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SALMONELLA OUTBREAK AND SOURCE TRACING

No. 8, 2002

Many outbreaks of salmonellosis in Denmark remain unresolved or totally undiscovered, and this is the background for a project by the Department of Gastrointestinal Infections. The purpose of the project is to develop tools to systematically find and trace outbreaks.

Automatic outbreak surveillance

Diagnostic laboratories are obliged to report infections with enteropathogenic bacteria to SSI at least once a week. The Enteropathogenic Register thus includes all cases of confirmed bacterial gastroenteritis in Denmark. In addition to data, the laboratories also send bacterial strains to SSI on an ongoing basis. Thus, the database provides a good picture of both the current and previous years' disease incidence, and can be used to look for clusters of cases, which may be due to an outbreak. The calculations are conducted weekly, both for each county and nationally. The further investigation of clusters detected is conducted by either the Medical Office of Health or the SSI. As a rule, the first step is to contact the general practitioner or the hospital and subsequently interview the patient.

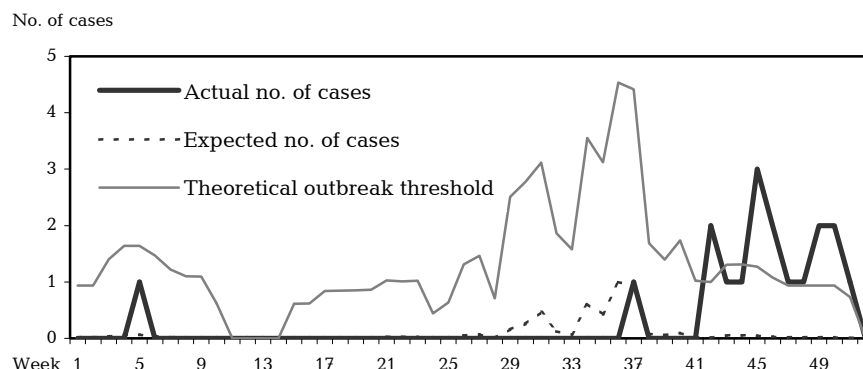
Surveillance website

The results of the outbreak calculations are published each week on the Gastroenteritis Monitor website: www.germ.dk. Apart from the most common Salmonella types, it also includes Campylobacter, Yersinia enterocolitica, Shigella and two types of pathogenic E. coli. Surveillance data with calculations of the current number of laboratory-confirmed cases, calculations of the number of patients for previous years and general information about the bacteria is also included.

DNA typing

There are often significant genetic differences between the bacterial isolates, even within the same Salmonella serotype. However, isolates from patients infected from the same source are usually identical. As a result, DNA profiling is used, and it has turned out to be useful to delineate recognised outbreaks, to link apparently sporadic cases and to pinpoint the source in those cases where many veterinary or foodstuff isolates exist. The DNA methods are thus applicable for both surveillance and actual investigations of outbreaks. The preferred

Fig. 1. Outbreak calculation for Salmonella Oranienburg, 2001



typing method is PFGE. By this method, the entire bacterial genome is digested with a single restriction enzyme and run onto a gel, after which the band patterns can be directly compared.

In an outbreak situation, it will often be necessary to quickly compare different laboratories' isolates, both with each other and with reference isolates. The project has therefore focused on standardising methods, conducting electronic data transfer and creating a joint typing database for SSI and the Danish Veterinary Institute, which is the reference laboratory for the veterinary sector. The project can be seen as a forerunner for future work in integrating the EU countries' DNA typing methods for pathogens in foodstuffs.

Salmonella in chocolate

A recent outbreak with chocolate as the source illustrates the work of the project. In week 46 (commencing 12 November), the automatic surveillance system detected a rise in the number of isolates with the otherwise rare serotype, Salmonella Oranienburg. Fig. 1 shows the result of the calculations and the real number of cases. Dates in the diagram refer to the date the laboratory received the data rather than date of onset. The three patients in week 45 (commencing 5 November) exceeded the calculated outbreak threshold, and an outbreak investigation was initiated. The patients were interviewed about behaviour and intake of food in the days before the onset of illness. The only item of food that all patients had consumed was chocolate, and German chocolate was frequently mentioned. Through the European outbreak network, Enternet, it subsequently became clear that an outbreak of S. Oranienburg with choco-

late suspected as the source was also circulating in Germany. The Danish and German bacterial isolates were typed using DNA methods and found to be identical. Further interviews and subsequent findings of S. Oranienburg in chocolate from the homes of German patients led to identification of the contaminated chocolate products. This in turn led to two brands of chocolate being withdrawn from the market in the whole of Europe just before Christmas, and the outbreak stopped. During the outbreak, a total of 17 patients were registered in Denmark and around 400 in Germany. This outbreak illustrates that even relatively small, national Salmonella outbreaks can be discovered early and resolved using an efficient central surveillance system. It also shows that outbreaks can have very different sources and can nowadays easily cross borders.

Surveillance

Thanks to the departments of Clinical Microbiology and the doctors requesting investigations, Denmark has quite good laboratory surveillance data. Only data concerning travel history is incomplete. It is estimated that around a quarter of Danish cases of bacterial gastroenteritis are travel-related, and information about travel is of great importance for source tracing. It is therefore recommended that information about patients' foreign travel is always recorded and submitted. Suspicion of outbreak before the microbiological diagnosis has been made must be notified on form 1515, and the Medical Office of Health or the SSI can be contacted, EPI-NEWS 51/01.

(S. Ethelberg, D. Sandvang, Dept. of Gastrointestinal Infections)

20 February 2002

Patients with diagnosed infections from streptococci isolated from blood and CSF

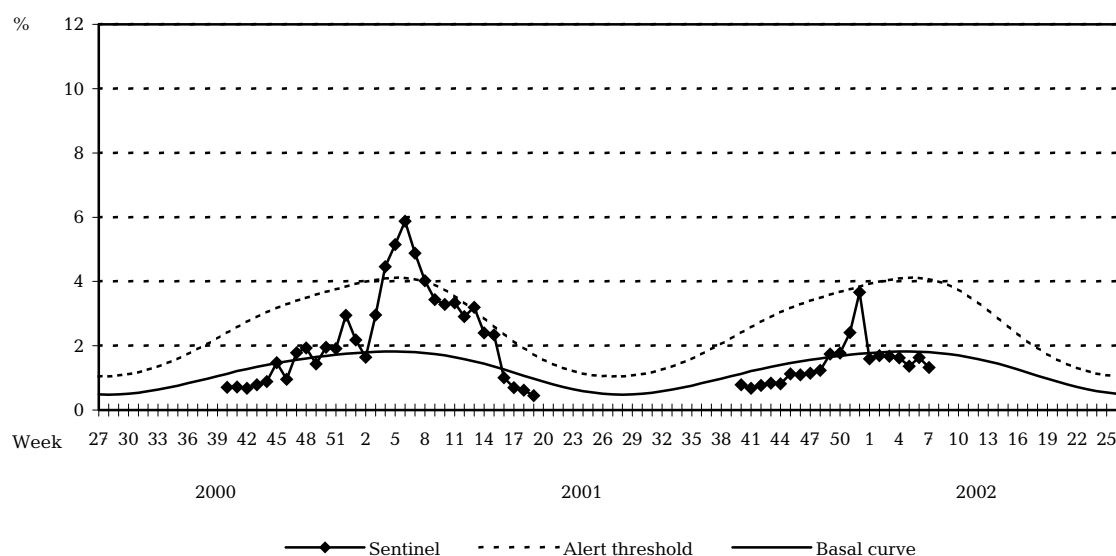
4th quarter of 2001 compared with the same period of the two previous years

		4th quarter 2001				4th quarter	
		< 2 yrs	2-59 yrs	60 yrs +	Total	1999	2000
October	S. pneumoniae	5	19	40	64	54	44
	Gr. A strep.	1	2	1	4	5	2
	Gr. C strep.	-	-	-	-	-	2
	Gr. G strep.	-	1	5	6	5	8
November	S. pneumoniae	4	17	30	51	83	78
	Gr. A strep.	-	3	5	8	4	10
	Gr. C strep.	-	1	2	3	-	2
	Gr. G strep.	-	3	4	7	11	7
December	S. pneumoniae	10	40	83	133	80	74
	Gr. A strep.	-	1	8	9	9	9
	Gr. C strep.	-	-	1	1	3	2
	Gr. G strep.	-	2	8	10	4	12
4th quarter	S. pneumoniae	19	76	153	248	217	196
	Gr. A strep.	1	6	14	21	18	21
	Gr. C strep.	-	1	3	4	3	6
	Gr. G strep.	-	6	17	23	20	27

(Dept. of Respiratory Infections, Meningitis and STIs)

Sentinel surveillance of influenza activity

Weekly percentage of consultations, 2000/2001/2002



Sentinel: Influenza consultations as % of total consultations

Basal curve: Expected frequency of influenza consultations under non-epidemic conditions

Alert threshold: Possible incipient epidemic

(Dept. of Epidemiology)