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FOODBORNE INFECTIONS AND INTOXICATIONS IN POLAND IN 2012

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ABSTRACT

AIM. The purpose of the study is to assess the epidemiological situation of foodborne infections and intoxications in Poland in 2012.

MATERIALS AND METHODS. The evaluation was based on analysis of information from reports of epidemiological investigations in foodborne outbreaks, 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 - 2012. Warsaw, NIPH-NIH and CSI).

RESULTS. In Poland in 2012 there was observed decrease in the number of infections intoxications both of bacterial and viral origin. It was recorded only one case of trichinellosis.

There were reported 491 outbreaks of foodborne poisonings or infections included 5 774 people, among them 718 children 1-14 years old. Out of them 1 364 people were hospitalized. Unlike last year, the predominant etiological agent in those outbreaks were zoonotic *Salmonella* serotypes which caused 38.1% outbreaks and 26.7% outbreak cases. The viruses have caused 27.1% of outbreaks and 36.2 % of cases. In 23.8% of outbreaks etiological agent has not been established. Most often the settings of an outbreak was a private household - 236 outbreaks and a hospital (84 outbreaks). As in previous years, the most common vehicle of infection were foods prepared with milk and eggs -11.8% of outbreaks and egg dishes - 9.0%. In 57.6 % of outbreaks vehicle of infection has not been established. Among outbreaks reported in 2012, there were 4 which involved more than 100 people. In 163 outbreaks of food items had been tested and in 33 % of them the results were positive .

CONCLUSIONS. The increasing negative results of bacteriological examinations of food items, suggeste necessity to start testing food contamination with viruses.

Keywords: *food poisonings and infections, foodborne outbreaks, epidemiology, Poland, 2012*

Register 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 allows to track changes in the number of outbreaks, involving various etiological agents and the characteristics 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 agent.

MATERIAL AND METHODS

The assessment of the epidemiological situation of outbreaks of foodborne disease in Poland in 2012, was based on analysis of data from the annual bulletins

(Czarkowski MP et al. "Infectious diseases and poisonings in Poland" - 2006-2012. 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.

RESULTS

Numbers of cases and the incidence of registered foodborne infections and intoxications in Poland in the years 2006 - 2012 with regard to their etiology are summarized in Table I. In 2012 among those suffering from gastroenteritis caused by a bacterial infection, the number of sick people or the incidence was similar albeit slightly lower than levels observed in 2011 and

Table I. Foodborne infections and intoxications registered in Poland in 2006-2012. Number of cases and incidence per 100 000 population

Foodborne infections and intoxications	Median 2006-2010		2011		2012	
	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	2	0.01
Shigellosis	33	0.09	18	0.04	13	0.03
Salmonellosis	9 732	25.5	8813	22.9	8444	21.9
<i>Staphylococcus aureus</i>	217	0.6	283	0.73	147	0.38
<i>Clostridium botulinum</i>	46	0.1	35	0.09	22	0.06
<i>Clostridium perfringens</i>	4	0.0	24	0.062	5	0.013
Other bacterial - specified	125	0.3	53	0.14	52	0.13
Listeriosis	33	0.07	64	0.17	54	0.14
Leptospirosis	6	0.02	4	0.01	2	0.005
Other bacterial - unspecified	2 347	6.2	1800	4.70	1561	4.10
viral						
Viral intestinal infections	32 559	85.40	44906	116.6	39462	102.4
children under 2 yeras old	15 260	1901.70	21250	258.8	18066	2288.4
Hepatitis A .	155	0.41	65	0.17	71	0.18
parasitical						
Trichinellosis	51	0.13	23	0.06	1	0
Echinococcosis	36	0.09	19	0.05	28	0.07
other						
Acute diarrhoea in children under 2 years	11 096	1389.20	13068	1591.4	14201	1798.9
mushroom poisonings	80	0.21	32	0.08	30	0.08
Berries or other parts of plants poisonings	10	0.03	8	0.021	3	0.008
Pesticide poisonings	68	0.18	19	0.05	30	0.08

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOs / GIS. Warsaw, Annual Reports:2006 -2012

considerably lower than the median reported between 2006-2010. In 2012, in 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, including *Vibrio parahaemolyticus* and *Bacillus cereus*

- A05.3-A05.8, and the unspecified agents - A05.9) recorded 10 054 incidence (incidence 26.1 per 100 000). As in previous years, the number of these cases shows a continuous downward trend.

The number of cases was significantly lower than the median for 2006-2010 (12 218 cases). In most prov-

Table II A. Bacterial foodborne infections and intoxications registered in Poland in 2006-2012. Number of cases and incidence per 100 000 population by province

Province	Median 2006-2010		2011		2012	
	number of cases	incidence rate	number of cases	incidence rate	number of cases	incidence rate
Poland	12 218	32.1	10847	28.2	10054	26.1
Dolnośląskie	655	22.8	595	20.4	616	21.1
Kujawsko-pomorskie	823	39.8	582	27.7	577	27.5
Lubelskie	816	37.7	648	29.8	628	29
Lubuskie	248	24.6	133	13	150	14.7
Łódzkie	780	30.6	572	22.5	518	20.5
Małopolskie	1 120	34.1	925	27.7	783	23.4
Mazowieckie	1 873	35.8	1956	37.1	1888	35.7
Opolskie	262	25.1	139	13.7	134	13.2
Podkarpackie	825	39.3	615	28.9	636	29.9
Podlaskie	528	44.4	278	23.1	442	36.8
Pomorskie	843	37.7	701	30.8	644	28.2
Śląskie	1 622	34.9	1550	33.5	1326	28.7
Świętokrzyskie	421	33.0	242	18.9	374	29.3
Warmińsko-mazurskie	538	37.7	610	42	377	26
Wielkopolskie	773	22.7	669	19.4	687	19.9
Zachodniopomorskie	591	34.9	632	36.7	274	15.9

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOs / GIS. Warsaw, Annual Reports:2006 -2012

Table II B. Mushroom poisonings in Poland in 2006-2012. Number of cases and incidence per 100 000 population by province.

Province	Median 2006-2010		2011		2012	
	number of cases	incidence rate	number of cases	incidence rate	number of cases	incidence rate
Poland	80	0.2	32	0.08	30	0.08
Dolnośląskie	2	0.1	3	0.1	1	0.03
Kujawsko-pomorskie	8	0.4	3	0.14	-	-
Lubelskie	8	0.4	7	0.32	14	0.65
Lubuskie	3	0.3	6	0.59	-	-
Łódzkie	11.5	0.5	2	0.08	-	-
Małopolskie	4	0.1	4	0.12	4	0.39
Mazowieckie	4	0.1	1	0.02	-	-
Opolskie	1	0.1	-	-	-	-
Podkarpackie	5	0.2	2	0.09	1	0.03
Podlaskie	2	0.2	-	-	2	0.09
Pomorskie	3	0.1	-	-	-	-
Śląskie	3	0.1	2	0.04	2	0.17
Świętokrzyskie	3	0.2	-	-	4	0.09
Warmińsko-mazurskie	1	0.1	1	0.07	1	0.07
Wielkopolskie	5	0.2	1	0.03	-	-
Zachodniopomorskie	5.5	0.3	-	-	1	0.06

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOS / GIS. Warsaw, Annual Reports:2006 -2012

inces the incidence was less than 30/100 000. Only two provinces Podlaskie and Mazowieckie was above this value, respectively, 36.8 and 35.7 (Table II A). In 2012, the incidence of foodborne disease in the urban area and the countryside was at a similar level, respectively, 26.6 and 25.4. Cases, like in previous years, were most common in the age group 0-4 and accounted for nearly 50% of all registered cases (Table III A). The incidence among men and women was the same and amounted to 26.18/100 000. As in previous years in boys up to 10 years of age, incidence was slightly higher, but in the remaining age groups, slightly lower than in women (Table III B).

For the first time in many years the number of cases and incidence of foodborne infections of viral etiology, classified as “viral, and other intestinal infections” was lower than in previous year, although higher than the median for 2006-2010. In 2012, a slight increase in the number of cases 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 worth noting that only one case of trichinellosis was reported, while in 2012 slightly more cases of echinococcosis was reported than in 2011, which will be discussed in another chapter.

In 2012, the number of cases of mushroom poisoning was similar to the recorded in 2011 - 30 cases, incidence of 0.08/100 000, (Table II B).

According to data from the Central Statistical Office in 2012 due to infections caused by *Salmonella* 7 persons died. Inflammation of the small intestine and colon caused by *Clostridium difficile* – caused 147

deaths, other specific and not specific bacterial infections - 40 deaths. Because of food poisoning caused by *Clostridium botulinum* died 2 persons, and due to other bacterial and not specified causes died 10. Rotavirus infection resulted in one death and other and unspecified viral infection of the intestine caused 4 deaths. Furthermore, “diarrhea and gastrointestinal inflammation probably of infectious origin“ caused 2 deaths.

OUTBREAKS OF FOODBORNE DISEASES

In 2012 there were 491 outbreaks of foodborne diseases, in which number of exposed people was 28 783. In those outbreaks 5 774 persons got ill, including 2 219 children up to 14 years. 1 596 people required hospitalization. Most of the outbreaks were caused by zoonotic *Salmonella* types – (38,1% of outbreaks and 26,7% of cases) and viruses (27,1% of outbreaks and 36,2% of the cases). In 23.8% of outbreaks etiological agent was not found (table IV). Among zoonotic serotypes of *Salmonella* bacilli *Salmonella* Enteritidis was the etiological agent for 91.4% of the outbreaks, of 93,4% cases, (table V). One outbreak caused by *Salmonella* Paratyphi was found among tourists who have returned from India. There has not been any outbreaks with a parasite as an etiological agent.

In recent years there has been significant increase in the number of hospital outbreaks caused by *Clostridium difficile*. In 2012, 30 such outbreaks with total of 211 cases including 17 fatalities were reported. Number of outbreaks in which the etiological agent was *Clostridium difficile* was 5 times higher than in 2011 and

Table III. Bacterial foodborne infections and intoxications registered in Poland in 2012. Number of cases, percentage and incidence by age, gender and residence (urban/rural)

A. urban and rural areas

Age group	Urban area			Rual area			Total		
	number of cases	%	incidence rate	number of cases	%	incidence rate	number of cases	%	incidence rate
0 - 4	2 545	41.0	213.0	1 535	39.9	176.4	4 080	47.3	197.6
0	360	5.8	161.9	321	8.3	198.2	681	8.8	177.2
1	577	9.3	244.9	407	10.6	240.0	681	11.5	242.9
2	547	8.8	222.1	333	8.7	187.2	984	10.7	207.5
3	578	9.3	230.9	275	7.1	150.5	880	9.3	197.0
4	483	7.8	201.0	199	5.2	111.8	853	6.9	163.0
5 - 9	968	15.6	93.9	558	14.5	68.7	558	16.0	82.8
10 - 19	596	26.8	17.8	396	10.3	20.4	992	6.4	23.8
20 - 29	463	13.1	14.2	297	7.7	12.4	760	4.6	12.8
30 - 39	372	9.9	10.5	193	5.0	8.4	565	3.7	9.3
40 - 49	222	7.8	9.9	158	4.1	8.0	380	2.9	7.9
50 - 59	354	9.7	11.6	236	6.1	11.4	590	4.4	10.3
60 i >	685	11.0	13.4	476	12.4	17.0	1161	9.2	14.7
Total	6 205	100.0	26.6	3 849	100.0	25.4	9 086	100.0	26.1

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	2 154	41.4	203.2	1 926	35.0	191.6	4 080	40.6	197.6
0	369	7.1	186.5	312	5.7	167.4	681	6.8	177.2
1	531	10.2	254.9	453	8.2	230.1	984	9.8	242.9
2	473	9.1	217.4	407	7.4	197.1	880	8.8	207.5
3	448	8.6	202.1	405	7.4	191.6	853	8.5	197.0
4	333	6.4	155.4	349	6.3	171.1	682	6.8	163.0
5 - 9	790	15.2	83.5	736	13.4	82.0	1 526	15.2	82.8
10 - 19	526	10.1	24.7	581	28.6	28.6	992.0	5.8	23.8
20 - 29	376	7.2	12.5	422	7.7	14.5	760.0	4.2	12.8
30 - 39	276	5.3	9.0	334	6.1	11.2	565.0	3.3	9.3
40 - 49	211	4.1	8.7	268	4.9	11.2	380.0	2.7	7.9
50 - 59	306	5.9	11.0	397	7.2	13.5	590.0	3.9	10.3
60 i >	558	10.7	17.3	840.0	15.3	17.9	1161.0	8.4	14.7
total	5 197	100.0	26.1	5 504	100.0	26.1	10 054	100.0	26.1

Data sources: Infectious diseases and poisonings in Poland. NIZP-PZH, MZiOŚ / GIS. Warsaw, Annual Report 2006/2012

15 times than in 2010. All of these outbreaks occurred in hospitals in one province. Six of them were reported from one hospital.

In 2012, in the 4 reported outbreaks, number of cases exceeded 100 people. In two of them etiologic factor were noroviruses in one *S. Enteritidis*, and in one *E. coli*. A total number of cases in those outbreaks was 537.

Table IV. Outbreaks of foodborne and waterborne infections and intoxications in Poland in 2011-2012. Number and percentage of outbreaks and cases by etiological agent

Etiological agent	2011				2012			
	Outbreaks		Cases		Outbreaks		Cases	
	number	%	number	%	number	%	number	%
zoonotic <i>Salmonella</i> types	174	35.5	1774	27.8	187	38.1	1543	26.7
<i>Staphylococcus aureus</i>	1	0.2	19	0.3	5	1.0	150	2.6
<i>Escherichia coli</i>	5	1.0	30	0.5	5	1.0	220	3.8
other bacterial agents	14	2.9	105	1.6	42	8.6	267	4.6
viruses	179	36.5	2590	40.6	133	27.1	2092	36.2
poisonous mushrooms	3	0.6	22	0.3	2	0.4	5	0.1
parasites	5	1.0	13	0.2	0	0.0	0	0.0
unknown	109	22.2	1 833	28.7	117	23.8	1497	25.9
total	490	100.0	6386	100.0	491	100.0	5774	100.0

Table V. Outbreaks of foodborne and waterborne infections and intoxications caused by Salmonella in Poland, in 2011-2012. Number and percentage of outbreaks and cases by serotype

Zoonotic <i>Salmonella</i> types	2011				2012			
	Outbreaks		Cases		Outbreaks		Cases	
	number	%	number	%	number	%	number	%
<i>S. Enteritidis</i>	160	93.6	1719	97.9	171	91.4	1441	93.4
<i>S. Typhimurium</i>	4	2.3	12	0.7	7	3.7	30	1.9
<i>S. Infantis</i>	2	1.2	7	0.4	1	0.5	2	0.1
<i>S. Branderburg</i>	-	-	-	-	1	0.5	2	0.1
<i>S. Stanley</i>	1	0.6	2	0.1	-	-	-	-
<i>S. spp</i>	-	-	-	-	2	1.1	4	0.3
<i>S. group B</i>	3	1.8	14	0.8	-	-	-	-
<i>S. group D</i>	1	0.6	2	0.1	2	1.1	22	1.4
<i>S. group D + S. group B</i>	-	-	-	-	1	0.5	3	0.2
<i>S. Enteritidis + S. group C</i>	-	-	-	-	1	0.5	33	2.1
<i>S. Typhimurium + S. Mbandaka</i>	-	-	-	-	1	0.5	6	0.4
<i>Salmonella</i> - total	171	100.0	1756	100.0	187	100.0	1543	100.0

Just as in 2011, the most frequent place where the outbreaks occurred were households (236 outbreaks, 954 cases). In hospitals happened 84 outbreaks involving 964 cases. In 66 reported outbreaks with a total of 964 cases the cause was the consumption of foods in restaurants (Table VI Outbreaks of collective foodborne diseases in Poland in 2012, Number of outbreaks by etiologic agent and the circumstances of exposure)

In 2012 a total of 13 outbreaks that occurred after the ingestion of food provided by caterers were registered in seven provinces. Total number of cases was

569, including 210 children under the age of 14. In those outbreaks total number of exposed was 2234. It should be emphasized that these data are not complete, because in many reports of outbreak investigations such information is not included. Special attention require four outbreaks which occurred in 15 kindergartens and one nursery. In three of them etiologic agent was *Salmonella* Enteritidis. In recent years, an increasing number of institutions such as kindergartens, schools, hospitals, use catering services, so it is particularly important that hygienic conduct of these companies

Table VI. Outbreaks of foodborne infections and intoxications in Poland in 2012. Number of outbreaks and cases by etiological agent and setting

Setting	Etiological agent							total	total %
	<i>Salmonella</i>	<i>E.coli</i>	<i>S. aureus</i>	other bacterial agents	viruses	poisonous mushrooms	unknown agent		
household, domestic kitchen	145 (658)	2 (6)		12 (23)	47 (150)	2 (5)	28 (112)	236 (954)	48.0 (16.5)
restaurant, bar, hotel, catering	17 (356)	1 (3)	1 (16)	1 (2)	16 (509)		30 (436)	66 (1322)	13.4 (22.9)
nursery, kindergarten	10 (262)		1 (52)		8 (151)		4 (40)	23 (505)	4.7 (8.8)
school	5 (134)		1 (18)		3 (63)		3 (63)	12 (278)	2.4 (4.8)
school trip, camp			1 (29)		8 (222)		20 (323)	29 (574)	5.9 (9.9)
children's home, boarding schools	2 (13)	1 (35)			2 (20)		5 (79)	10 (147)	2.0 (2.5)
social care	1 (7)				3 (92)		4 (54)	8 (153)	1.6 (2.6)
hospital			1 (35)	29 (242)	37 (429)		17 (258)	84 (964)	17.1 (16.7)
sanatorium, rehabilitation center		1 (176)			6 (294)		6 (132)	13 (602)	2.7 (10.4)
other setting	7 (113)				3 (162)			10 (275)	2.0 (4.8)
total	187 (1543)	5 (220)	5 (150)	42 (267)	133 (2092)	2 (5)	117 (1497)	491 (5774)	
total %	38.1 (26.7)	1.0 (3.8)	1.0 (2.6)	8.6 (4.6)	27.1 (36.2)	0.4 (0.1)	23.8 (25.9)		

* number of outbreaks ** number of cases ()

Table VII. Outbreaks of foodborne infections and intoxications in Poland in 2012. Number of cases in outbreaks by vehicle of infection

Etiological agent		Vehicle of infection									
		milk and eggs	eggs	poultry and eggs	red meat and eggs	red meat	mixed food	other food	unknown	total	%
zoonotic <i>Salmonella</i> types	outbreaks	55	43	8	20	3	11	5	42	187	38.1
	cases	378	213	67	166	10	387	25	297	1543	26.7
<i>Escherichia coli</i>	outbreaks			1			1	1	2	5	1.0
	cases			35			176	2	7	220	3.8
<i>Staphylococcus aureus</i>	outbreaks				1	2	2			5	1.0
	cases				29	70	51			150	2.6
other bacterial agents	outbreaks					2	1		39	42	8.6
	cases					4	14		249	267	4.6
viruses	outbreaks	1				1	5	17	109	133	27.1
	cases	14				2	235	335	1506	2092	36.2
poisonous mushrooms	outbreaks							2		2	0.4
	cases							5		5	0.1
unknown agent	outbreaks	2	1	2	1	5	9	6	91	117	23.8
	cases	31	2	7	13	68	230	164	982	1497	25.9
total	outbreaks	58	44	11	22	13	29	31	283	491	
	%	11.8	9.0	2.2	4.5	2.6	5.9	6.3	57.6		
	cases	423	215	109	208	154	1093	531	3041	5774	
	%	7.3	3.7	1.9	3.6	2.7	18.9	9.2	52.7		

should be meticulously followed on food processing, transporting and serving.

In 2012 as in the previous years, the most common vehicle of foodborne infections, were dishes prepared from milk and eggs (11.8% of outbreaks, 7.3% of cases) and eggs (9.0% of outbreaks, 3.7% of cases). In 283 (57.6%) outbreaks, in which 3041 people fell ill (63.2%) vehicle of infection was not identified (Table VII).

In 2012 the prevailing symptoms of foodborne diseases, depending on the etiological agent were as follows:

- In diseases caused by *Salmonella* dominated diarrhea, which occurred in 89.5% of patients, in 76.0% fever and abdominal pain in 68.4% ;
- In cases of staphylococcal etiology vomiting occurred in 86% of patients, nausea in 60% and diarrhea in 56.0 % ;
- In diseases caused by viruses vomiting was in 69.8 % and diarrhea in 63.7 %

The clinical picture of illness of unknown etiological agent was similar to those caused by viruses. It was also dominated by diarrhea and vomiting 64.7% and 57.4%, pointing to their viral nature .

Outbreaks, as in every year, have been reported to the European Union database operated by EFSA, in accordance with the criteria set by this organization. In 2012, there were reported 491 outbreaks, and detailed data providing strong evidence of association of disease with the consumption of food were provided for 79. In 43 outbreaks such evidence was microbiological detection the same causative agent in food vehicle or environment and in human cases, and in 36 others evidence was epidemiological (a strong statistical association between disease and the consumption of particular food).

It should be noted that currently in Poland, in the context of the criteria adopted by EFSA for the classification of outbreaks on the nature of the evidence,

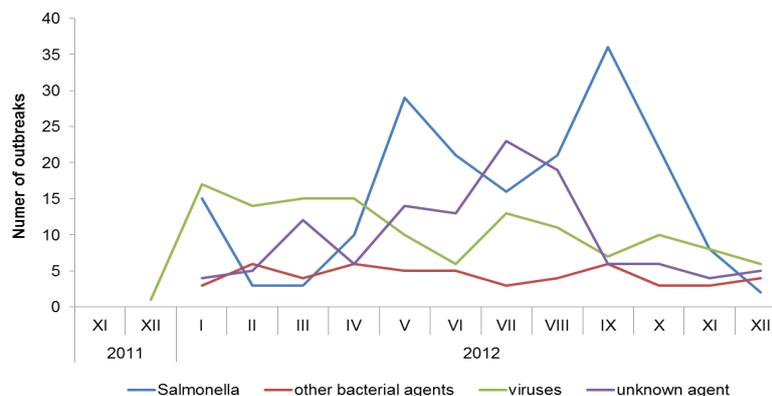


Fig 1. Outbreaks of foodborne and waterborne infections in Poland in 2012. Number of reported outbreaks by etiological agent and month (date of the first cases in the outbreak)

Table VIII. Selected foodborne outbreaks in Poland in 2012, associated with the consumption of a food prepared by a catering company

no	Month	Province (town)	Setting (number of places)	Nuber of cases (with children up to 14 y)	Food vehicle	Etiological agent
1	I	Zachodnio-pomorskie (Połczyn Zdrój)	sanatorium (4)	176 (0)	mixed food	Escherichia coli O125
2	III	Podlaskie (Koczery)	workplace (1)	3 (0)	product containing milk and eggs	Salmonella Enteritidis
3	V	Podkarpackie (Chmielnik)	training center (1)	5 (0)	unknown	nd
4	V	Małopolskie (Kraków)	kindergarten (8), nursery (1)	49 (47)	mixed food	Salmonella Enteritidis
5	VII	Kujawsko-pomorskie (Nakło n. Notecią)	medical care facility (1)	26 (0)	mixed food	Norovirus
6	VII	Pomorskie (Starogard Gdański)	hospital (1)	9 (0)	unknown	nd
7	VIII	Zachodnio-pomorskie (Wałcz)	hospital (1)	24 (20)	unknown	nd
8	VIII	Pomorskie (Gdańsk)	hospital (1)	19 (0)	unknown	Norovirus
9	IX	Mazowieckie (Warszawa)	kindergarten (4), school (1)	104 (101)	mixed food	Salmonella Enteritidis
10	IX	Mazowieckie (Warszawa)	kindergarten (2)	20 (17)	mixed food	Salmonella Enteritidis
11	X	Pomorskie (Starogard Gdański)	medical care facility (1)	5 (0)	unknown	nd
12	XI	Mazowieckie (Warszawa)	kindergarten (1), school (1)	25 (25)	mixed food	Norovirus
13	XII	Pomorskie (Gdańsk)	training center (1)	7 (0)	unknown	Norovirus
14	XII	Mazowieckie (Warszawa)	workplace (1)	97 (0)	mixed food	Norovirus

investigation of patient and the food is carried out only in the direction of bacterial agents. This approach is not fully justified, because recent years shows that increased fraction of outbreaks is caused by viruses.

Analysis of outbreaks by date of occurrence of the first case in 2012 (Fig 1), as in the previous years indicates that the seasonality of outbreaks of unknown origin is similar to outbreaks of viral etiology, which may indirectly indicate their viral nature. In addition, in 2012 increased the number and proportion of outbreaks in which food or raw materials were examined (163 outbreaks, 33.2 %), with decrease of the number of positive results (only 33 % of these outbreaks raised at least one positive result). This confirms that the source of infection and the food vehicle are rarely identified in the outbreaks. As consequence, implementation of the fundamental purpose of the outbreak investigation, which is to prevent further cases of illness by elimination of the vehicle and modes of transmission.

SUMMARY AND CONCLUSIONS

1. In 2012, as in previous years, the increase in the number and proportion of outbreaks, in which the

pathogen was not isolated from food despite the increased fraction of dishes tested.

2. In recent years, there is increasing number of reported outbreaks caused by viruses. It points to the urgent need to expand the current panel of food testing to viral agents.
3. In recent years, there is an increase in the number of reported outbreaks in hospitals, with *Clostridium difficile* as the etiological agent.
4. In Poland, more frequently are reported outbreaks, in which the food vehicle are dishes prepared by catering services. Such services are also used by institutions such as kindergartens, schools, hospitals and nursing homes, in which exposed people are particularly vulnerable to the effects of infection. Therefore, it is important to strengthen the supervision of such companies and how they conduct their services.

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