1	909	4.8	22.6
20 - 29	365	13.1	10.8	249	7.1	10.5	614	3.6	10.7
30 - 39	370	9.9	9.6	202	5.8	8.7	572	2.9	9.3
40 - 49	197	7.8	6.9	152	4.3	7.6	349	2.2	7.2
50 - 59	301	9.7	8.6	239	6.8	11.5	540	3.3	9.7
60 i >	786	14.2	14.9	407	11.6	14.2	1193	7.9	14.6
Total	5 553	100.0	23.8	3 500	100.0	23.0	9 053	100.0	23.5
B. men and women									
Age group	Men			Women			Total		
	number of cases	%	incidence rate	number of cases	%	incidence rate	number of cases	%	incidence rate
0 - 4	1 777	40.0	171.0	1 664	36.1	169.1	3 441	36.9	170.1
0	272	6.1	143.8	265	5.7	148.4	537	5.8	146.0
1	453	10.2	224.3	388	8.4	203.7	841	9.0	214.3
2	392	8.8	188.0	386	8.4	195.8	778	8.3	191.8
3	359	8.1	164.9	343	7.4	166.0	702	7.5	165.5
4	301	6.8	135.8	282	6.1	133.5	583	6.3	134.6
5 - 9	732	16.5	74.8	703	15.3	75.7	1 435	15.4	75.2
10 - 19	470	10.6	22.8	439	28.6	22.4	909.0	4.7	22.6
20 - 29	288	6.5	9.8	326	7.1	11.5	760.0	3.5	10.7
30 - 39	307	6.9	9.8	265	5.7	8.7	565.0	2.8	9.3
40 - 49	148	3.3	6.1	201	4.4	8.3	380.0	2.2	7.2
50 - 59	243	5.5	8.9	297	6.4	10.3	590.0	3.2	9.7
60 i >	479	10.8	14.4	714.0	15.5	14.8	1161.0	7.7	14.6
total	4 444	100.0	23.8	4 609	100.0	23.2	9 324	100.0	23.5

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOs / GIS. Warsaw,

Table IV. Outbreaks of foodborne and waterborne infections and intoxications in Poland in 2012-2013. Number and percentage of outbreaks and cases by etiological agent.

Etiological agent	2012				2013			
	Outbreaks		Cases		Outbreaks		Cases	
	number	%	number	%	number	%	number	%
zoonotic Salmonella types	187	38.1	1543	26.7	178	36.3	1215	21.5
Staphylococcus aureus	5	1.0	150	2.6	5	1.0	103	1.8
Escherichia coli	5	1.0	220	3.8	2	0.4	4	0.1
other bacterial agents	42	8.6	267	4.6	58	11.8	499	8.8
viruses	133	27.1	2092	36.2	146	29.7	2590	45.7
poisonous mushrooms	2	0.4	5	0.1	4	0.8	11	0.2
parasites	0	0.0	0	0.0	3	0.6	10	0.2
unknown	117	23.8	1497	25.9	95	19.3	1232	21.8
total	491	100.0	5774	100.0	491	100.0	5664	100.0

15 times more than in 2010) were reported in which 217 persons fell ill and 10 died. Most of these outbreaks took place in hospitals (apart from one, which was classified as a domestic/household outbreak).

In the years 2010-2012 an increase of cases among children up to 14 years of age in outbreaks was observed. In 2010 a total number of 292 cases fitting this group was reported, in the next year there was almost 4 times increase, which slightly increases even more in the

Table V. Outbreaks of foodborne and waterborne infections and intoxications caused by Salmonella in Poland, in 2012-2013. Number and percentage of outbreaks and cases by serotype.

Zoonotic Salmonella types	2012				2013			
	Outbreaks		Cases		Outbreaks		Cases	
	number	%	number	%	number	%	number	%
S. Enteritidis	171	94.0	1441	96.3	159	89.8	1125	92.7
S. Typhimurium	7	3.8	30	2.0	5	2.8	26	2.1
S. spp	2	1.1	4	0.3	2	1.1	6	0.5
S.group B	-	-	-	-	2	1.1	16	1.3
S.group C	-	-	-	-	1	0.6	4	0.3
S.group D	2	1.1	22	1.5	6	3.4	27	2.2
S. Kentucky	-	-	-	-	1	0.6	4	0.3
S.Schleissheim	-	-	-	-	1	0.6	5	0.4
Salmonella - total	182	100.0	1497	100.0	177	100.0	1213	100.0

Table VI. Outbreaks of foodborne infections and intoxications in Poland in 2013. Number of outbreaks and cases by etiological agent and setting.

Setting		Etiological agent							total	total %	
		Salmonella	E.coli	S. aureus	other bacterial agents	viruses	poisonous mushrooms	parasites			unknown agent
household, domestic kitchen	outbreaks	147	1	1	6	40	4	2	27	228	46.4
	cases	638	2	9	13	168	11	6	89	936	16.5
restaurant, bar, hotel, catering	outbreaks	19	1	2	1	13			36	72	14.7
	cases	267	2	62	87	412			559	1389	24.5
nursery, kindergarten	outbreaks	6			1	8			1	16	3.3
	cases	175			3	100			6	284	5.0
school	outbreaks			1		9			2	12	2.4
	cases			20		827			72	919	16.2
school trip, camp	outbreaks	1				2			2	5	1.0
	cases	3				59			35	97	1.7
children's home, boarding schools	outbreaks	1				7			8	16	3.3
	cases	22				197			167	386	6.8
social care	outbreaks					3			2	5	1.0
	cases					52			42	94	1.7
hospital	outbreaks	1			49	55		1	11	117	23.8
	cases	4			268	469		4	139	884	15.6
sanatorium, rehabilitation center	outbreaks	1				6			4	11	2.2
	cases	5				258			85	348	6.1
other setting	outbreaks	2		1	1	3			2	9	1.8
	cases	101		12	128	48			38	327	5.8
total	outbreaks	178	2	5	58	146	4	3	95	491	
	cases	1215	4	103	499	2590	11	10	1232	5664	
total %	outbreaks	36.3	0.4	1.0	11.8	29.7	0.8	0.6	19.3		100.0
	cases	21.5	0.1	1.8	8.8	45.7	0.2	0.2	21.8		100.0

\* number of outbreaks \*\* number of cases ( )

year 2012 (in this year the biggest number of outbreaks was reported in kindergartens, nurseries and schools).

There were 3 outbreaks reported in 2013 with the case number exceeding 100. Two of them were caused by noroviruses and rotavirus respectively, and the third one was classified as an outbreak of mixed etiology. A total number of 628 persons fell ill in those 3 outbreaks.

Just as in 2012, the most frequent place where outbreaks took place in 2013 was private household

(228 outbreaks, 936 cases). Furthermore there were 117 hospital outbreaks with 884 cases (33 outbreaks more than in 2012).

In 2013 there were 72 outbreaks recorded in food providing facilities, in which 1 389 persons fell ill (Table VI).

The most common vehicles in 2013 were dishes falling into the category of deserts (including cakes with cream) (6,1% of outbreaks, 4,7% of cases). In

Table VII. Outbreaks of foodborne infections and intoxications in Poland in 2013. Number of cases in outbreaks by vehicle of infection.

Etiological agent	Vehicle of infection																total	%	
	eggs	milk and eggs	milk and milk products	cakes with cream, cream, desserts	cakes without cream	poultry meat	poultry and eggs	beef	pork meat	mixed meat	other meat products	ready to eat products	vegetables	fruits	mushrooms	other			unknown
zoonotic Salmonella types	22	21		27	5	3	6	8	1		4	9	3			6	63	178	36.3
Escherichia coli	161	102		255	31	16	24	48	8		18	30	11			126	385	1215	21.5
Staphylococcus aureus																	1	2	0.4
other bacterial agents											1					2	2	4	0.1
viruses											12					49	42	103	1.8
poisonous mushrooms											1					3	53	58	11.8
parasites											2					234	229	499	8.8
unknown agent	1											3	1	4		8	129	146	29.7
	317											40	33	47		163	1990	2590	45.7
																3	4	4	0.8
																9	2	11	0.2
											1						1	3	0.6
											4						2	10	0.2
	1	2	1	3		1	1	1	1	1	1	1			2	10	70	95	19.3
	2	8	9	14		2	15	2	2	86	25				7	173	887	1232	21.8
	23	23	2	30	5	4	7	9	4	1	8	12	4	5	5	30	319	491	
	4.7	4.7	0.4	6.1	1.0	0.8	1.4	1.8	0.8	0.2	1.6	2.4	0.8	1.0	1.0	6.1	65.0	100.0	
total	163	110	326	269	31	18	39	50	48	86	61	70	44	49	16	747	3537	5664	
	2.9	1.9	5.8	4.7	0.5	0.3	0.7	0.9	0.8	1.5	1.1	1.2	0.8	0.9	0.3	13.2	62.4	100.0	

319 (65,0%) of outbreaks, with 3 537 cases (62,4%) no vehicle was discovered (Table VII).

In 2013 the prevailing symptoms of foodborne diseases, depending on the etiological agent were as follows:

- in diseases caused by *Salmonella* dominated diarrhea, which occurred in 88,7% of patients, fever (63,9%) and abdominal pain (59,5%);
- among the cases of staphylococcal etiology vomiting occurred in 85,4% of patients, nausea in 60,3% and diarrhea in 52,2 %;
- in diseases caused by viruses the most frequent symptoms were vomiting (in 66,6% of cases), diarrhea (in 60,3% of cases) and abdominal pain (52,2% of cases).

As in previous years outbreaks, have been reported to the European Union database operated by EFSA, in accordance with the criteria set by this organization. Among outbreaks reported there were 125 classified as strong-evidence outbreaks (with the proven link between the illness and food consumption), which was 46 more than in 2012. In 29 outbreaks evidences mentioned were laboratory (microbiologically) based (in food samples or surfaces swabs the same agent was discovered as in samples taken from the cases), and in 93 of outbreaks the epidemiological proofs were found (strong connection between food consumption and falling ill proven by epidemiological analysis or by descriptive epidemiology). In 3 outbreaks the potential etiological agent was found only in food samples or surface swabs, but the cases had symptoms consistent with the disease caused by this agent.

## SUMMARY AND CONCLUSIONS

1. In 2013, similarly as in previous years the number and the proportion of foodborne outbreaks caused by viruses increased.
2. From the year 2010 there is an increase of both the number and the proportion of children in foodborne outbreaks.
3. The increase in the number of foodborne outbreaks of viral etiology shows the need of adjustment some aspects of epidemiological investigations especially such features as: laboratory confirmation of etiological agent of persons ill as well as persons involved in the food processing and meals preparing and the aspect of food samples testing.

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