



## SLOVAKIA (SVK)

Population: 5.4 million (1998)

Area: 48 845 km<sup>2</sup>



*The designations and the presentation of material on this map of the Member States of the WHO European Region (as at 31 July 1997) do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines represent approximate border lines for which there may not yet be full agreement.*

### 1. General information

#### 1.1 Organisational structure

Since the sixth report of this WHO Surveillance Programme the principles and organisation of communicable diseases surveillance system have not changed. The national surveillance of foodborne infections in Slovakia is co-ordinated by the national public health officer, the head of the Public Health Service, who is seated at the Ministry of Health. Special supporting documents for his decision-making activity are prepared at the National Public Health Institute (ŠZÚ SR, before 1994 NÚHE) in Bratislava. In 1996 the public and administrative organisation of Slovakia changed. Before then Slovakia was divided into 4 regions and 36 districts; since 1996 it has been divided into 8 regions and 79 districts. However, the network of Public Health Institutes (ŠZÚs) has not changed substantially. There are 36 Public Health Institutes with the territorial competence over 79 districts, 8 of them fulfil the tasks of Regional Public Health Institutes and they also form a link between the top and basic levels of the Public Health Service.

For the control of foodborne infections there is a close co-operation between the departments of epidemiology, the department of food hygiene and the department of public hygiene of Public Health Institutes. The inspection of food production is the duty of the Veterinary Service belonging to the Ministry of Agriculture and Food.

#### 1.2 Collection of information and data

Each doctor who diagnoses or suspects a case of a notifiable infectious disease is obliged to inform the District ŠZÚ on a standard form. In urgent or unusual cases, faster communication

methods are used. Microbiological laboratories report each *Salmonella* and *Shigella* isolation to an epidemiologist on the ŠZU. All notifiable infectious diseases are registered in the Central Register of infectious diseases according to the ICD 10 code.

Cases, which are in any way linked, are considered as an outbreak. Otherwise they are registered as sporadic cases. An epidemiological investigation of every single case is compulsory and comprehensive, including investigations essential for finding the source of infection and the factor of transmission, and for implementing containment measures. An official standard questionnaire is completed for every focus of infection. Special attention is paid to foodborne and waterborne diseases.

The notification of a severe case, cases in infants and toddlers and cases belonging to outbreaks (also as a consequence of an active search for mild cases) is rather accurate. The doctors' different interest in the verification of the aetiology of diarrhoeal diseases also influences the exactness of notification. With regard to sporadic adult and mild cases a considerable underreporting has to be taken into account when interpreting the statistical data.

### 1.3 Database

Each individual report is fed into the CD Information System in the District ŠZÚ and dispatched to the Central Register in ŠZÚ Banská Bystrica once a week. The database contains all the relevant data on every case of a notified disease.

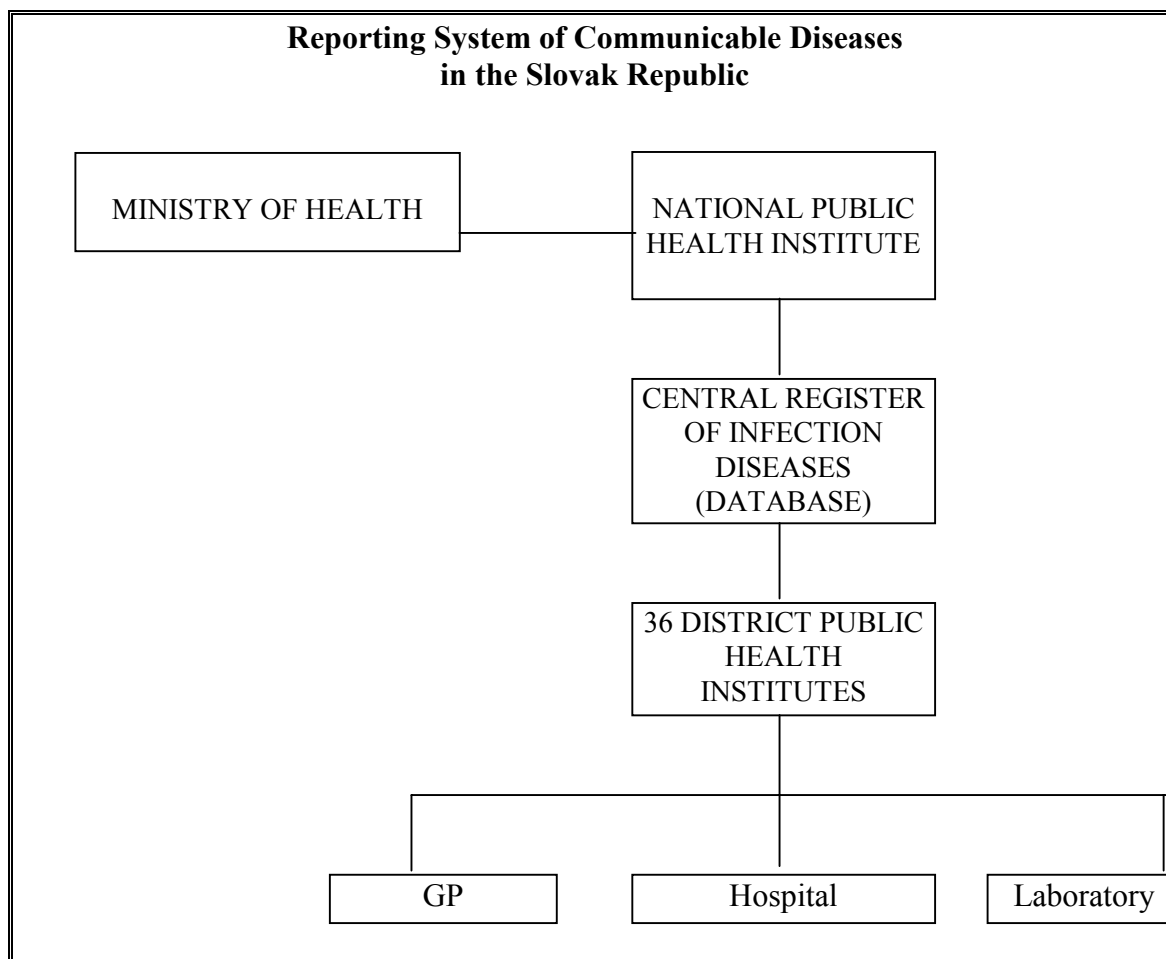
### 1.4 Information output

In the ŠZÚ of the Banská Bystrica district, data is compiled and analysed, and monthly and annual reports are disseminated to all ŠZÚs in Slovakia.

### 1.5 The outbreak reporting system

Practising medical doctors report the emergence of an outbreak immediately after the assertion of a suspicion by telephone to the territorially relevant Public Health Institute. From these institutes the emergence of a new outbreak, together with other serious situations endangering the health state of the population, to the Ministry of Health of the SR weekly by fax or e-mail is reported, always on a Friday. After the termination of an outbreak the epidemiologists who investigated the given outbreak in the area prepare a final report and fill in the questionnaire "Final report on the outbreak of foodborne infections" in the EPI-Info programme. This questionnaire was prepared in the Slovak language on the basis of a questionnaire recommended by the WHO Surveillance Programme for Control of Foodborne Infections and Intoxications in Europe: "Report of Incident". The use of the questionnaire was administered in 1995 as a trial. Practice, however, has shown that it contained a large number of data, which is impossible to statistically evaluate and interpret. That is why the questionnaire was adjusted and, mainly, simplified. The questionnaire is sent on a diskette or by e-mail to the National Public Health Institute in Bratislava, where the data on outbreaks are processed annually. Valid data on outbreaks have been obtained in this manner since 1997.

Figure SK 1



## 2. Statutory notification

From the foodborne infections observed, salmonellosis caused the greatest public and health problem. The increasing trend of its incidence rate was interrupted only in 1996. The second most frequent reason of diseases from food were infections caused by *Campylobacter jejuni*.

**WHO Surveillance Programme for Control of Foodborne Infections and Intoxications in Europe**  
**7th Report**

Country Reports: *SLOVAKIA 1993 – 1998*

Table SK 1

**Foodborne diseases - Number of cases and incidence rates**  
**SLOVAKIA 1992 - 1998**

ICD-10		Year						
		1992	1993	1994	1995	1996	1997	1998
A 01	Typh./para-typh.fever	2	1	6	2	3	1	1
	<i>Incidence</i>	0.04	0.02	0.1	0.04	0.06	0.02	0.02
A02	Salmonellosis	9243	11719	17239	17717	15176	18335	21471
	<i>Incidence</i>	174.1	220.8	323.8	330.8	282.9	341.9	400.0
A03	Shigellosis	2763	3020	3464	1899	970	1596	1075
	<i>Incidence</i>	52.0	56.9	65.1	35.5	18.1	29.7	20.0
A04	Other bact. intest.infect.	3150	2125	2091	2149	2400	2150	2122
	<i>Incidence</i>	59.3	40.0	39.3	40.1	44.8	40.1	39.5
A05	Other bact. fdb. intox.	469	554	536	463	553	247	308
	<i>Incidence</i>	8.8	10.4	10.1	8.6	10.3	4.6	5.7
A05.1	Botulism	5	2	5	3	1	4	5
	<i>Incidence</i>	0.1	0.04	0.1	0.06	0.02	0.07	0.1
A09	Diarrh. and gastroent. of presumed inf. origin	2145	2392	2923	2655	2777	2661	3543
	<i>Incidence</i>	40.4	45.1	54.9	49.6	51.8	49.6	65.9

Figure SK 2

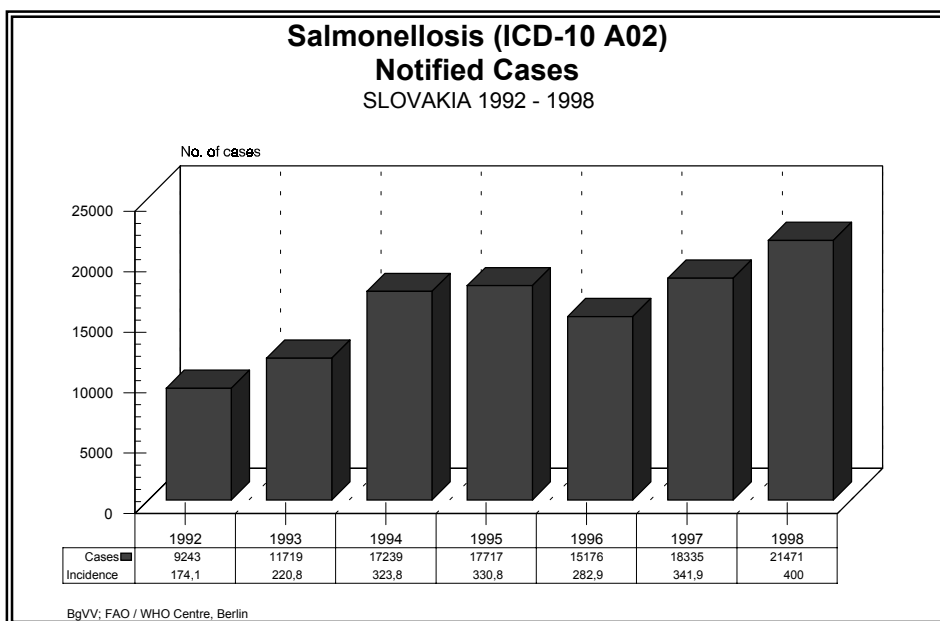


Figure SK 3

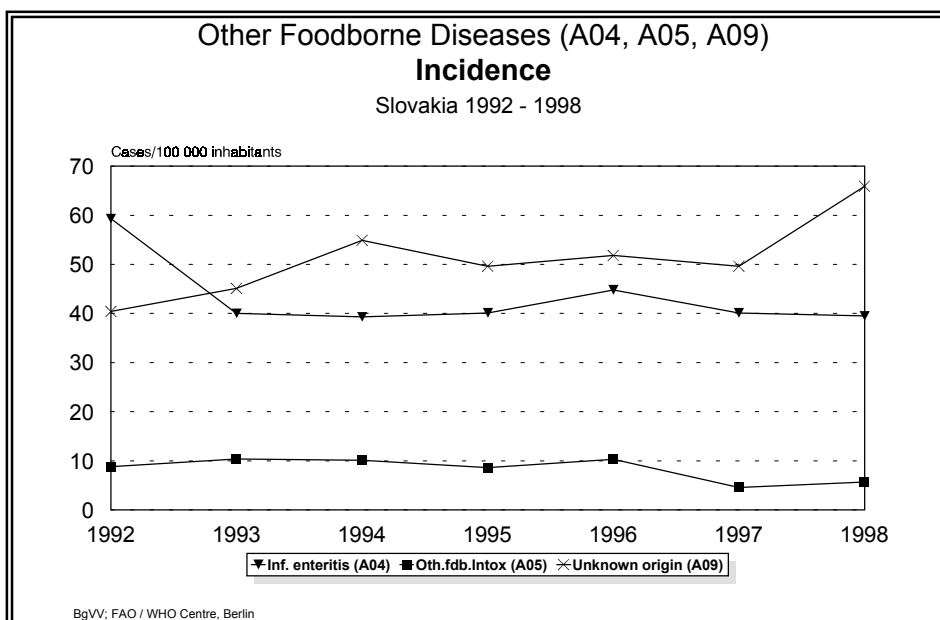


Table SK 2

**Age-specific incidence of salmonellosis**  
SLOVAKIA 1992 - 1998

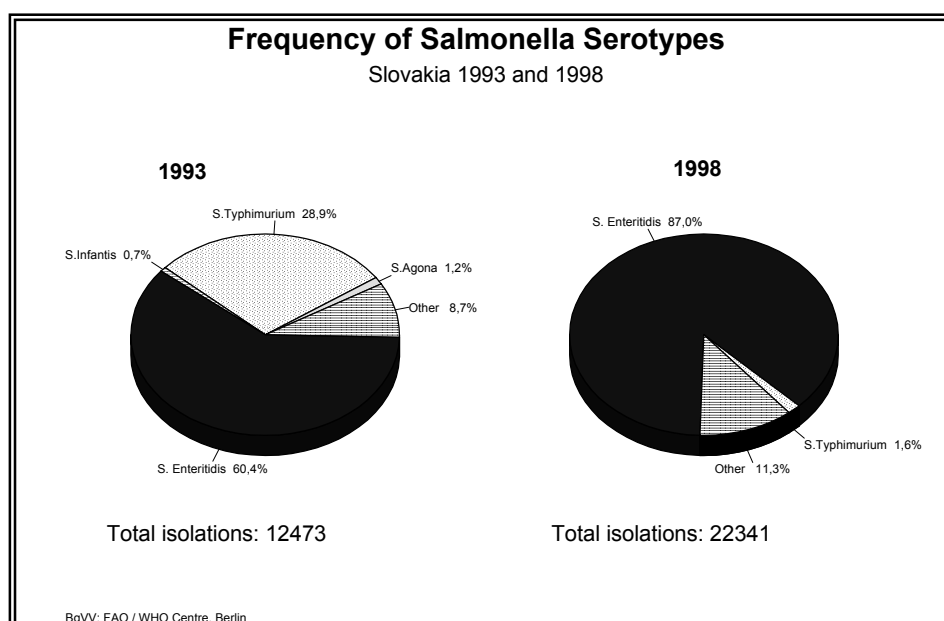
Age group	1992	1993	1994	1995	1996	1997	1998
< 1 year	1025.5	1072.0	1785.5	1378.0	1312.6	1448.0	1884.4
1- 4 years	612.5	808.0	1324.5	1096.5	1004.6	1128.9	1341.5
5 - 9 years	359.7	465.0	752.0	755.9	633.9	698.8	824.6
10 - 14 years	219.8	297.0	423.0	502.1	412.8	459.7	473.8
15 - 19 years	163.3	193.6	272.0	282.3	252.4	3431	338.3
> 20 years	100.5	139.6	182.0	180.0	155.8	208.7	253.4
All age groups	174.1	220.8	323.8	330.8	282.9	341.9	400.0

Table SK 3

**Frequency of Salmonella serotypes**  
SLOVAKIA 1992 - 1998

Serotype	Year							Total	
	1992	1993	1994	1995	1996	1997	1998	1992-1998	
	No. of cases							No.	%
<i>S. Enteritidis</i>	7374	7539	15936	17342	13823	16780	19446	98240	85.2
<i>S. Typhimurium</i>	1266	3605	915	499	435	346	365	7431	6.4
<i>S. Infantis</i>	143	148	159	131	61	55	61	758	0.7
<i>S. Agona</i>	71	93	62	38	45	86	22	417	0.4
Other	565	1088	463	526	1491	1878	2447	8458	7.3
<b>Total</b>	<b>9419</b>	<b>12473</b>	<b>17535</b>	<b>18536</b>	<b>15855</b>	<b>19145</b>	<b>22341</b>	<b>115304</b>	<b>100</b>

Figure SK 4



**WHO Surveillance Programme for Control of Foodborne Infections and Intoxications in Europe**  
**7th Report**

Country Reports: *SLOVAKIA 1993 – 1998*

**3. Epidemiologically investigated incidents**

Table SK 4

**Extent of outbreaks**  
***Salmonella*-associated outbreaks (10 and more cases)**  
SLOVAKIA 1992 - 1998

No of cases in one outbreak	Outbreaks/cases						
	1992	1993	1994	1995	1996	1997	1998
10-19	17/210	24/316	25/373	18/245	27/375	36/481	36/496
%	36.2/11.9	57.1/13.6	34.2/9.7	24.7/7.4	44.3/22.4	46.7/17.5	43.9/15.3
20-49	21/647	10/313	30/841	37/1133	27/836	23/748	31/934
%	44.7/36.7	23.8/13.5	41.1/21.8	50.7/34.4	44.3/50.0	29.9/27.2	37.8/28.9
50-99	5/347	5/288	13/911	11/695	6/357	13/878	10/650
%	10.6/19.7	12.0/12.5	17.8/23.6	15.1/21.1	9.8/21.4	16.9/31.9	12.2/20.0
100+	4/558	3/1400	5/1735	7/1220	1/103	5/641	5/1157
%	8.5/31.7	7.1/60.4	6.9/44.9	9.5/37.1	1.6/6.2	6.5/23.4	6.1/35.8
<b>Total</b>	<b>47/1762</b>	<b>42/2317</b>	<b>73/3860</b>	<b>73/3293</b>	<b>61/1671</b>	<b>77/2748</b>	<b>82/3237</b>
	<b>100/100</b>	<b>100/100</b>	<b>100/100</b>	<b>100/100</b>	<b>100/100</b>	<b>100/100</b>	<b>100/100</b>

Table SK 5

**Incriminated foods**  
**in *Salmonella*-associated outbreaks (10 and more cases)**  
SLOVAKIA 1992 - 1998

Food	Year														Total		
	1992		1993		1994		1995		1996		1997		1998		1992-1998		
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	%	Cases
1.Eggs and egg products	31	1311	22	1788	42	1878	46	1960	37	977	49	1585	52	1776	<b>279</b>	<b>61.3</b>	<b>11275</b>
2.Meat and meat products	4	72	9	173	9	343	5	393	3	78	4	313	2	40	<b>36</b>	<b>7.9</b>	<b>1412</b>
3.Milk and milk products	1	11	1	124	3	1128	1	127	1	15	1	15	-		<b>8</b>	<b>1.8</b>	<b>1420</b>
4.Poultry	-		1	20	2	51	1	14	1	50	2	26	2	82	<b>9</b>	<b>2.0</b>	<b>243</b>
5.Other	5	203	-		7	212	6	326	6	189	10	319	6	725	<b>40</b>	<b>8.8</b>	<b>1974</b>
6.Unknown (imported)	6	165	9	212	10	248	14	473	13	362	11	490	20	614	<b>83</b>	<b>18.2</b>	<b>2564</b>
<b>Total</b>	<b>47</b>	<b>1762</b>	<b>42</b>	<b>2317</b>	<b>73</b>	<b>3860</b>	<b>73</b>	<b>3293</b>	<b>61</b>	<b>1671</b>	<b>77</b>	<b>2748</b>	<b>82</b>	<b>3237</b>	<b>455</b>	<b>100</b>	<b>18888</b>

Figure SK 5

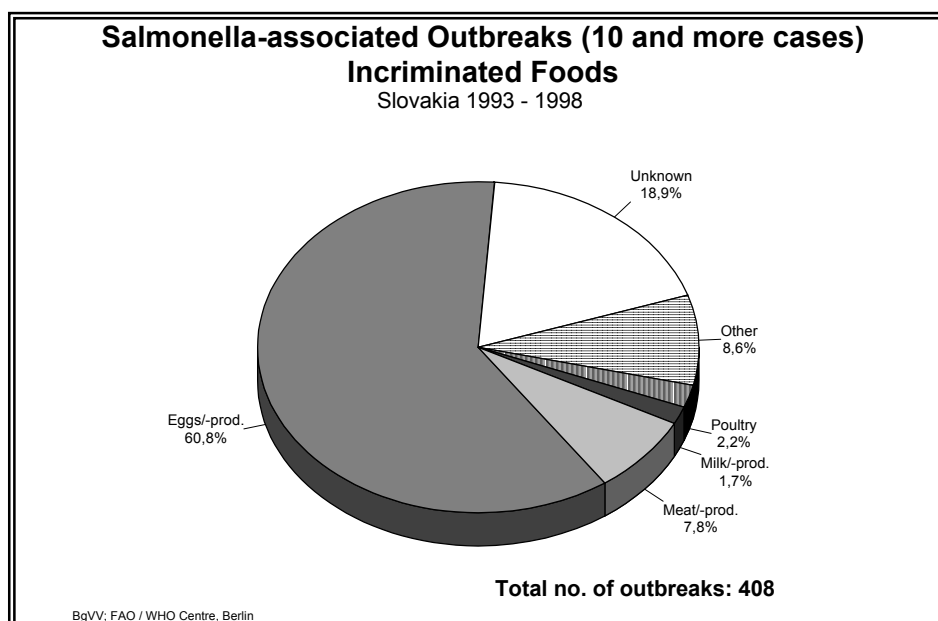


Table SK 6

**Place where food was prepared and/or consumed  
in *Salmonella*-associated outbreaks (10 and more cases )  
SLOVAKIA 1992 - 1998**

Place	Year														Total		
	1992		1993		1994		1995		1996		1997		1998		Outbreaks	%	Cases
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases			
Household	20	548	15	378	18	506	17	446	15	298	32	718	23	445	140	30.8	3339
Commercial catering	11	658	10	1492	17	1967	16	1002	15	475	14	358	14	353	97	21.3	6305
School canteen	8	294	7	289	16	522	20	910	14	400	11	636	13	525	89	19.6	3576
Factory canteen	2	146	4	48	6	202	6	506	7	178	8	586	12	893	45	9.9	2559
Hospital	1	33	3	71	8	266	5	110	5	184	3	172	4	185	29	6.4	1021
Imported	1	21	1	14					1	31					3	0.7	66
Social institution	3	51	1	12	4	321	7	221	3	944	2	52	10	338	30	6.6	1939
Other	1	11	1	13	4	76	2	98	1	11	7	226	6	498	22	4.8	933
<b>Total</b>	<b>47</b>	<b>1762</b>	<b>42</b>	<b>2317</b>	<b>73</b>	<b>3860</b>	<b>73</b>	<b>3293</b>	<b>61</b>	<b>1671</b>	<b>77</b>	<b>2748</b>	<b>82</b>	<b>3237</b>	<b>455</b>	<b>100</b>	<b>18888</b>



Figure SK 6

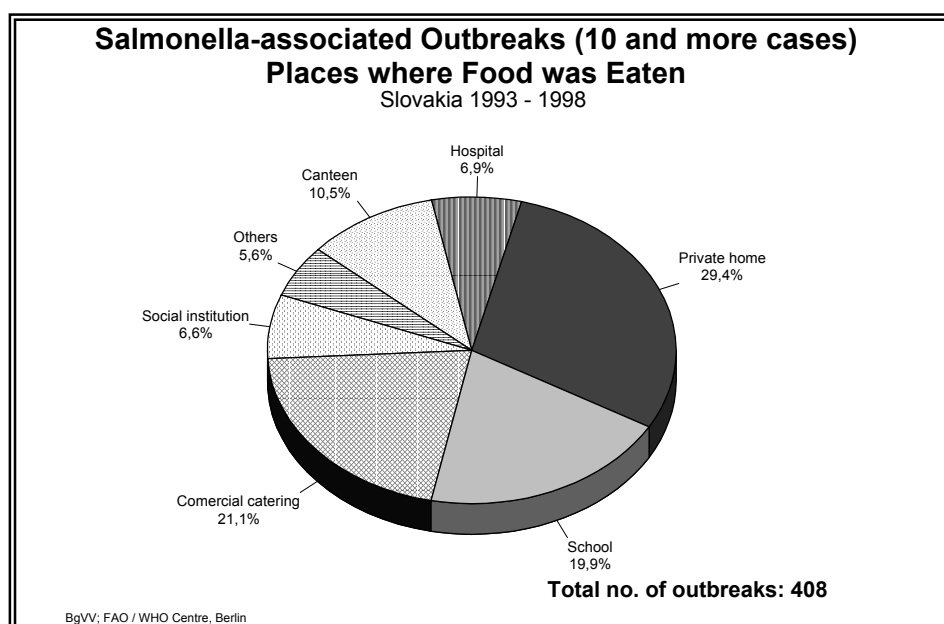


Table SK 7

**Contributing factors**  
**in *Salmonella*-associated outbreaks (10 and more cases )**  
SLOVAKIA 1997 – 1998

Factor	1997		1998		1997-1998	
	No.	%	No.	%	No.	%
Improper storage	35	25.4	19	13.4	54	19.3
Inadequate cooking/reheating	13	9.4	21	14.8	34	12.1
Use of contaminated ingredients	29	21.0	32	22.5	61	21.9
Shortcomings in transport	4	2.9	2	1.4	6	2.1
Shortcomings in handling and sale	8	5.8	12	8.5	20	7.1
Cross-contamination	40	29.0	45	31.7	85	30.4
Poor personal hygiene	9	6.5	5	3.5	14	5.0
Other factors	-		6	4.2	6	2.1
<b>Factors known in total</b>	<b>138</b>	<b>100</b>	<b>142</b>	<b>100</b>	<b>280</b>	<b>100</b>
<b>Total outbreaks where factors were known</b>	<b>51</b>	<b>66.2</b>	<b>55</b>	<b>67.1</b>	<b>106</b>	<b>66.7</b>
<b>Total outbreaks where factors were not known</b>	<b>26</b>	<b>33.8</b>	<b>27</b>	<b>32.9</b>	<b>53</b>	<b>33.3</b>
<b>TOTAL OUTBREAKS</b>	<b>77</b>	<b>100</b>	<b>82</b>	<b>100</b>	<b>159</b>	<b>100</b>

In some outbreaks there was more than one contributing factor

Table SK 8

**Other bacterial intestinal infections (A 04)**  
SLOVAKIA 1992 - 1998

Causative agent	1992		1993		1994		1995		1996		1997		1998	
	No. of cases	%	No. of cases	%	No. of cases	%	No. of cases	%	No. of cases	%	No. of cases	%	No. of cases	%
<i>Campylobacter jejuni</i>	1320	41.9	1045	49.2	1141	54.6	794	37.0	1243	51.8	1142	53.5	1304	54.4
<i>E. coli</i>	1176	37.3	572	26.9	481	23.0	557	25.9	646	26.9	553	25.8	521	21.7
Other agents	654	20.8	508	23.9	469	22.4	798	37.1	511	21.3	445	20.7	571	23.9
<b>Total</b>	<b>3150</b>	<b>100</b>	<b>2125</b>	<b>100</b>	<b>2091</b>	<b>100</b>	<b>2149</b>	<b>100</b>	<b>2400</b>	<b>100</b>	<b>2140</b>	<b>100</b>	<b>2396</b>	<b>100</b>

Table SK 9

**Frequency of Shigellosis types**  
SLOVAKIA 1992 - 1998

	Year													
	1992		1993		1994		1995		1996		1997		1998	
	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
<i>Sh. sonnei</i>	1666	60.3	2108	69.8	2498	72.1	1166	61.4	495	51.0	1168	73.2	610	56.7
<i>Sh. dysenteriae</i>	10	0.4	8	0.2	13	0.4	32	1.7	9	0.9	6	0.4	5	0.5
<i>Sh. flexneri</i>	1015	36.7	849	28.1	818	23.6	640	33.7	377	38.9	339	21.2	360	33.5
<i>Sh. boydii</i>	2	0.1	2	0.1	3	0.1	1	0.1	-	-	3	0.2	2	0.2
NS	70	2.5	53	1.8	132	3.8	60	3.1	89	9.2	80	5.0	98	9.1
<b>Total</b>	<b>2763</b>	<b>100</b>	<b>3020</b>	<b>100</b>	<b>3464</b>	<b>100</b>	<b>1899</b>	<b>100</b>	<b>970</b>	<b>100</b>	<b>1596</b>	<b>100</b>	<b>1075</b>	<b>100</b>

#### 4. Additional epidemiological information

##### 4.1 A 01 Typhus abdominalis

The incidence rate of typhus abdominalis is very low in Slovakia (Table SK1). 1-3 diseases were reported annually, except for 1994 when an outbreak emerged in the institute of social care for the mentally diseased. 4 patients of this institute became ill. The origin of the infection was a before then unidentified carrier *S. typhi* abdominalis. The transmission of the infection was probably carried out by contact in the absence of basic hygienic behaviour. There were 16 diseases reported in total in 1992-1998; of these 4 were imported, 4 arose after a contact with an identified carrier, 4 in the above outbreak and 4 of them remained epidemiologically unexplained. No death was recorded. In 1992 there were 183 carriers of *S. typhi* abdominalis registered in Slovakia; this number gradually naturally dropped. There were 3 newly-identified carriers in the given period. By 1998 the number of carriers dropped to 123.

##### 4.2 A02 Salmonellosis

###### 4.2.1 Incidence

The incidence of salmonellosis rose in 1992 – 98 from 174.1 to 400.0 per 100 000 inhabitants, which is a rise of 130%. The increasing trend has been recorded since the sixties. In the individual years the incidence rate grew by 2-47%, with the exception of 1996 when,

compared to 1995, a decrease of 15% ensued. The most significant rise occurred between 1993 and 1994 (table SK1).

In the period observed there were from 582 to 1 416 carriers of salmonella reported annually without clinical symptoms of disease. They were most frequently detected in the course of an epidemiological investigation in the focus of infection.

There were 36 deaths caused by salmonellosis reported in total. In 1993 ten cases of death were reported, in 1992 and 1997 six cases each, in 1995 and 1996 five each and in 1994 four cases of death were reported. In 1998 no death was reported. Fatality rate in the years when deaths were reported reached 0.02 - 0.09%. The majority of deaths were reported in the lowest and highest age groups.

#### 4.2.2 Age-specific incidence rate

Notification rates were highest in children aged less than one year and in the higher age groups it gradually decreased in each year of observation. The highest incidence rate of 0-year children, 1884.4/100 000, was registered in 1998, and in 1994 - 1785.5/100 000. By comparing the age-specific incidence rate in 1992 with 1998 in each age group the greatest increase was found in adults aged 20 and more, by 152%; then in the group aged 5-9 years, by 129%. The lowest increase occurred in the age group of children aged less than one year (Table SK 2).

#### 4.2.3 Serotypes

The four commonly reported serotypes for each year are shown in table SK3. These accounted for 89 to 97% of the total laboratory-confirmed salmonella. Salmonella Enteritidis has been the most common serotype since 1989. Salmonella Typhimurium dominated before. The proportion of Salmonella enteritidis was 84% in the entire period with the range in each year from 60.4% in 1993 to 93.6% in 1995 (Table SK3).

#### 4.2.4 Phage types

Until 1994 only *S. typhimurium* was phage-typed. Since 1995, apart from *S. typhimurium*, also *S. enteritidis* has been phage-typed. In 1992-98 the number of diseases caused by *S. typhimurium* significantly decreased. Therefore the number of phage-typed strains also gradually decreased. In 1993 681 and in 1997 only 6 strains of *S. typhimurium* were phage-typed. In 1993 PT1 dominated, in the rest of the years, taking into account the low number of strains, it is impossible to talk about dominance. Since 1995 144 - 752 strains of *S. enteritidis* were phage-typed annually. Most frequently PT 8 was confirmed, then PT 6 and PT4.

#### 4.2.5 Character of the occurrence

Most of the registered cases occurred sporadically (64.8 – 76.4%). In the outbreaks with 3-9 of the diseased 12.8 – 17.5% out of the total number of salmonellosis were reported. In the outbreaks with 10 and more of the cases, from 11.0 to 22.4% infections were recorded. Outbreaks with 10 and more infections in one focus are divided according to their extent into 4 groups that are defined in table SK4.

#### 4.2.6 Epidemiologically investigated outbreaks

Small outbreaks with 3–9 diseased are usually family outbreaks, in which the factor of transmission and the source of infection are rarely identified. Outbreaks with 10 and more diseases in one focus are usually identified during epidemiological investigation, and from the viewpoint of epidemiology of salmonellosis they have the greatest documentation value. The number of outbreaks was gradually growing as the total incidence rate of salmonellosis increased. In 1992 47 outbreaks were registered, in 1998 it was 82. The number of infections in outbreaks was influenced especially by large outbreaks. The highest number of the diseased in outbreaks occurred in 1994. In this year the greatest outbreak in the entire presented period was recorded. After the consumption of a dairy-cream product – “miláčik” - 1 237 infections were revealed. By an epidemiological investigation it was found out that gelatine contaminated by *S. enteritidis* was used in the production. The product was distributed throughout almost the whole of Slovakia.

#### 4.2.7 Incriminated foods

Factors of transmission were confirmed in a laboratory in 29.3–53.2% of outbreaks. Other foods were defined as a factor of transmission on the basis of epidemiological investigation. The proportion of outbreaks with an unidentified factor of transmission oscillated in the range between 12.8–24.4%. Incriminated foods are observed according to their commercial name and classified into six groups as is stated in table SK5. Eggs and egg products were the most frequently identified food incriminated in outbreaks. In the individual years they formed from 52.4% in 1993 to 66.0% in 1992. From the group of egg products cream cakes and homemade mayonnaise were most frequently confirmed. Further, they included not only scrambled eggs, but also desserts such as e.g. pastry with egg white foam, dumplings with eggs, cream buns etc.

An unusual factor of transmission was confirmed in an outbreak where, after the consumption of lunch in a school canteen, 161 persons were infected. *S. enteritidis* was isolated from the poppy seeds sprinkled over noodles.

Under the group “other” cases when salmonella was isolated from several secondarily contaminated kinds of food were the most frequently classified.

#### 4.2.8 Place where the food was prepared and/or consumed

The largest number of outbreaks, 23.3–42.6%, is recorded at various family celebrations, such as weddings, birthday parties, pig-killing occasions etc. These outbreaks usually do not affect a large number of people. More people are infected in outbreaks from public catering. A gradual, even though slight, decrease in outbreaks from public catering is probably a result of training which, in the last 3 years, has been compulsory for the employees of these facilities before the start of their job.

In the recent years the number of cases as well as the number of outbreaks, which emerged in a closed, especially school and factory catering, has been growing. Despite the great travelling boom after the opening of borders in 1989, the number of revealed imported outbreaks remains very low - table SK6.

#### 4.2.9 Contributing factors

Exact data on the number of contributing factors has been available since 1997 (table SK7). However, in the course of the entire period, the most frequent reasons for the emergence of outbreaks were shortcomings in the preparation of food or in the production of food, especially cross contamination - 28.3%, inadequate cooking - 11.3%, the use of contaminated ingredients (20.3%) and shortcomings in storing, including inadequate refrigeration - 18.0% in the course of storage. No contributing factors were discovered approximately in one third of outbreaks. This was mainly in the cases when the intervention in the focus was delayed as a result of a late reporting of the emergence of an outbreak.

#### 4.3 A03 Shigellosis

The incidence rate of Shigellosis has had a decreasing trend (Table SK1). At the beginning of the observed period it varied around 51.3 - 65.1 /100 000 inhabitants, in 1998 it dropped to 20.0/100 000. A large number of the diseased are the Gypsies who live at a lower level of hygiene than the rest of the population. In the course of the entire period the most frequent agent was *Sh. sonnei* (65.7%). *Sh. flexneri* was confirmed in 29.7% of the diseased. Other shigellas formed less than 1%. 111 outbreaks were reported in total, in which infection was most often disseminated by contact and by dairy products, especially by “bryndza” cheese. Water was a factor of transmission in 14 outbreaks. In 1992-1998 15 cases of death were reported in total, which is a 0.1% fatality rate.

#### 4.4 A04 Other bacterial infections

The incidence rate of “other bacterial infections” has a mildly decreasing trend; in the individual years it varied from **39.3 to 59.3/100 000** inhabitants (table SK 1). The aetiology most often included *Campylobacter jejuni* (48.6%) (Table SK 8). The occurrence of infections evoked by *C. jejuni* was prevalently sporadic. Various serotypes of *E. coli* were most frequently confirmed in outbreaks. There were 34 outbreaks reported with 809 cases in total. 3-10 outbreaks were reported annually, with the number of less than 50 infections in one focus. In this water was 7 times a factor of transmission. 12 outbreaks were of a nosocomial nature. In these nosocomial outbreaks various types of *E. coli* featured as etiological agents. The transmission was probably carried out by the hands of the personnel. In 1994 1 death was reported of an infection caused by an enteroinvasive *E. coli* 028. In the rest of the years no death was reported.

#### 4.5 A 05 Foodborne bacterial poisoning

The incidence rate of foodborne bacterial poisoning was the lowest from all the infections observed (table SK 1), except for typhus abdominalis. Annually it ranged from 4.6 in 1997 to 10.4 in 1993. The majority of 70-75% infections were identified in outbreaks. There were between 4 to 16 outbreaks registered annually, the extent of which was in one case only greater than 50 infections (249). The factor of transmission was most frequently food contaminated by the *Cl. perfringens*, *St. aureus* and *B. cereus* toxins, prepared in the facilities for group catering for children. An important role in the emergence of outbreaks was played by the operation of “occasional cuisine” in summer camps and outdoor schools. Too-long a transport of food in vacuum flasks and their inadequate cleaning were the cause of reproduction of anaerobic flora in 18 outbreaks. No death was reported.

#### 4.5.1 A 05.1 Botulism

25 infections were reported in total. In the individual years from 1 to 5 infections were reported. In 1997 and 1998 2 family outbreaks were reported with 4 (1997) and 3 (1998) infections. Most of the infections arose after the consumption of homemade, inadequately preserved food such as meat paste, sausage, smoked ham, home-made canned food. Two infections ended in death. The fatality rate in the entire 7-year period was 8%.

#### 4.6 A09 Infections enteritidis of unknown origin

The incidence rate of infections of unknown origin has had an increasing trend. Since 1992, when it reached 40.4/100 000, it increased to 65.9/100 000 by 1998. 1 death was reported, in 1993. In the years observed 129 outbreaks were reported, to the extent of 11-26 outbreaks annually. The outbreaks most often emerged in recreation facilities, in camps and outdoor schools (20 outbreaks), then in school canteens (15 outbreaks) and in factory catering (12). 11 outbreaks were of nosocomial nature. Water, as a factor of transmission, featured in 3 outbreaks. In the rest of the outbreaks various types of food were assumed as a transmission factor. Contributing factors of an outbreak are similar to those which were discovered in the salmonella-associated outbreaks.

#### 4.7 B75 Trichinellosis

Trichinellosis occurs in Slovakia rarely. In 1998 an outbreak of Trichinellosis was recorded in Slovakia. 345 persons became ill after the consumption of sausage containing dog meat. Adding dog meat is a tradition maintained in one of the small villages of middle Slovakia. The disease was diagnosed on the basis of positive anamnesis - consumption of the incriminated sausages, the presence of eosinophils in blood, serological and parasitological examination. The clinical symptoms were similar to influenza. No death was recorded. One miscarriage occurred, and in one case abortion was indicated. 53 patients overcame an infection, without clinical symptoms. The shortest incubation period lasted for 4 days and the longest for 97 days, mean 24.1, modus 29 days. As regards the age of those infected, the youngest person infected was 4 years old and the oldest 66 years old; the majority of infections occurred in the age of 44 years. The presence of *Trichinella britovi* was laboratory-confirmed in the incriminated sausages in the dog meat that was used for their production. The sausages were made of pork and dog meat. The presence of a different kind of meat (e.g. venison) was not confirmed. Further, they were home-made, the meat came from domestic rearing of animals, without a veterinary control. They were distributed outside the trade network.

### 5. Conclusions

Salmonella-associated infections remain the most serious problem of foodborne infections in the Slovak Republic. This is a consequence of an increased activity of *S. Enteritidis*, especially in rearing poultry. Eggs and products containing insufficiently cooked eggs are the most frequent factor of transmission. Despite an intensive campaign related to health education, people are unwilling to give up their long-term established habits, in particular as regards the preparation of food containing eggs. They underestimate the need of their storing in a cold place and of careful cooking.