EPI-INSIGHT

IONAD NAISIUNTA FAIRE GALAIR

Disease Surveillance Report of NDSC, Ireland

Volume 4, Issue 3, March 2003 ISSN: 1393-9548

IN THE NEWS

A New Strain of MRSA Imported from Singapore

The National Methicillin-Resistant *Staphylococcus aureus* (MRSA) Reference Laboratory (NMRSARL) reports the isolation of a new strain of MRSA from a patient who had been hospitalised in Singapore. On admission to an Irish hospital, an MRSA isolate with the resistance pattern shown in Table 1 was recovered. The isolate was also resistant to amikacin, cadmium, ethidium bromide, mercury ions, spectinomycin (500µg/disk), kanamycin and streptomycin. This pattern is unlike any antibiogram-resistogram (AR) pattern held in NMRSARL's AR typing database and has been assigned AR type, AR44.

Twelve days after the patient was discharged, MRSA with a similar AR profile was isolated from another patient (patient 2) and subsequently from three additional patients in the same unit. A later isolate from patient 2 was susceptible to mupirocin as was the isolate from one of the subsequent patients. Three of the later patients also carried another strain of MRSA (AR type, AR06). During the following one-month period, a total of eight patients from this unit carried AR06 MRSA but no further AR44 MRSA were recovered. Thus, two concurrent outbreaks were occurring. Chromosomal DNA from isolates of both strains was investigated by digestion with the restriction endonuclease S*ma*1 followed by pulsed field gel electrophoresis. The pattern obtained with isolates exhibiting the AR pattern AR44 was unlike those obtained with any of the current Irish MRSA strains investigated in NMRSARL to date.

Table 1. Resistance pattern of MRSA isolate from a patient from Singapore

Resistant	Susceptible	Minimum Inhibitory Concentration (mg/L)
Ciprofloxacin	Chloramphenicol	.....
Erythromycin	Fusidic acid	.....
Gentamicin	Linezolid	Linezolid..... 0.5
Lincomycin	.....	.....
Mupirocin	.....	Mupirocin.....>1024
Neomycin	Quinupristin/dalfopristin	Quinupristin/dalfopristin..... 0.25
Sulphonamide	Rifampicin	.....
Tetracycline	.....	.....
Tobramycin	Teicoplanin	Teicoplanin..... 1.0*...(6.0† mg/L)
Trimethoprim	Vancomycin	Vancomycin.....2.0*...(4.0† mg/L)

* MICs were determined by the E-test system using Mueller-Hinton agar and an inoculum density equivalent to 0.5 McFarland turbidity standard. National Committee for Clinical Laboratory Standards (NCCLS) MIC (mg/L) breakpoint criteria are: vancomycin; susceptible, ≤4; intermediate, 8-16; resistant ≥32: teicoplanin; susceptible, ≤8; intermediate, 16; resistant, ≥32.
† MICs were determined by the E-test macro-method. Interpretation: isolates with both vancomycin and teicoplanin MICs of ≥8 mg/L or teicoplanin MIC ≥12 mg/L require further investigation.

These findings highlight the importance of screening patients who may have been admitted from hospitals abroad and the advantages of rapid epidemiological typing methods to quickly recognise the introduction of new, potentially epidemic strains into the local MRSA population. NMRSARL suggests that, since this new strain is resistant to tetracycline and preliminary data show that only 1.8% of MRSA isolates submitted to NMRSARL during 2002 were tetracycline-resistant, tetracycline may be a useful marker for the rapid recognition of this strain. NMRSARL would be pleased to receive any suspect isolates for confirmation.

Dr Angela Rossney, Chief Medical Scientist, National MRSA Reference Laboratory.

Acknowledgements

NMRSARL thank the staff of the submitting hospital for permission to present these data.

Measles Update

A total of 265 cases of clinical measles have been notified to NDSC between Week 48/2002 - Week 7/2003. The majority of these cases have occurred in the ERHA (40%) and the Midland Health Board (42%). The highest age-specific rates were in the <1 year olds (67.5/100,000 population) and 1-2 year olds (84/100,000). Twenty-five percent of cases occurred in 5-9 year olds.

Table 1. Vaccination status of measles cases notified through enhanced surveillance from week 48, 2002 to week 07, 2003

Vaccination status	Numbers
Not vaccinated	54(26%)
MMR_1*	67(32%)
MMR_2**	7(3%)
Unknown	79(38%)
Total	**207(100%)**

* 15 of these cases received MMR_1 1-12 days prior to onset of illness.

**5 of these cases had received MMR_2 1-12 days prior to onset of illness. It was not reported when the remaing 2 cases received MMR_2

Enhanced surveillance data were obtained on 207 of the 265 notifications. Of these, 133 (64%) had specimens sent for laboratory testing, 44 of which were laboratory-confirmed, 5 were negative and results are awaited on the remaining 84 cases. Table 1 outlines the vaccination status of notified cases on whom enhanced data were received (n=207). It is notable that of the 67 cases who received MMR_1 only, 38 were in the 5-14 year age group and therefore would have been eligible for MMR_2.

The affected health regions have implemented control measures which are outlined in detail in *Eurosurveillance Weekly*, 2003, **7**(8). Available at www.eurosurveillance.org

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Update on the European Antimicrobial Resistance Surveillance System (EARSS) in Ireland, 2002.

The European Antimicrobial Resistance Surveillance System (EARSS) is a network of national surveillance systems currently encompassing over 600 laboratories representing 970 hospitals in 27 countries. EARSS was established in 1998 with funding from the European Commission and is an on-going surveillance system that aims to collect comparable and reliable antimicrobial resistance data for public health action.

The number of Irish laboratories participating in EARSS has increased from 12 in 1999, when Ireland joined the network, to 23 in 2002. The 23 laboratories cover all health boards and approximately 90% of the population. From January 2002, surveillance of *Escherichia coli* and the *enterococci*, *E. faecalis* and *E. faecium*, commenced in 19 of the 23 laboratories, covering 80-85% of the population.

Participating laboratories are asked to submit routinely-generated susceptibility data, along with relevant demographic information on the first invasive isolate per patient per quarter (defined as blood or CSF isolates for *Streptococcus pneumoniae* and *E. coli* and blood only for *Staphylococcus aureus* and the enterococci). For each pathogen, data are collected on the most important antibiotics (Table 1) as well as any others that are tested locally. The majority of data obtained from routine disc diffusion are qualitative, i.e. resistant (R), intermediate (I) or susceptible (S). Where quantitative minimum inhibitory concentration (MIC) data are required, laboratories have been requested to submit isolates to one of two referral laboratories: the National MRSA Reference Laboratory (NMRSARL) for methicillin-resistant *S. aureus* (MRSA) isolates only and the Streptococcal Referral Laboratory (SRL) for all pneumococcal isolates. However, as of July 1st 2002, the service provided by the SRL was suspended due to lack of funding and laboratories were requested to provide the results of penicillin MICs performed locally on penicillin non-susceptible *S. pneumoniae* (PNSP) isolates.

Table 1. Mandatory antibiotics required by the EARSS protocol for each of the four pathogen groups under surveillance.

	Mandatory antibiotics required by EARSS protocol	
Pathogen	Qualitative disc diffusion (RIS)	Quantitative MIC using Etest (mg/L)
S. aureus	oxacillin/methicillin	oxacillin/methicillin (MRSA only) vancomycin (MRSA only)
S. pneumoniae	oxacillin/penicillin erythromycin	penicillin (PNSP only) cefotaxime/ceftriaxone (PNSP only) ciprofloxacin (PNSP only)
E. coli	ampicillin cefotaxime/ceftriaxone +/- ceftazidime (3GC)* ciprofloxacin/ofloxacin gentamicin	
E. faecalis/ E. faecium	ampicillin high-level gentamicin vancomycin	

Legend: RIS – resistant/ intermediate/ susceptible; MIC – minimum inhibitory concentration; MRSA – methicillin-resistant *Staphylococcus aureus*; PNSP – penicillin-non-susceptible pneumococci; 3GC – 3rd–generation cephalosporin. * Extended-spectrum beta-lactamase (ESBL) detection is also required.

S. aureus

From January 1999 to the end of Quarter 3 (Q3) 2002, data have been collected on 2734 isolates of *S. aureus*. Trends by year are shown in Figure 1.

In 2002, 769 isolates were submitted up to the end of Q3. Of these, 333 were methicillin-resistant giving an MRSA rate of 43.3%. This represents an increase from 2001, when the rate was 41.3%. The MRSA rate in Ireland continues to be one of the highest in Europe (Figure 2).

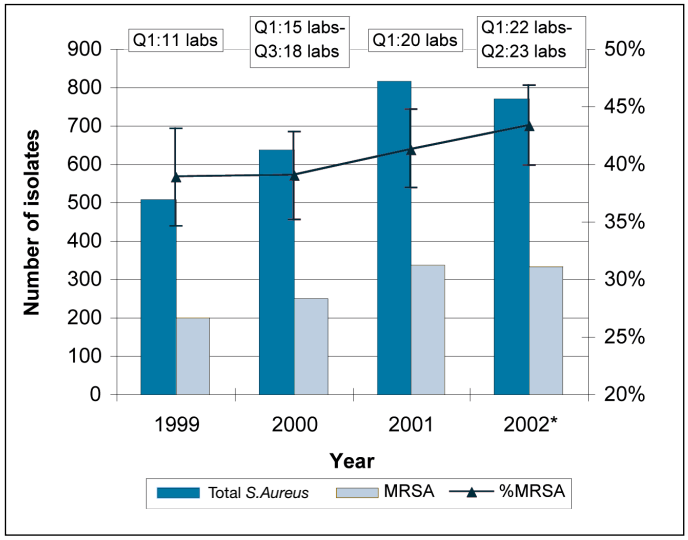

*Figure 1. Trends in S. aureus isolates from invasive infections by year, 1999 – 2002 (*up to Q3) showing numbers of S. aureus/MRSA and percentage MRSA with 95% confidence intervals.*

Boxes indicate quarters when additional laboratories began submitting data.

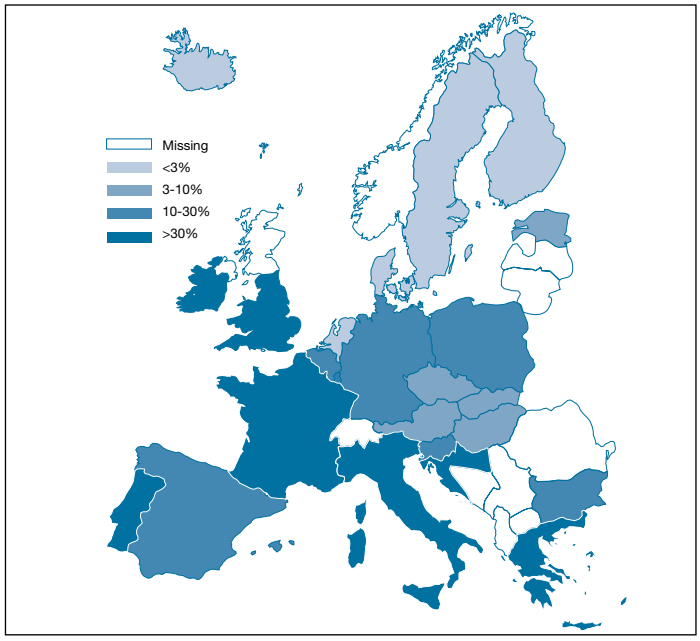

Figure 2. Proportion of MRSA in all countries participating in EARSS in 2001.

Gentamicin resistance rates among MRSA isolates have decreased steadily over the past four years: from 58.4% in 1999, to 44.2% in 2000, to 33.8% in 2001, to 27.6% to the end of Q3 in 2002. This reflects a growing trend observed in many parts of Europe in which the predominant circulating strains of epidemic MRSA (EMRSA) are becoming less resistant to multiple antibiotics. This reduction in resistance to specific antimicrobials has limited clinical significance as the agents have only a limited or no role in therapy. In Ireland, there has been a dramatic increase in the prevalence of one particular epidemic strain, identified by the NMRSARL as antibiogram-resistogram type, AR-06. AR-06 has been shown to be closely related to EMRSA-15,[1] which is the most prevalent strain in the UK and is known to have spread to a number of European and other countries, including Finland, Germany, Sweden, Australia and New Zealand.[2]

There has been no report to date of vancomycin-intermediate *S. aureus* (VISA) in Ireland. All laboratories are advised to suspect VISA in the case of a therapeutic failure with a glycopeptide and to submit any suspicious isolates to the NMRSARL for confirmation and further investigation. The

past year has seen the emergence of the first high-level vancomycin-resistant isolate of *S. aureus* (VRSA) in the United States.[3] Despite one further report that was not epidemiologically-linked to the first, there is no evidence that VRSA has spread any further. Both vancomycin-intermediate and vancomycin-resistant *S. aureus* (VISA/VRSA) are real threats that represent a serious therapeutic challenge globally.

S. pneumoniae

From January 1999 to the end of Q3 2002, data have been collected on 809 isolates of *S. pneumoniae*. Trends by year are shown in Figure 3.

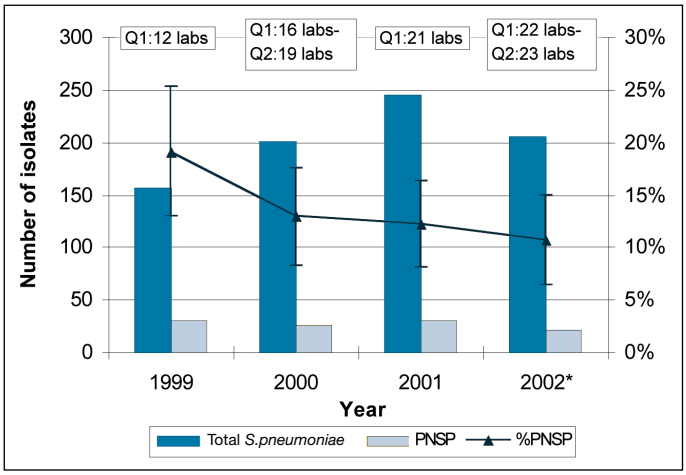

Figure 3. Trends in S. pneumoniae isolates from invasive infections by year, 1999 – 2002 (up to Q3) showing numbers of S. pneumoniae/ PNSP and percentage PNSP with 95% confidence intervals.*

Boxes indicate quarters when additional laboratories began submitting data.

In 2002, 206 isolates were submitted up to the end of Q3. Of these, 22 were penicillin-non-susceptible giving a PNSP rate of 10.7% (Figure 3). This represents a decrease from 2001, when the rate was 12.2%. In spite of this decrease, the PNSP rate in Ireland continues to be moderately high, with levels close to those found in parts of Central and Southern Europe (Figure 4). Of the 22 PNSP isolates, 18 exhibited low-level resistance to penicillin (MIC 0.1-1mg/l), three were found to be high-level resistant to penicillin (MIC ≥2mg/l) and no MIC data were available for one isolate. Resistance to cefotaxime was not detected.

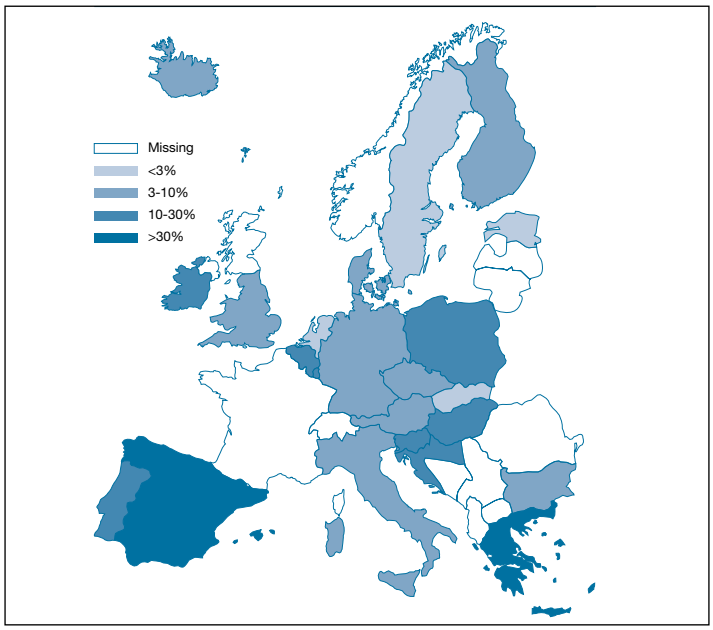

Figure 4. Proportion of PNSP in all countries participating in EARSS in 2001.

E. coli

Data were submitted on 524 isolates (522 from blood and 2 from CSF) during Q1-3, 2002. All comparisons with rates in Europe are for 2001.[4] Preliminary data show that resistance rates were 62.7% for ampicillin, 2.3% for the 3rd-generation cephalosporins (3GCs), 3.9% for ciprofloxacin and 1.7% for gentamicin. The resistance rate observed for ampicillin was high compared to all other European countries reporting to EARSS while the rates for the other antibiotics were consistent with those seen in countries with low levels of resistance.

Resistance to multiple antibiotics was determined in six isolates: two were found to be resistant to all four antibiotic classes required by the protocol (ampicillin, 3GCs, ciprofloxacin and gentamicin), three were resistant to all but 3GCs and one was resistant to all but ciprofloxacin. Thus far, only three isolates were found to produce extended-spectrum beta-lactamases (ESBL), enzymes that destroy 3GCs and so, by definition, organisms that produce these are resistant to all 3GC antibiotics regardless of their apparent in vitro susceptibility. However, ESBL detection was reported for just 153 isolates (27.3% of the total). Laboratories are invited to send suspected ESBL-producers to Prof M Cormican in Dept of Bacteriology, NUI Galway for confirmation and storage.

Enterococci

Data were submitted on 119 isolates of *E. faecalis* and 39 isolates of *E. faecium* during Q1-3, 2002. All comparisons with rates in Europe are for 2001.[4]

Preliminary data show that resistance rates observed in *E. faecalis* were 8.9% for ampicillin, 34.5% for high-level gentamicin (HLG) and 3.4% for vancomycin. The resistance rate reported for HLG was high and was comparable to those observed in other European countries reporting to EARSS. However, the number of isolates tested remains low (n = 29). The rate of vancomycin resistance was low, which is similar to the rates observed throughout Europe (Croatia, Greece and Portugal have slightly higher rates). One *E. faecalis* isolate was resistant to both HLG and vancomycin.

The resistance rates observed in *E. faecium* were 88.9% for ampicillin, 19.0% for HLG and 12.7% for vancomycin. The resistance rate observed for HLG was high and was comparable to that observed in many European countries reporting to EARSS (Estonia, Germany, Iceland, Israel, The Netherlands and Portugal all had lower rates). However, the number of isolates tested remains low (n = 21). The rate of vancomycin resistance in *E. faecium* was high compared to most other countries and was comparable with rates seen in Greece, Italy and Portugal.

Conclusions

The threat posed by organisms, which have developed, or are developing, resistance to the common antimicrobial agents used to combat infections they cause, is a major concern in Ireland. The Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) was launched in 2000 to tackle this growing problem.[5] MRSA and PNSP rates remain high compared to the rest of Europe.[4] The introduction of surveillance of invasive isolates of *E. coli* and enterococci in 2002 has highlighted a number of other potential problem areas but with data available for Q1-3 2002 only, any conclusions must be treated with caution. Rates of HLG resistance in both *E. faecalis* and *E. faecium* are high in Ireland as in many European countries. However the data are based on only a small proportion of all isolates being tested. Detection of HLG resistance is particularly important, as this will predict the outcome of treatment when gentamicin is used in combination with a cell wall-active agent, such as ampicillin or vancomycin (i.e. whether the combination will be synergistic). Vancomycin resistance in *E. faecium* also appears to be of concern. The fear is that some isolates will acquire resistance to all the main anti-enterococcal agents. Resistance in *E. coli* does not appear to be a major problem, however, the occurrence of a number of multi-drug resistant isolates could pose serious therapeutic and infection control challenges if left unchecked. Good surveillance, in tandem with fully functional reference laboratories that can provide important epidemiological typing data, is essential if we are to identify, and ultimately control, antimicrobial resistant organisms.

Stephen Murchan on behalf of the EARSS Steering Group

Acknowledgements

Thanks to all laboratories participating in EARSS, the National MRSA Reference Laboratory and *S. pneumoniae* Referral Laboratory (up to 1st July 2002), for their enthusiasm and support for the programme.

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Influenza A (H5N1) in Hong Kong SAR of China

As of the 20th February 2003, the Department of Health in Hong Kong Special Administrative Region (SAR) of China confirmed that a 33-year-old man, who died in hospital in Hong Kong on the 17th February, was infected with influenza A (H5N1) virus.[1]

The 33-year-old man is the second confirmed case of influenza A (H5N1) virus related to this outbreak. He is the father of a 9-year-old boy who also tested positive for influenza A (H5N1) on the 19th February. Both cases had travelled to Fujian Province (China) in January. Two other members of the family who accompanied the cases to Fujian have also been unwell. The mother of the family made a full recovery; the other affected member of the family (an 8 year old girl) died on the 4th February 2003, in Fujian Province. The health authorities in Hong Kong are continuing laboratory and epidemiological investigations to determine the source of this outbreak. The results of laboratory tests show that the influenza virus genes are purely avian in origin therefore the risk of human to human transmission is very low.[2] The Department of Health in Hong Kong has reported that no unusual increase in influenza activity has been detected over the past few weeks.

Influenza A (H5N1) was first detected in humans in 1997 when an outbreak of 18 cases caused six deaths in Hong Kong. Until then, this virus was only detected in birds including chickens and ducks, causing high mortality in chickens. Following confirmation of the initial case, in a two-year-old child in August 1997, an investigation was launched and surveillance was increased. In December 1997, all chickens, which were thought to be the source of this outbreak of influenza in humans, were slaughtered in Hong Kong. No further cases of this disease were reported in humans. Since then, authorities have maintained intensive surveillance of influenza in human and birds in Hong Kong.

In the current outbreak, the World Health Organization is in close contact with the health authorities in Beijing, China and Hong Kong. The WHO Global Influenza Surveillance Network has been alerted and additional reagents for laboratory diagnosis are being made available to National Influenza Centres and other members of the Global Influenza Surveillance Network.

Reference

1. WHO. Influenza A (H5N1) in Hong Kong SAR of China – update. CSR 2003. Available at www.who.int/csr/don/2003_02_20/en/
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UK Pertussis Guidelines

There are no national guidelines in Ireland for the use of chemoprophylaxis in contacts of pertussis cases. In 2002, UK guidelines were published.[1] These guidelines are based on a review of the evidence and aim to help clinicians make more rational decisions on the use of erythromycin chemoprophylaxis for pertussis. Public health doctors and clinicians in Ireland may find these guidelines useful in identifying those who may benefit from chemoprophylaxis.

Key Points

- Erythromycin has well-established side effects and so its use should be limited to situations where it is likely to be of greatest benefit.
- There is no evidence of any benefit from chemoprophylaxis given more than 21 days from the date of onset of the primary case.
- Chemoprophylaxis should be considered if a case has a household contact who is at greatest risk from pertussis – primarily young infants.
- The aim is to protect those at greatest risk from pertussis by offering chemoprophylaxis to them and to their household contacts who are not fully immunised.
- The risks and benefits of giving erythromycin to neonates need to be weighed up and the parents informed of the possible risk of infantile hypertrophic pyloric stenosis in this age group.

Dr Fiona Ryan, Specialist in Public Health Medicine, SHB

Reference

1. Dodhia H, Crowcroft NS, Bramley JC, Miller E. UK guidelines for the use of erythromycin chemoprophylaxis in persons exposed to pertussis. *J Public Health Med* 2002; **24**(3): 200-206. Available at www.pubmed.oupjournals.org

Annual Conference on Epidemiology and Control of Communicable Diseases and Environmental Hazards

The annual conference on Epidemiology and Control of Communicable Diseases and Environmental Hazards will be held at The Glasgow Royal Concert Hall, Glasgow, Scotland from Monday 3rd November to Wednesday 5th November 2003. The conference will address a wide range of health protection issues that have arisen in the past year and provide fresh perspectives on established areas of disease prevention and communicable disease control, dealing with non-communicable environmental threats and health emergencies i.e. the health protection agenda. Short papers on recent outbreaks and surveillance initiatives will also be presented. The conference organizing committee is drawn from CDSC in England, Wales and Northern Ireland, the Scottish Centre for Infection and Environmental Health, the National Disease Surveillance Centre in Dublin, the Public Health Medicine Environmental Group, Consultants in Communicable Disease Control and Consultants in Public Health Medicine (Communicable Diseases/Environmental Health).

Further details will be available at the end of March 2003 from Vivienne Fitch at vfitch@phls.org.uk or Rebecca Flanagan at Rebecca.Flanagan@scieh.csa.scot.nhs.uk

Salmonella Monthly Report (January 2003):

Strains are allocated to months based on the date of receipt of the isolate from the referring laboratory. These figures are provisional as work may not be finished on particular strains at the time of publication. Data are provided courtesy of Prof Martin Cormican and Dr Geraldine Corbett-Feeney, NSRL

Health Board	E	M	MW	NE	NW	SE	S	W	Total
S.Anatum	1	0	0	0	0	0	0	1	2
S.Blockley	0	0	0	0	0	1	0	0	1
S.Bredeney	0	0	1	0	0	0	0	0	1
S.Corvallis	0	0	0	0	0	0	1	0	1
S.Derby	0	0	0	0	0	0	0	1	1
S.Enteritidis	1	0	0	1	0	1	0	0	3
S.Infantis	0	0	0	0	0	0	0	1	1
S.Kottbus	0	0	0	0	0	0	0	1	1
S.Ohio	0	0	0	0	1	0	0	0	1
S.Saintpaul	1	0	0	0	0	0	1	0	2
S.Typhimurium	2	0	1	0	0	0	2	1	6
S.Virchow	1	0	0	0	0	0	0	0	1
Total	**6**	**0**	**2**	**1**	**1**	**2**	**4**	**5**	**21**