



SPAIN (SPA)

Population: 39.6 million

Area: 504 782 km²



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1. General information

In December of 1995 the National Network of Epidemiological Surveillance was created by law. This law and its development produced changes in the surveillance system.

During 1997 the protocols of statutory notification of diseases were approved and implemented in Spain. In Spain the Autonomous Regions have wide powers with respect to epidemiological surveillance and national decisions are usually taken by consensus.

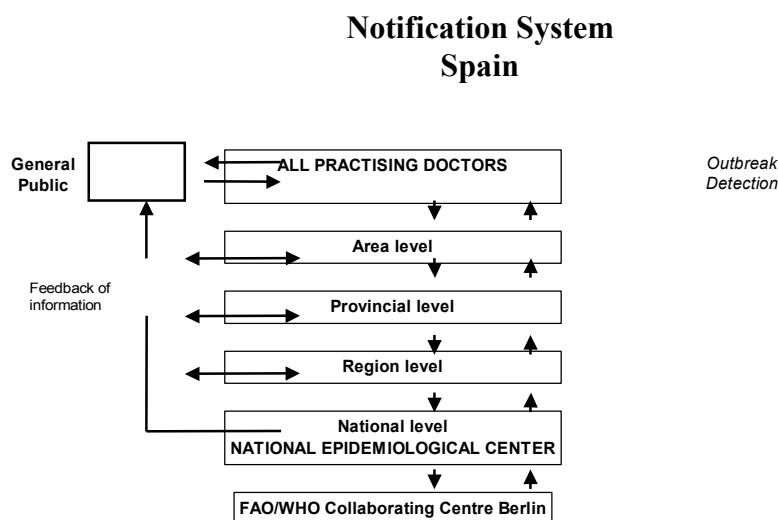
All practising doctors are obliged to notify, both those in the public health service and in private practice, and both those practising outside and within hospitals. On occasions the appearance of cases and outbreaks is detected by other means (from the mass media, from citizens complaints, etc.) and in these cases the information is checked and if confirmed it is incorporated into the system at the corresponding level.

The notification may be carried out using a variety of systems: mail, fax, telephone, e-mail, etc. Presently all the regions (and in many cases levels below) transmit the data by e-mail. A network is being developed for the National Epidemiological Surveillance Network which will permit the flow of data from the local level.

In Spain the main source of information of these diseases is the notification of outbreaks. This notification has been compulsory by law for all doctors since 1982. It includes disease outbreaks of any origin, not only those related to food.

Spain has joined the WHO Surveillance Programme for Control of Foodborne Infections and Intoxications in Europe in 1983.

Figure ES 1



1.1 Reporting Systems

1.1.1 Statutory notification of cases of foodborne diseases

The statutory notification of diseases is considered complementary to the information regarding outbreaks.

The surveillance system of statutory notification of diseases currently includes information about foodborne diseases (Botulism, Cholera, Para-/Typhoid fever, Shigellosis, Trichinosis) and others such as Brucellosis, etc.

From 1997 onward, due to the change in epidemiological surveillance, "Food infections and intoxications" (cases classified as 003 and 005 in the International Classification of Diseases; 9th revision) and "other diarrhoeal cases" (cases classified as 006, 007, 008 and 009 in ICD 9) are not included at the national level because they are not specific. However, in many regions the surveillance of these two groups is maintained for detecting outbreaks.

All practising doctors must report clinically diagnosed cases of notifiable diseases weekly. Laboratory confirmation is not necessary. This notification allows for outbreak detection and trend analysis (evaluation of control measures). The number of cases is higher than obtained in outbreak investigation since they include single cases as well as other cases in which no outbreak investigation has been conducted, a very frequent situation in big cities.

This weekly notification at the national level is accompanied by information about age, sex, place and time of a particular case and other variables of epidemiological interest (such as vehicle of transmission, etc.). The variables required depend on the protocol of each disease. Each diagnosed case of Cholerae, Botulism or Trichinosis is investigated with the possibility in mind that an outbreak could occur. In the case of Cholera the notification is urgent at the national level.

1.1.2 Microbiological Information System

The Microbiological Information System has been based since 1989 on voluntary weekly reporting by clinical microbiology laboratories (principally hospital laboratories). Currently, in

order to improve the notification, this procedure is becoming compulsory for a designated group of representative laboratories. The information in these reports is based on individual cases and includes the following variables: agent, time, place, age, sex, etc.

1.1.3 Enter-net

Spain participates in Enter-net, an European network for the surveillance of human gastrointestinal infections. Enternet has monitored salmonellosis since 1994 and Vero cytotoxin producing *Escherichia coli* O157 since 1999. Each country participates with a microbiologist of the national reference laboratory (source of the data) and the epidemiologist responsible for national surveillance.

1.1.4 Outbreak reporting

In Spain outbreaks are the main source of information for the foodborne diseases.

The notification of outbreaks is mandatory and standardized. All the outbreaks must be reported immediately at the regional level. At the national level it is obligatory to report immediately only those outbreaks which, by law, are defined as being “supra-communitary“ (considered to be of national interest) in order to facilitate their rapid control, where as the rest of the outbreaks are reported quarterly. Some regions have set up early warning systems in order to support doctors in reporting and investigating outbreaks. A similar national system is entering into operation.

In 1997 a uniform outbreak reporting format (variables and codification) was developed in all of Spain in accordance with the one recommended by the WHO Programme. The report includes relevant information such as agent, food involved, place of consumption and contributing factors.

The results of the statistical and epidemiological analysis are disseminated in annual reports. In addition they are published in epidemiological bulletins (national, regional and other). The weekly national epidemiological bulletin can be found at: <http://cne.isciii.es/bes/bes.htm>.

Outbreak investigations as well as necessary control measures are carried out by the health authorities of the autonomous regions.

Training courses and guidelines on outbreak investigation addressed to doctors dealing with these problems have been set up in all regions. At the national level a programme of Field Epidemiology Training is provided. In addition, local health authorities have issued specific regulations related to food hygiene and environmental sanitation.

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2. Statutory notification

Table ES 1 shows reported cases of selected notifiable diseases and the respective incidence rates for Spain for the period 1993 to 1998.

Table ES 1

Reported cases of selected notifiable diseases
SPAIN 1993 - 1998

	Year					
	1993	1994	1995	1996	1997	1998
Botulism	-	-	-	2	7	13
Incidence rate	-	-	-	0.0	0.0	0.0
Cholera	3	0	6	0	0	0
Incidence rate	0.0	0.0	0.0	0.0	0.0	0.0
Para-/Typhoid fever	740	676	555	548	324	316
Incidence rate	1.9	1.7	1.4	1.4	0.8	0.8
Shigellosis	375	252	126	108	201	170
Incidence rate	1.0	0.6	0.3	0.3	0.5	0.4
Brucellosis	2842	2842	2708	2093	2145	1545
Incidence rate	7.2	7.2	6.9	5.3	5.5	3.9
Trichinosis	39	8	39	16	11	58
Incidence rate	0.1	0.0	0.1	0.0	0.0	0.1

Table ES 2 shows cases of Salmonellosis, Campylobacteriosis, Aeromonas, Yersiniosis, Listeriosis, etc. reported by clinical microbiology laboratories to the Microbiological Information System.

Table ES 2

Cases of selected agents reported to the Microbiological Information System
SPAIN 1993 – 1998

Causative agent	Year						<u>Total</u> <u>93-98</u>
	1993	1994	1995	1996	1997	1998	
	No. of isolates						No.
<i>Salmonella</i>	4144	3900	4208	4996	5129	6653	29030
<i>Shigella</i>	110	181	118	120	134	160	823
<i>Campylobacter</i>	2387	2943	3235	3687	3755	4389	20396
<i>Aeromonas</i>	165	247	214	252	365	406	1649
<i>Yersinia enterocolitica</i>	223	274	239	308	367	425	1836
<i>Listeria monocytogenes</i>	24	26	25	21	19	16	131

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2.1 Enter-net

Table 3 shows the distribution of the top ten *Salmonella* serotypes isolated in 1993-1998. The maximum incidence of human salmonellosis was observed in 1998 (5 778 registered cases). The annual number of registered cases of *S. Enteritidis* increased in 1998 (2 092 cases in 1997 and 2 479 cases in 1998).

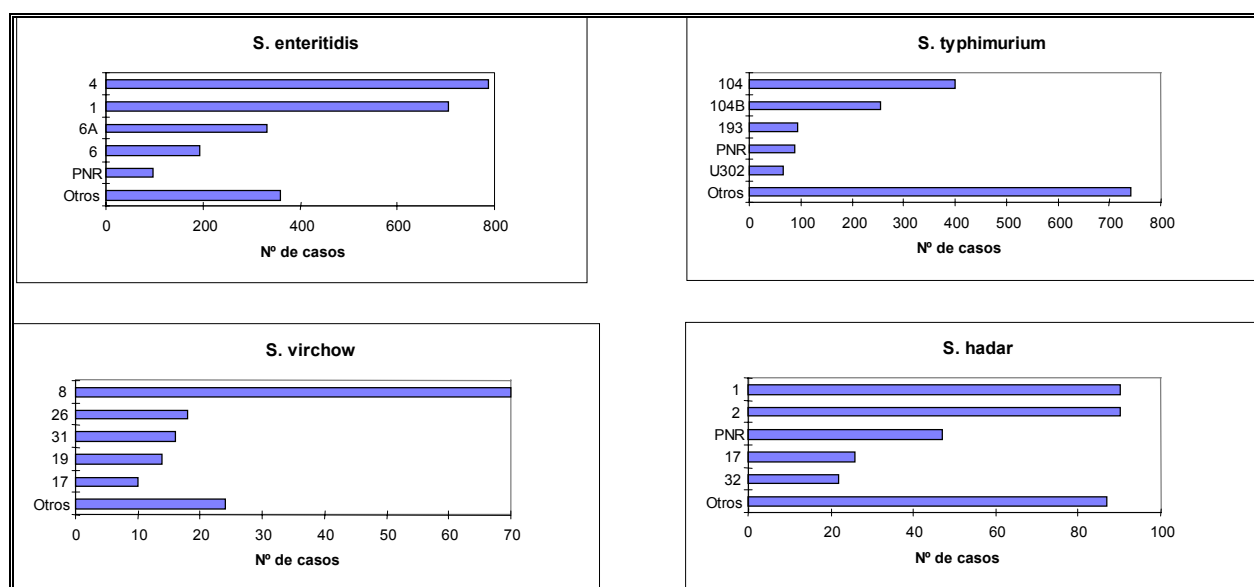
Table ES 3

Top ten *Salmonella* serotypes. Enter-net
SPAIN 1993 – 1998

Serotype	Year						Total	
	1993	1994	1995	1996	1997	1998	1993 -1998	
	No.						No.	%
<i>S. Enteritidis</i>	1576	1406	2088	2089	2092	2479	11730	43.5
<i>S. Typhimurium</i>	804	858	1541	1552	1570	1645	7970	29.6
<i>S. Hadar</i>	83	130	227	347	284	363	1434	5.3
<i>S. Enterica</i> 4,5,12:i:-	6	0	0	0	19	241	266	1.0
<i>S. Virchow</i>	180	407	204	146	65	157	1159	4.3
<i>S. Ohio</i>	25	30	40	46	35	118	294	1.1
<i>S. Brandenburg</i>	32	35	91	74	85	65	382	1.4
<i>S. Infantis</i>	26	26	82	52	30	42	258	1.0
<i>S. Goldcoast</i>	12	17	28	17	13	40	127	0.5
<i>S. Anatum</i>	7	5	18	16	30	35	111	0.4
Other	353	371	704	589	536	593	3146	12.0
Total	3104	3285	5023	4928	4759	5778	26877	100.0

Figure ES 2

Phage type distribution of *S. enteritidis*, *S. typhimurium*, *S. virchow* and *S. hadar* from humans. Enter-net. Spain, 1998.



Source: National Reference Laboratory of Salmonella

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3. Epidemiologically investigated incidents

Table ES 4

Foodborne disease outbreaks
SPAIN 1993- 1998

Year	No. of outbreaks	Cases in outbreaks	Persons hospitalized	Deaths
1993	944	11 511	1 104	3
1994	969	11 657	890	5
1995	904	11 386	1 457	8
1996	887	11 119	1 045	3
1997	871	11 220	996	4
1998	942	12 660	1 328	3

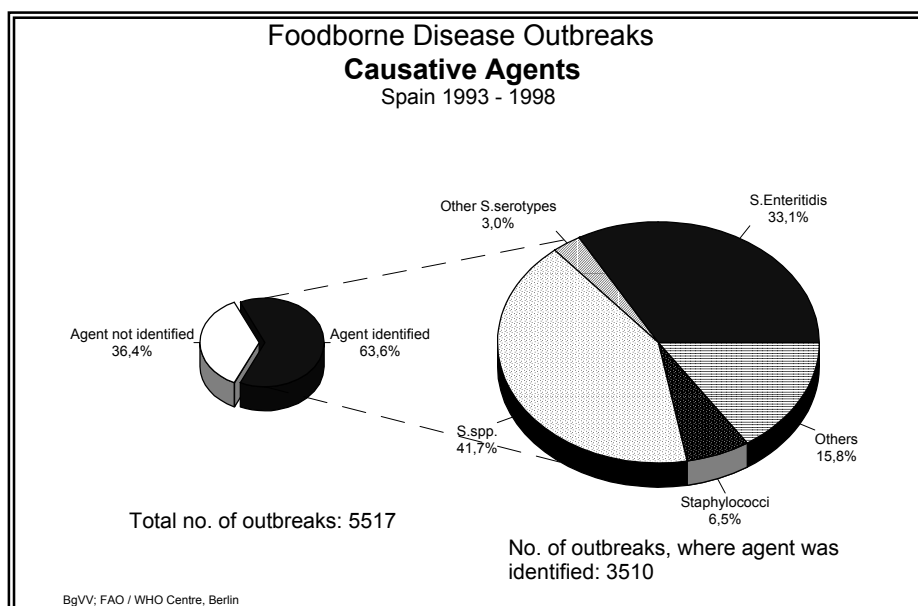
3.1 Causative agents

Table ES 5

Foodborne disease outbreaks by causative agents
SPAIN 1993- 1998

Causative agent	Year						Total	
	1993	1994	1995	1996	1997	1998	1993-98	
	No.						No.	%
<i>S. Enteritidis</i>	195	141	153	188	214	272	1163	21.1
<i>S. Typhimurium</i>	7	11	5	9	9	8	49	0.9
Other <i>S.</i> serotypes	8	11	10	9	3	10	51	0.9
<i>Salmonella</i> spp.	260	214	263	249	215	261	1462	26.5
<i>S. typhi/paratyphi</i>	1	2	2	1	4	3	13	0.2
Staphylococci	50	39	24	40	39	36	228	4.1
<i>Cl. perfringens</i>	8	13	17	11	17	22	88	1.6
<i>Cl. botulinum</i>	8	5	5	5	7	9	39	0.7
<i>B. cereus</i>	-	1	5	4	5	4	19	0.3
<i>Shigella</i> spp.	-	6	1	-	1	3	11	0.2
<i>C. jejuni</i>	-	2	1	-	5	1	9	0.2
<i>E. coli</i>	9	9	12	5	3	12	50	0.9
<i>V. parahaemolyticus</i>	2	1	5	6	6	2	22	0.4
<i>Brucella</i>	2	6	16	9	4	10	47	0.9
<i>Trichinella spiralis</i>	5	4	6	3	2	2	22	0.4
Hepatitis A virus	-	-	1	-	1	10	12	0.2
Toxic substances	22	31	33	22	15	18	141	2.6
Others	21	17	7	6	4	7	62	1.1
Various agents	9	3	2	1	-	7	22	0.4
Not known	337	453	336	319	317	245	2007	36.4
TOTAL	944	969	904	887	871	942	5517	100

Figure ES 3



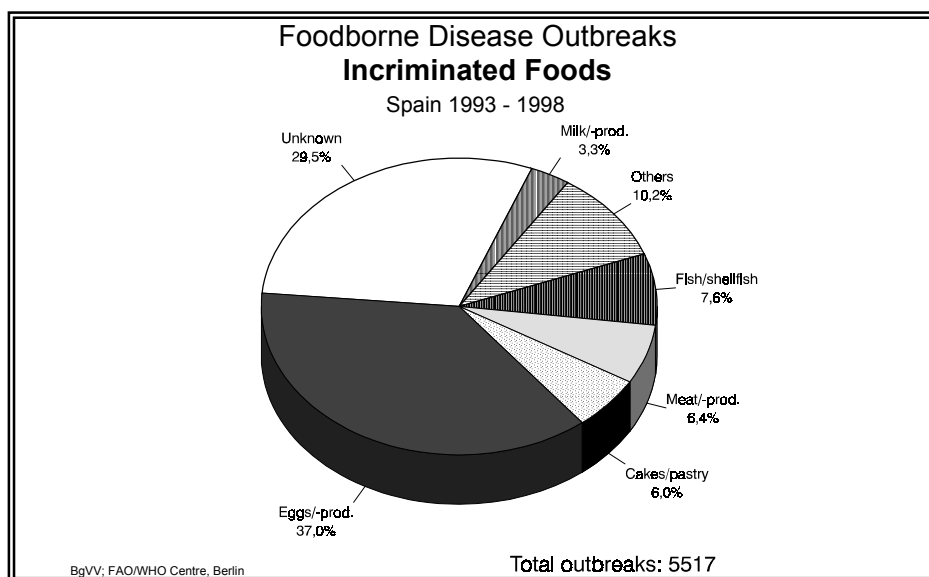
3.2 Foods involved

Table ES 6

**Foodborne outbreaks by implicated foods
SPAIN 1993- 1998**

Food	Year						Total	
	1993	1994	1995	1996	1997	1998	1993 - 98	
	No.						No.	%
Egg/Mayonnaise	386	322	323	321	328	363	2043	37.1
Cakes/Pastry/ Baking premises	75	68	54	36	48	48	329	6.0
Meat/poultry	51	66	65	58	42	73	355	6.4
Cheese	17	15	19	12	9	19	91	1.6
Fish/Shellfish	76	75	72	64	68	63	418	7.6
Canned products	7	4	9	-	-	-	20	0.4
Milk	10	28	22	13	7	11	91	1.6
Other foods	82	97	86	77	109	91	542	9.8
Not known	240	294	254	306	260	274	1628	29.5
Total	944	969	904	887	871	942	5517	100

Figure ES 4



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3.2.1 Additional information for 1998

Table ES 7

Foodborne disease outbreaks by causative agents and implicated foods
SPAIN 1998

Causative agent	FOOD								
	Egg Mayonnaise	Cakes Pastry	Meat Poultry	Cheese	Fish Selfish	Milk	Other foods	Not known	Total
<i>S. Enteritidis</i>	143	20	9	0	8	3	14	75	272
<i>S. Typhimurium</i>	1	2	1	1	1	0	0	2	8
Other <i>S. serotypes</i>	4	0	0	0	1	0	1	4	10
<i>Salmonella</i> spp.	167	7	15	0	5	2	18	47	261
<i>S.typhi/paratyphi</i>	1	0	0	0	0	0	0	2	3
Staphylococci	4	8	7	5	2	4	2	4	36
<i>Cl. perfringens</i>	0	0	12	0	2	0	5	3	22
<i>Cl. botulinum</i>	0	0	2	0	0	0	7	0	9
<i>B. cereus</i>	1	0	0	0	0	0	3	0	4
<i>Shigella</i> spp.	0	1	0	0	0	0	1	1	3
<i>C. jejuni</i>	0	0	0	0	0	0	0	1	1
<i>E. coli</i>	1	1	1	0	3	0	3	3	12
<i>V. parahaemolyticus</i>	0	0	0	0	2	0	0	1	2
<i>Brucella</i>	0	0	0	8	0	2	0	0	10
<i>Trichinella spiralis</i>	0	0	2	0	0	0	0	0	2
Hepatitis A virus	0	0	0	0	8	0	1	1	10
Toxic substances	0	0	1	0	9	1	7	0	18
Others	0	2	0	1	5	0	3	3	14
Various agents									
Not known	38	6	23	4	18	1	32	123	245
TOTAL	360	47	73	19	64	13	97	269	942
%	38.2	5.0	7.7	2.0	6.8	1.4	10.3	28.6	100.0

3.3 Place where food was eaten or acquired

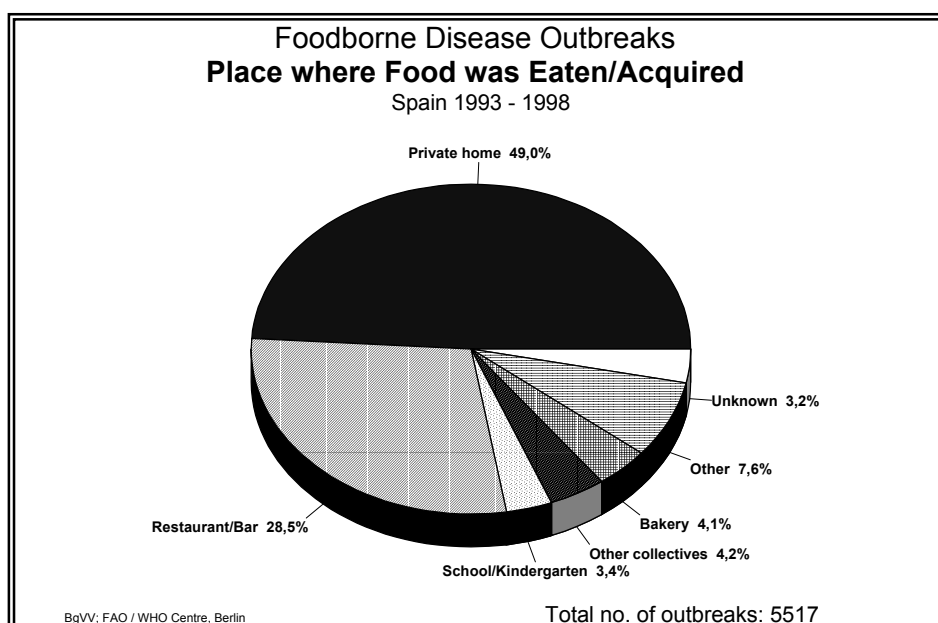
Table ES 8

Foodborne disease outbreaks by place where food was eaten or acquired
SPAIN 1993- 1998

Place	Year						Total	
	1993	1994	1995	1996	1997	1998	No.	%
Private home	501	488	485	429	395	407	2705	49.0
Restaurant	193	157	194	198	199	254	1195	21.7
Bar	73	48	77	60	57	61	376	6.8
School/kindergarten	31	36	24	21	39	34	185	3.4
Homes for elderly	12	11	12	13	14	10	72	1.3
Mobile retailer	-	-	-	8	9	6	23	0.4
Hospital	9	7	9	5	7	9	46	0.8
Prison	-	-	-	1	4	2	7	0.1
Other collectives	27	98	25	16	51	16	233	4.2
Bakery/pastry shop/ retail/stores	57	40	34	29	34	31	225	4.1
Camping/Picnic	8	10	11	7	15	7	58	1.1
Other places	16	21	25	80	12	62	216	3.9
Not known	17	53	8	20	35	43	176	3.2
Total	944	969	904	887	871	942	5517	100

* Canteens include dining rooms in schools, residential homes, factory canteens and prisons

Figure ES 5



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3.3.1 Additional information for 1998

Table ES 9

**Foodborne disease outbreaks by causative agents and
place where food was eaten or acquired
SPAIN 1998**

Causative agent	PLACE												Total
	Private home	Restaurant	Bar	School Kindergarten	Homes for elderly	Mobile retailer	Hospital	Other collectives	Bakery, Pastry shop Retail/stores	Camping, Picnic	Other places	Unknown	
<i>S. Enteritidis</i>	111	78	18	14	2	1	1	6	6	2	12	21	272
<i>S. Typhimurium</i>	4	2	0	1	0	0	0	0	0	0	0	1	8
Other <i>S.</i> serotypes	6	3	0	0	0	0	0	0	0	0	1	0	10
<i>Salmonella</i> spp.	146	52	20	3	5	0	3	3	4	1	15	9	261
<i>S. typhi</i> /para-typhi	2	1	0	0	0	0	0	0	0	0	0	0	3
Staphylococci	10	7	5	4	0	1	0	0	6	0	1	2	36
<i>Cl. perfringens</i>	2	5	1	5	0	0	0	4	2	0	3	0	22
<i>Cl. botulinum</i>	6	2	0	0	0	0	0	0	0	0	1	0	9
<i>B. cereus</i>	1	2	1	0	0	0	0	0	0	0	0	0	4
<i>Shigella</i> spp.	0	1	0	0	0	0	0	0	1	0	1	0	3
<i>C. jejuni</i>	0	0	0	1	0	0	0	0	0	0	0	0	1
<i>E. coli</i>	0	9	0	1	0	0	0	1	0	0	1	0	12
<i>V. parahaemolyticus</i>	0	2	0	0	0	0	0	0	0	0	0	0	2
<i>Brucella</i>	5	0	0	0	0	0	0	0	0	0	5	0	10
<i>Trichinella spiralis</i>	1	0	0	0	0	0	0	0	0	0	1	0	2
Hepatitis A virus	2	4	0	0	0	0	1	0	0	0	3	0	10
Toxic substances	12	1	0	0	0	0	1	1	1	0	2	0	18
Others	0	7	1	0	1	0	1	0	1	0	1	2	14
Unknown	92	78	15	5	2	4	2	3	10	2	18	14	245
TOTAL	400	254	61	34	10	6	9	18	31	5	65	49	942
%	42.5	27.0	6.5	3.6	1.1	0.6	1.0	1.9	3.3	0.5	6.9	5.2	100.0

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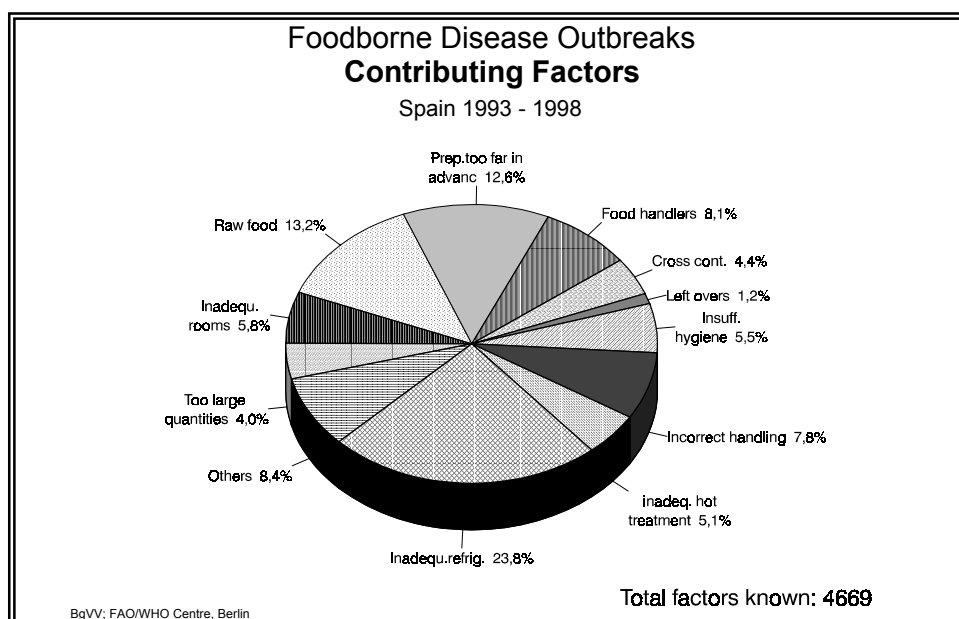
3.4 Contributing factors

Table ES 10

Foodborne disease outbreaks - Contributing factors
SPAIN 1993 - 1997

Factor	Year						Total	
	1993	1994	1995	1996	1997	1998	1993-1998	
	No.						No.	%
Temperature misuse	406	432	382	331	190	383	2 124	45.6
Food prepared too far in advance	122	120	96	85	53	110	586	12.6
Preparation of too large quantities	44	52	43	26	11	12	188	4.1
Inadequate refrigeration	197	205	204	179	107	220	1 112	23.8
Inadequate cooking/reheating	43	55	39	41	19	41	238	5.1
Raw material	96	105	120	86	97	112	616	13.2
Consumption of raw foods	96	105	120	86	97	112	616	13.2
Inadequate handling	150	164	163	128	97	181	883	18.9
Incorrect handling	74	71	67	46	45	59	362	7.8
Insufficient hygiene	23	49	51	41	25	69	258	5.5
Use of left-overs	11	10	12	13	7	3	56	1.2
Cross contamination	42	34	33	28	20	50	207	4.4
Environmental factors	129	149	123	106	57	89	653	13.9
Inadequate rooms	70	77	52	42	15	17	273	5.8
Food handlers	59	72	71	64	42	72	380	8.1
Other factors	77	89	56	42	65	64	393	8.4
*In some outbreaks there was more than one contributing factor								
Total factors known*	858	939	844	693	506	829	4 669	100.0
Total outbreaks where factors were known	410	456	439	466	341	516	2 628	47.6
Total outbreaks where factors were not known	534	513	465	421	530	426	2 889	52.4
Total outbreaks	944	969	904	887	871	942	5 517	100.0

Figure ES 6



4. Comments

Salmonella, the principal cause of outbreaks in Spain, is associated with the consumption of certain foods. The sauces that contain egg and are consumed raw are the main source of the outbreaks. Storing food at inadequate temperatures and consuming foods that have been prepared too far in advance also have been known to be contributing factors. In addition, the rise in outbreaks coincides with the hottest months.