



**International surveillance network for  
the enteric infections -  
Salmonella and VTEC O157**

Funded by the European Commission – DG SANCO

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**Enter-net – Human enteric pathogen surveillance  
network**

**Interim report for the period 1/4/01 – 31/3/02**

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## **Introduction.**

Public health surveillance is essential for recognising outbreaks of food-borne infection so that investigations can be mounted to identify contaminated sources and protect consumers. Swift and comprehensive typing by laboratories of enteric bacteria isolated from human cases together with rapid pooling of these data from as wide an area as possible is the foundation for successful surveillance of these infections. The steady increase in the geographical distribution of food products both within and between countries makes it more likely for outbreak cases to be widely scattered. International surveillance systems which combine highly discriminating and reliable typing data from reference laboratories are a necessary response to the vulnerability caused by global food distribution chains.

Enter-net is an established and thriving EU-wide network for the surveillance of human Salmonella and Verocytotoxin-producing *Escherichia coli* (VTEC) infections. By involving the microbiologist in charge of the national reference laboratory and the epidemiologist responsible for national surveillance of these organisms, the key professionals in every EU country are participating. Data from all 15 countries are being collated every month to create international salmonella and VTEC databases. Outbreak recognition and the efficiency of investigations in the EU has improved, and national surveillance has been strengthened. The network functions as an alert system through rapid enquiries to all participants when an unexplained outbreak is recognised in one of the member countries. Harmonisation has been agreed for the phage-typing of *S. Enteritidis* and *S. Typhimurium* for the principal European laboratories undertaking this activity.

The problem of widespread and increasing antimicrobial resistance, including resistant Salmonella, was recently highlighted by the European Parliament. Resistance to several newly developed antibiotics in salmonellas has been reported. The report of the Parliament's Economic and Social Committee called for research on the evolution of antimicrobial resistance and for surveillance which incorporated external quality assurance of resistance detection methods.

A co-ordinated study of the results from antimicrobial susceptibility testing of specially selected salmonella strains has provided a basis for initial comparisons of resistance trends between countries participating in Enter-net. Although there is sufficient concordance in measurement of resistance in enteric bacteria between national laboratories for trend comparisons to be meaningful, the need to harmonise resistance testing is a priority. Standardisation of antimicrobial susceptibility testing is currently being actively pursued by veterinary laboratories within the EU and by the Office International des Epizooties. Recommendations for the adoption of methods for human isolates based on internationally agreed levels are now required to enable the accurate comparison of resistance to epidemiologically-important and therapeutically-relevant antibiotics.

## **Enter-net objectives.**

Enter-net's purpose is to maintain and develop EU-wide laboratory-based surveillance of the major enteric bacterial pathogens through a co-ordinated network in which the microbiologists responsible for national reference services, and the epidemiologists responsible for national surveillance, of these bacteria are actively involved (annex 1).

During the period from April 2001 through March 2002 the Enter-net aims were achieved by pursuing the following objectives:

1. Improve the completeness and timeliness of the data collated regularly on human salmonella and Verocytotoxin-producing *Escherichia coli* O157 (VTEC) infections,

2. Facilitate the investigation of international outbreaks, or widely distributed national outbreaks, of enteric bacterial pathogens through the rapid exchange of information and strains,
3. Extend international surveillance to include non-O157 VTEC,
4. Continue to harmonise the surveillance of antimicrobial resistance through repeat calibration studies and a pilot of agreed sensitivity testing methods,
5. Establish routine quality assurance of salmonella serotyping and phage-typing by national reference laboratories through extending the existing ring-trial arrangements,
6. Continue to promote and facilitate collaborative international research on typing and antimicrobial resistance testing of human enteric bacteria,
7. Review the Enter-net collaboration principles with participants, Commission staff, and members of the Network Committee of DG SANCO,
8. Develop a consensus on international surveillance standards against which the performance of Enter-net participants and co-ordinators can be assessed,
9. Continue to strengthen global surveillance of these infections through collaboration with WHO and non-EU countries, including EU-candidate countries, Canada, the United States, South Africa, Japan and Australia.

The operational aims of Enter-net can be summarised as having three main threads; monitoring trends, requesting and disseminating information on potential international incidents and recognising and reacting to international outbreaks of food-borne pathogens. Significant progress has been made in each of these. To underpin these aims, quality assurance of the reference laboratories is an integral part of the management of the network, and is built into the project.

## **Methods.**

Limited data on each laboratory-confirmed case of salmonella or *E.coli* infection identified by the national reference laboratories are transferred to the central databases held at the Enter-net hub. These records include microbiological and epidemiological data (annex 2), and are analysed on a regular basis and fed back to all participants. The creation of the central databases allows Enter-net to monitor trends in infection and recognise unusual events that can only be seen when the data are pooled internationally. The quality of these data are supported by the regular Quality Assurance programs within Enter-net.

The hub also acts as the distribution point for all urgent enquiries on incidents and outbreaks of enteric pathogens. Often these only affect individual countries, but international outbreaks have been identified by conveying information on outbreaks between members of the network. When international outbreaks are recognised their co-ordination is managed by the hub.

Regular meetings of the project team, the steering committee, and all the participants at the annual workshop manage the progress of project. The Greek Microbiological Society, University of Athens hosted the annual workshop for 2001-02 in January 2002. At these meetings the progress of the network to date is reviewed, potential shortcomings identified and any necessary remedial actions implemented. Strategic developments for the future are also discussed and methods for progressing towards these targets decided.

## **Results.**

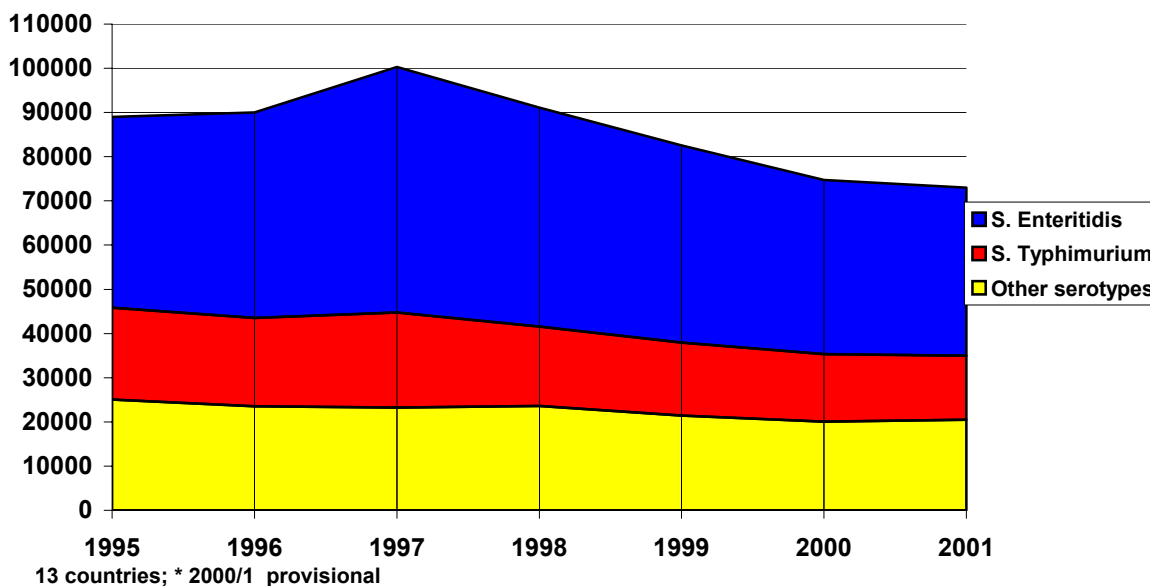
### **Monitoring trends;**

The quarterly salmonella reports are produced on a regular basis, and distributed to all participants, a public-domain version of this report is also made more widely available as it is being published in Eurosurveillance weekly. Very shortly these will also be accessible on the

Enter-net web page. Draft VTEC surveillance reports are being prepared for consideration by the Enter-net participants at the next workshop.

It has been agreed by participants that an Enter-net annual report will be prepared. This will form the basis for the human data included in the annual zoonoses report. Enter-net will provide the data on human salmonella and VTEC infections under the revised Zoonoses Directive, once this is in place. An example of the data to be included in the annual report is shown below.

### Total human salmonellas by year: 1995 - 2001\*



#### Information requests and dissemination of results;

Usually at the start of an outbreak the vehicle of infection is not known. Enter-net provides a mechanism to inform other countries of potential international problems and ask for any information that may be of relevance to the outbreak investigation. A negative response is just as valuable as a positive one. If nothing is happening in another country, then this allows lines of enquiry to be focused accordingly, if something is then there may be an incident with international implications occurring. If the latter is the case then the investigation can be conducted appropriately. The list of information requests that have been sent this year are;

Index country	Organism	Association
Canada	S. Enteritidis PT30	Almonds
England & Wales	S. Newport/Umbilo	Ready-to-eat salad
Denmark	S. Bovismorbificans	Not found
Sweden	S. Typhimurium PT104	Halva/Tahini
Czech Rep	S. Indiana	Not known
Norway	S. Enteritidis PT14b	Travel to Crete
Australia/Canada	S. Stanley	Peanuts
England & Wales	S. Infantis	Poultry
Norway	S Typhimurium U302	Travel to the Canaries
Germany	S. Oranienburg	Chocolate
Finland	S. Kottbus	Not known
Netherlands	S. Manhattan	Not known

### **Recognising and investigating international outbreaks;**

The most significant international outbreak identified this year was that of *S. Oranienburg* in European and North American countries<sup>1</sup>. It is highly likely that this was associated with consumption of contaminated chocolate products distributed around Europe. This outbreak involved over 500 laboratory-confirmed cases throughout Europe. The outbreak was initially brought to the attention of Enter-net on 6 December 2001, when an urgent enquiry was sent from the German participants informing the network of an outbreak in Germany associated with the consumption of chocolate. Over four hundred cases of this serotype were recognised in Germany, the results of a case-control study implicated two brands of chocolate bought from one supermarket chain (OR 5.5, CI 1.2-51.1). Chocolate samples with the same serotype and Pulsed-Field Gel Electrophoresis (PFGE) as the human strain were also identified. In Denmark an increase in *S. Oranienburg* had been identified before the information from Germany was available, interviews with some of the cases indicated that the same brands from the same supermarket were associated with infection with this serotype. The information that was disseminated by Enter-net identified a concomitant rise in cases in several other countries; Sweden had 19 cases five of which were confirmed by PFGE as being the outbreak strain, as were two isolates from chocolate, the Netherlands identified six cases, two confirmed as the outbreak strain, Austria had 15 cases between October to December compared with just six in the previous nine months, Belgium had 19 cases in the same period, with just eight being in the first nine months, Finland identified salmonella in four bars of the implicated brands, with some associated cases. Contaminated batches of chocolate tested positive for the outbreak strain in Canada, Croatia, and the Czech Republic, these were not released for sale and no human cases are known to have occurred in these countries. On an historical note, Australia reported that the Microbiological Diagnostic Unit had isolated *S. Oranienburg* from cocoa powder intended for chocolate manufacture in 1997, showing the it was biologically plausible for the product to be contaminated with this serotype.

In summary, over five hundred cases of *S. Oranienburg* were identified in the course of this outbreak, but more importantly due to the dissemination of information via Enter-net, contaminated product was impounded in three countries prior to getting into the retail trade, thus preventing further cases occurring.

### **Dissemination of results.**

International outbreaks of gastrointestinal infections are reported to a wider public health audience in published journals. Immediate information is disseminated via the electronic Eurosurveillance weekly journal. Final reports are published in other scientific journals. The quarterly salmonella report is produced regularly and sent to all participants, a public-domain version of this report is now being made available. This will be put up on the Enter-net website, and is often published in Eurosurveillance weekly. The Quarterly VTEC report was developed in 2001/02 and will be made available in 2002/03. The format of this will be agreed by all participants at the workshop in 2002, and dissemination of this document will commence in the latter part of the year.

### **Quality Assurance;**

Two quality assurance schemes have been undertaken; one for the sero- and phage-typing of salmonellas, and one for antimicrobial susceptibility testing. The results will be published when the analysis has been completed.

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<sup>1</sup> International outbreak of *Salmonella* Oranienburg, October-December 2001, Parts 1-3, *Eurosurv Weekly* 2002; **6**: 020117.

## **Conclusion.**

The surveillance scheme is working well and is meeting its primary objectives. Data from the international databases are being circulated to all participants, and a wider, public health audience whenever possible. Information on potential and actual international incidents of infection by food-borne pathogens is being circulated around the network, and, when appropriate, to other relevant public health professionals in a timely manner. International outbreaks identified are being investigated on an international basis.

The laboratory component of the network is being actively supported by the annual QA schemes. These schemes ensure that the data being supplied to the Enter-net databases are of the highest quality.

During the year an application for a complimentary development to Enter-net was applied for from DG RESEARCH. Salm-gene (strengthening international salmonella surveillance through molecular strain typing and differentiation) and was awarded funding of €1.2M. This project will continue the collaborative work done by a small working-group of the Enter-net salmonella laboratories (under a McDonalds grant), and expand so that the majority of Enter-net laboratories are working on harmonised molecular methods for real-time molecular typing for surveillance purposes. This grant came into effect in Autumn last year.

Outputs; the Quarterly salmonella report is routinely available to all participants, a public-domain version is also prepared, and will be put on the Enter-net web site when it is ready ([www.Enter-net.org.uk](http://www.Enter-net.org.uk)). The quarterly VTEC reports were agreed at the 2002 workshop, and will be made available by the end of the year. An annual salmonella and VTEC report will be prepared for presentation and agreement by all participants during this year. This will be publicly available later in the year.

The annual workshop for 2001-02 was hosted by the Greek Microbiological Society, University of Athens, January 2002.

Specific objectives for 2002/03 are to improve the availability of outputs from the salmonella database by making the public-domain reports available on the web, to develop regular VTEC reports, and to fully establish the antimicrobial resistance-testing database for salmonellas. In addition the profile of Enter-net should be increased with more peer-reviewed papers and presentations at scientific conferences.

Ian Fisher  
Enter-net Scientific Co-ordinator  
April 30, 2002

## Annex 1.

### References:

1. Fisher IST, de Jong B, van Pelt W, Aramini J, Berghold C, Matthys F, et al. International outbreak of *S. Oranienburg*, October- December 2001, Part 3: other countries. *Eurosurv Weekly* 2002; **6**: 020117.
2. Ian Fisher. Salmonella in Europe – Enter-net report, July-September 2001. *Eurosurv Weekly* 2001; **5**: 021129.
3. Ethelberg S, Fisher IST. Prolonged outbreak of a rare salmonella serotype in Denmark. *Eurosurv Weekly* 2001; **5**: 010830.
4. Ian Fisher; Yvonne Anderson, Birgitta de Jong; Kerry-Ann O’Grady, Joan Powling. International outbreak of *Salmonella* Typhimurium DT104 – update from Enter-net. *Eurosurv Weekly*; 2001; **5**: 010809.
5. IST Fisher; N Gill, B Reilly, H Smith, J Threlfall, on behalf of the Enter-net participants. Real-time international surveillance of antimicrobial resistance by the Enter-net surveillance network. Abstracts of the international conference on emerging infectious diseases, Atlanta, USA, March 2002, P111.
6. HR Smith, A Caprioli, T Cheasty, JE Coia, IST Fisher, SJ O’Brien, WJ Reilly, H Tschäpe, GA Willshaw. Changing patterns of infection with Vero Cytotoxin-producing *Escherichia coli* in Britain and Continental Europe. Abstracts of the international conference on emerging infectious diseases, Atlanta, USA, March 2002, P160
7. Threlfall, EA Lindsay, AJ Lawson, RA Walker, LR Ward, HR Smith, FW Scott, SJ O’Brien, IST Fisher, PD Crook, D Wilson, DJ Brown, H Hardardottir, WJB Wannet, H Tschäpe. Molecular characterization of a multiresistant strain of *Salmonella enterica* serotype Typhimurium DT 204b responsible for an international outbreak of salmonellosis. Abstracts of the international conference on emerging infectious diseases, Atlanta, USA, March 2002, P178.
8. Ian ST Fisher, ON Gill, WJ Reilly, HR Smith, EJ Threlfall on behalf of the Enter-net participants. Harmonisation of antimicrobial resistance testing results – outcome of the international Enter-net study. 2<sup>nd</sup> OIE international conference on antimicrobial resistance, Paris, October 2001.
9. I Fisher on behalf of the Enter-net participants. Recognising and responding to outbreaks of travel-associated gastrointestinal infections – the Enter-net experience. 7<sup>th</sup> Conference of the International Society of Travel Medicine, Innsbruck, Austria, May 2001, P73.
10. I Fisher on behalf of the Enter-net participants. Control of food-borne infections at the international level – the Enter-net experience. Abstracts of the 11<sup>th</sup> European Congress of Clinical Microbiology and Infectious Diseases, Istanbul, Turkey, April 2001, p28.



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**31 March 2002**

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