

Volume 11

Number 11

15 March 2001



NEWS



ENTERIC



RESPIRATORY



IMMUNISATION



HIV/STIs



BACTERAEMIA



ZOONOSES



DIARY



INDEX

CDR WEEKLY

Main stories this week:

[Outbreak of campylobacter infection following microbiology conference](#)

[Meningococcal immunisation for asplenic patients](#)

[Bacteraemia reporting in *CDR Weekly*](#)

Updated this week:

[Group A, C, and G streptococci; *Escherichia coli*; and *Proteus spp/Morganella morganii* bacteraemia, England and Wales: January to December 2000](#)

[Diary dates](#)

[Notifications of infectious diseases, weekly data](#)

[Printable versions \(PDF files\) of *CDR Weekly* 01-10/00](#)

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NEWS



ENTERIC



RESPIRATORY



IMMUNISATION



HIV/STIs



BACTERAEMIA



ZOONOSES



DIARY



INDEX

Contents

[Outbreak of campylobacter infection following microbiology conference](#)

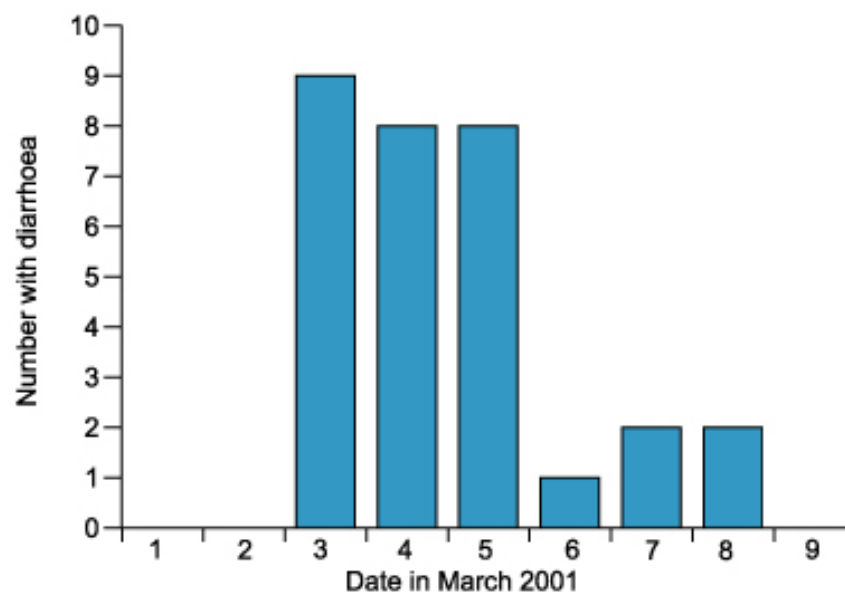
[Meningococcal immunisation for asplenic patients](#)

[Bacteraemia reporting in CDR Weekly](#)

Outbreak of campylobacter infection following microbiology conference

Barnet Health Authority and the London Borough of Barnet Environmental Health Department are investigating an outbreak of campylobacter infection following the Standing Conference on Water and Environmental Microbiology (SCWEM) held at the PHLS in Colindale on the 1 March 2001. The PHLS Communicable Disease Surveillance Centre and the PHLS Laboratory of Enteric Pathogens are collaborating in the investigation. Thirty people who attended the conference developed symptoms of diarrhoea and severe abdominal pain between 40 hours and seven days after the implicated meal (figure). Of 78 people who attended SCWEM, 74 ate the conference lunch prepared for that occasion. Sixty-seven members of the cohort have been interviewed (response rate 91%) and data analysis and further investigations are underway.

Figure Epidemic curve for illness following SCWEM held on 1 March 2001



The epidemic curve is consistent with a point source outbreak. There are twelve laboratory confirmed cases of *Campylobacter* infection and seven isolates have been forwarded so far to the PHLS Laboratory of Enteric Pathogens for further characterisation. Laboratories and Consultants in Communicable Disease Control are reminded that the Campylobacter Reference Unit will provide typing in support of any campylobacter outbreak investigation. Isolates from patients thought to be involved in a possible campylobacter outbreak should be referred for typing and CRU informed of the outbreak investigation.

Meningococcal immunisation for asplenic patients

Current vaccine and immunisation issues (1), a letter from the Chief Medical Officer, includes the recommendation that asplenic patients should be offered conjugate group C meningococcal vaccine. Although asplenic patients are at greatest risk from pneumococcal infections, other encapsulated organisms such as *Haemophilus influenzae* type b and meningococci may be implicated. Immunisation with pneumococcal, Hib, and influenza vaccines is currently recommended for asplenic patients, in addition to routine vaccination. Previously, meningococcal vaccination was recommended only in high risk situations, such as travel to high risk areas, as most infections in the United Kingdom are with group B strains, and any protection from polysaccharide A and C vaccine is of short duration. With the

improved efficacy and long lasting immunity conferred by conjugate group C meningococcal (MenC) vaccine, the Joint Committee on Vaccination and Immunisation now recommends that this vaccine be offered to all patients with an absent or dysfunctional spleen.

Asplenic patients traveling to high risk areas will still require polysaccharide A and C or quadrivalent (A,C,W135,Y) vaccine.

1. Chief Medical Officer. *Current vaccine and immunisation issues PL/CMO/2001/1*. London: Department of Health, 9 March 2001. Available online from <www.doh.gov.uk/cmoh/cmoh.htm>

Bacteraemia reporting in *CDR Weekly*










The report on streptococcal, *Escherichia coli* and *Proteus* spp/*Morganella morganii* bacteraemias in this week's *CDR* heralds a change in approach. Previously, the monthly bacteraemia surveillance report in *CDR Weekly* has normally comprised a table comparing numbers of reports of selected organisms in the current year against the same period in the previous year, with an organism ranking (1). Once a quarter, this table has been supplemented by a report on *Staphylococcus aureus* bacteraemia, which, since the beginning of 1999, has provided regional reporting rates, information on the proportion of isolates missing methicillin susceptibility information, and a commentary (2). It is now planned to use a similar format to produce more detailed reports on organisms that are common or of clinical or antibiotic resistance relevance and do not otherwise feature in routine surveillance reports. The table of bacteraemias will still be published, but less frequently.

The selection of bacteraemia organisms featured in this issue has been made mainly on the basis of bringing together those that largely reflect community-acquired infections. Future reports will deal with those that primarily reflect hospital acquisition (klebsiellae, enterococci etc); the pseudomonads and related species; alpha and non-haemolytic streptococci; and finally a miscellaneous group.

We would welcome feed back on this approach and what you would like to see featured. Comments should be sent to Georgia Duckworth (email: gduckworth@phls.org.uk).

1. CDSC. Bacteraemia, England and Wales: laboratory reports 1999 and 2000. *Commun Dis Rep CDR Wkly* [serial online] 2001 [cited 12 March 2001]; **11** (3): bacteraemia.

2. CDSC. *Staphylococcus aureus* bacteraemia: England and Wales, January to December 2000. *Commun Dis Rep CDR Wkly* [serial online] 2001 [cited 12 March 2001]; **11** (7): bacteraemia.

-  NEWS
-  ENTERIC
-  RESPIRATORY
-  IMMUNISATION
-  HIV/STIs
-  BACTERAEMIA
-  ZOOSES
-  INDEX
-  DIARY

Group A, C, and G streptococci; *Escherichia coli*; and *Proteus* spp/*Morganella morganii* bacteraemia, England and Wales: January to December 2000

Group A, C, and G streptococci

Group A streptococci were the commonest of these streptococci reported by laboratories in England and Wales in 1999 and 2000. There were 845 reports of Group A streptococcal bacteraemias in 2000, followed by 528 reports of group G streptococcal bacteraemias and much lower numbers (158) of reported group C streptococcal bacteraemias (table 1). Group C streptococci include those reported as streptococcus group C, *S. zooepidemicus*, *S. dysgalactiae*, *S. equi*, and *S. equisimilis*. Group G streptococci include those reported as streptococcus group G and *S. canis*. [Group B streptococci will be dealt with separately, with particular emphasis on neonatal infections. The PHLS and the British Paediatric Surveillance Unit are currently collaborating on enhanced surveillance of all group B streptococcal neonatal systemic disease episodes in England and Wales].

Table 1 Group A, C, and G streptococcal bacteraemia laboratory reports, England and Wales: 1999 and 2000

	1999	2000
Streptococcus group A		
Northern and Yorkshire	81	68
Trent	83	84
Eastern	70	110
London	90	64
South East	132	125
South West	93	119
West Midlands	83	138
North West	90	85
Wales	35	52
Total for England and Wales	757	845
Streptococcus group C		
Northern and Yorkshire	13	22
Trent	15	10
Eastern	15	19
London	12	21
South East	19	10
South West	14	18
West Midlands	17	27
North West	19	18
Wales	2	13
Total for England and Wales	126	158
Streptococcus group G		
Northern and Yorkshire	40	44
Trent	62	65
Eastern	49	71
London	55	46
South East	88	64
South West	69	69
West Midlands	88	92
North West	41	40
Wales	46	37
Total for England and Wales	538	528

The number of bacteraemia reports for group A and C streptococci increased by 12% and 25% respectively in 2000 compared to 1999, while reports of Group G infections fell by 2%. In 2000, most group A, C, and G streptococcal bacteraemias were reported from the West Midlands, whereas the previous year most were reported from the South East (jointly with the West Midlands for group G streptococci) (table 1).

The overall reported rate for England and Wales in 2000 was 1.6/100,000 population for group A streptococcal bacteraemias (range: 0.79 to 4.7), 0.3/100,000 for group C streptococcal bacteraemias (range: 0.11 to 0.92) and 1.0/100,000 for group G streptococcal bacteraemias (range: 0.56 to 3.13) (figures 1,2,3). Although Wales reported the lowest numbers of group A and G bacteraemias in 2000, it had the highest reported rate for all three streptococcal groups, albeit with wider confidence intervals, reflecting its lower population. The reported rates for the English regions clustered at a lower level for all three streptococcal groups. The South West had the highest rate for group A and G streptococci, possibly reflecting improved reported after an enhanced surveillance programme for group A streptococcal bacteraemias in that region (1). The reported rate for group A streptococcal bacteraemia compares with a rate for invasive disease (isolation from a usually sterile site) of 3.8/100,000 in eight participating states of the United States (US) in 1998 (2). Substantial geographic variation was noted (range: 2.6 to 4.1).

Figure 1 Group A streptococcal bacteraemia reporting rates (95% confidence intervals) per 100,000 population, English and Wales: 2000

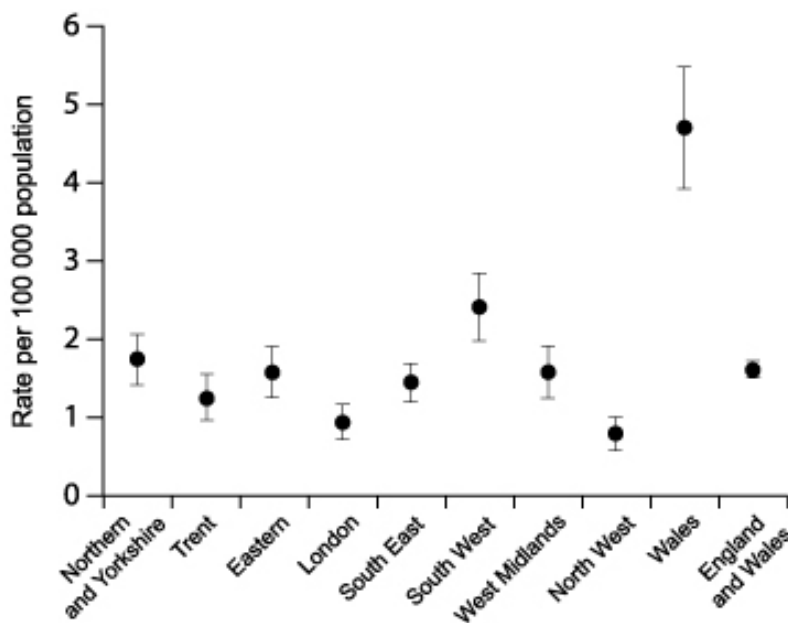


Figure 2 Group C streptococcal bacteraemia reporting rates (95% confidence intervals) per 100,000 population, England and Wales: 2000

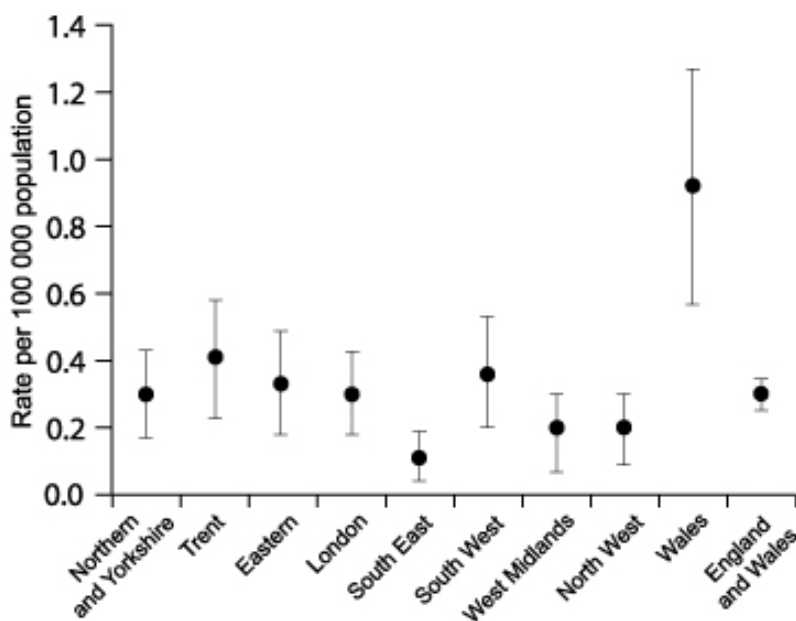
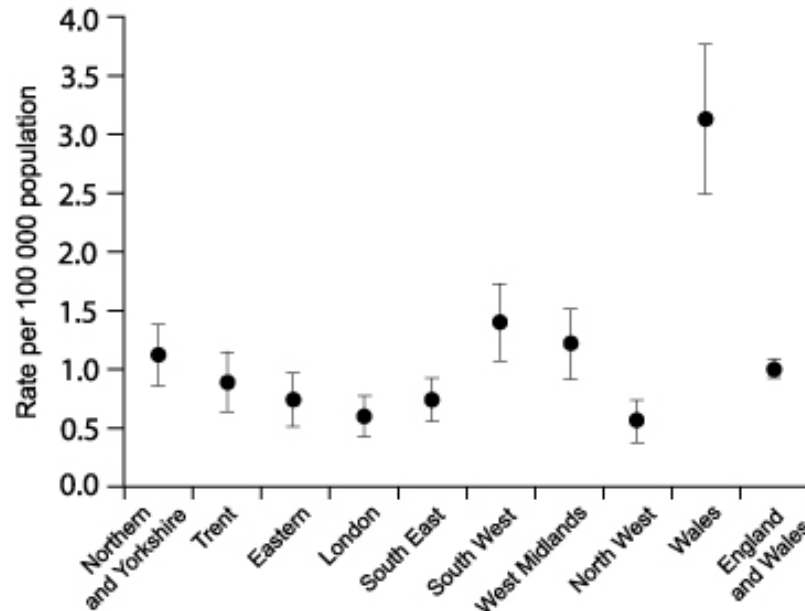


Figure 3 Group G streptococcal bacteraemia reporting rates (95% confidence intervals) per 100,000 population, English and Wales: 2000



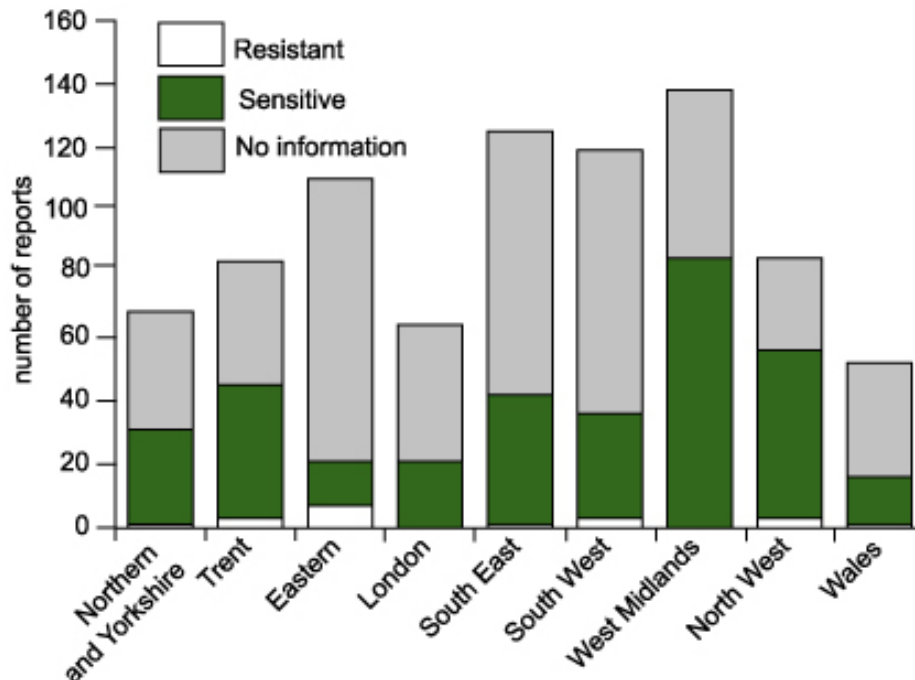
The proportion of reports lacking information on penicillin or erythromycin susceptibility was similar between the streptococci and ranged from 36 to 40% (table 2, figure 4). Information on penicillin and erythromycin susceptibility for group A and C streptococci fell by between 19 and 29% in 2000 compared to 1999. There were 16 instances in 2000 (and 18 in 1999) where information was given on the penicillin susceptibility of group A streptococcal bacteraemias, but not on erythromycin susceptibility.

Table 2 Penicillin and erythromycin susceptibility data in group A, C, and G streptococcal bacteraemia laboratory reports, England and Wales: 1999 and 2000

		Resistant (%)	Sensitive (%)	No information (%)	Total
Streptococcus group A					
	Penicillin	–	527 (62)	318 (38)	845
	Erythromycin	19 (2)	492 (58)	334 (40)	845
Streptococcus group C					
	Penicillin	–	97 (61)	61 (39)	158
	Erythromycin	10 (6)	85 (54)	63 (40)	158
Streptococcus group G					
	Penicillin	–	338 (64)	190 (36)	528
	Erythromycin	39 (7)	292 (55)	197 (37)	529

Percentage may not add up to 100 due to rounding error.

Figure 4 Erythromycin susceptibility data in group A streptococcal bacteraemia reports, England and Wales: 2000



Of the reports with information on erythromycin susceptibility, 3.7% of group A, 11% of group C and 12% of group G organisms were reported resistant to erythromycin in 2000, compared to 2.8%, 8.2%, and 15% respectively in 1999. There were no reports of erythromycin-resistant group A streptococcal bacteraemias in London or the West Midlands in 2000 (figure 4). There were five reports of penicillin resistance in group A, C, and G streptococci in 2000, but none were confirmed.

The above information on Group A, C, and G streptococci was obtained through routine laboratory reports to CDSC. Further relevant data are gained from the isolates referred to the PHLS Streptococcus and Diphtheria Reference Unit (SDRU), Respiratory and Systemic Infection Laboratory (RSIL). Four hundred and eighty-five and 731 sterile site isolate referrals of group A streptococci were received by SDRU during 1999 and 2000 respectively. The predominant M types for 1999 were M1 (18% of all sterile site isolates); M3 (12%); R28 (11%) and M89 (8%), whereas in 2000, the distributions were: M1 (41%); R28 (10%); M89 (9%); M3 (5%). Nearly all the increase in referrals during 2000 was due to the increase of M1.

The data from the enhanced surveillance of group A streptococci in England and Wales for the period 1 July 1994 to 30 June 1997 show the emergence of M89, formerly known as provisional type 4245, and a decrease in the numbers of infections caused by M3 strains. The reported mortality rate from the enhanced surveillance period was 27%, with a much higher rate amongst those aged ≥ 65 years (approximately 43%). It is not possible to comment upon current mortality rates as this information is not normally included in routine laboratory reported.

As the numbers of Group C and G streptococcal isolates referred to RSIL are small and current typing systems less discriminatory, it is not possible to make meaningful comment on these data at this time.

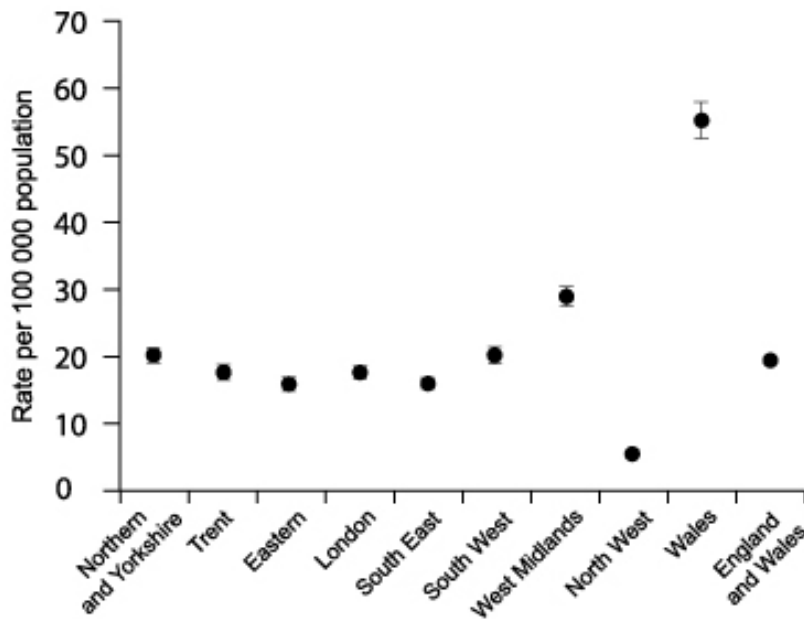
Escherichia coli*, and *Proteus spp/Morganella morganii

There were 10,261 bacteraemia reports for *Escherichia coli* in 2000, a 12% decline compared with 1999 (table 3). Numbers of reports in 2000 ranged from 362 in Wales, followed by the North West with 863, to 1622 in the West Midlands. This represented an increase of 16%, 8%, and 7% in the West Midlands, Trent, and Eastern regions respectively compared with 1999. The number of reports in Wales fell by 55%, and by 42% in the North West. The overall *E. coli* bacteraemia reported rate for England and Wales in 2000 was 19.5/100,000 population, ranging from 5.5/100,000 in the North West to 55.23/100,000 in Wales (figure 5).

Table 3 *Escherichia coli* and *Proteus spp/Morganella morganii* bacteraemia laboratory reports, England and Wales: 1999 and 2000

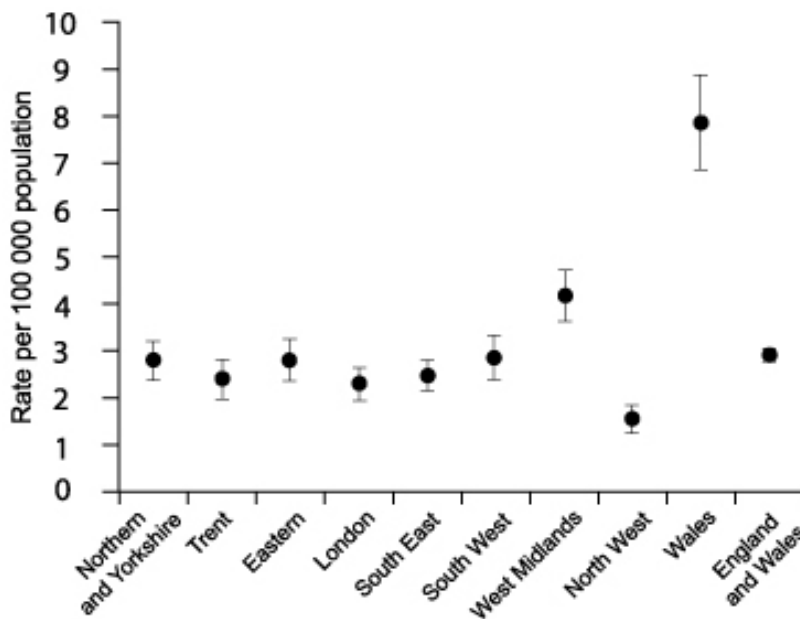
	1999	2000
<i>Escherichia coli</i>		
Northern and Yorkshire	1596	1287
Trent	1439	1547
Eastern	1198	1281
London	1080	909
South East	1531	1392
South West	1099	998
West Midlands	1400	1622
North West	1479	863
Wales	801	362
Total for England and Wales	11623	10261
<i>Proteus sp/Morganella morganii</i>		
Northern and Yorkshire	180	168
Trent	166	223
Eastern	153	177
London	156	124
South East	211	216
South West	117	141
West Midlands	207	231
North West	200	152
Wales	111	102
Total for England and Wales	1501	1534

Figure 5 *Escherichia coli* bacteraemia reporting rates (95% confidence intervals) per 100,000 population, England and Wales: 2000



Numbers of *Proteus* spp/*Morganella morganii* bacteraemia reports were much smaller, approximately 15% of *E. coli* bacteraemia levels: 1534 in 2000, a 2.2% increase on numbers in 1999 (table 3). *Proteus mirabilis* accounted for approximately two thirds of these reports, whilst *P. vulgaris* and *Morg. morganii* accounted for just under 20%. The remainder included other speciated and unspciated *Proteus*. Numbers of reports in 2000 ranged from 231 in the West Midlands to 102 in Wales. Compared to 1999, this marked an increase of in 34% in Trent, 21% in the South West, 16% in Eastern, the 12% in West Midlands and the 2% in South East regions. The remaining regions and Wales experienced a decrease in the number of bacteraemia reports, from 24% in the North West to 7% in Northern and Yorkshire. The smaller changes probably reflect normal variation, given the relatively small number of reports in each region. The overall reported rate for *Proteus* spp/*Morg. morganii* bacteraemias in England and Wales in 2000 was 2.9/100,000 population, significantly lower than that for *E. coli*. As for *E. coli*, however, the highest reported rate of 7.9/100,000 was seen in Wales, and the lowest, 1.55/100,000, in the North West, (figure 6).

Figure 6 *Proteus* spp/*Morganella morganii* bacteraemia reporting rates (95% confidence intervals) per 100,000 population, England and Wales: 2000



The proportions of bacteraemia reports lacking susceptibility information ranged from 58% and 55% for trimethoprim in *E. coli* and *Proteus spp/Morg. morganii* respectively; to 43% and 42% for ciprofloxacin; 41% for ampicillin/amoxycillin and 38% and 37% for gentamicin (table 4). Overall there were increases of 5%, 4%, and 1% in the proportions of reports without susceptibility information for ampicillin/amoxycillin, trimethoprim, and ciprofloxacin in *E. coli* bacteraemias in 2000 compared to 1999 (similar proportions lacked gentamicin susceptibility information in both years). The only increase in *Proteus spp/Morg. morganii* bacteraemia reports without susceptibility information, was in ampicillin/amoxycillin reports (3%), while the proportions with gentamicin, ciprofloxacin, and trimethoprim susceptibility information improved slightly, by 3%, 2%, and 1% respectively.

Table 4 Ampicillin/amoxycillin, trimethoprim, gentamicin, and ciprofloxacin susceptibility data in *Escherichia coli* and *Proteus spp/Morganella morganii* bacteraemia laboratory reports, England and Wales: 1999 and 2000

	Resistant (%)	Sensitive (%)	No information (%)	Total
<i>Escherichia coli</i>				
Amoxycillin/Ampicillin	3309 (32)	2746 (27)	4206 (41)	10261
Trimethoprim	1277 (12)	2997 (29)	5987 (58)	10261
Gentamicin	197 (2)	6150 (60)	3914 (38)	10261
Ciprofloxacin	273 (3)	5596 (55)	4392 (43)	10261
<i>Proteus sp/Morg. morganii</i>				
Amoxycillin/Ampicillin	287 (19)	625 (41)	622 (41)	1534
Trimethoprim	379 (25)	314 (21)	841 (55)	1534
Gentamicin	12 (1)	957 (63)	565 (37)	1534
Ciprofloxacin	24 (2)	869 (57)	641 (42)	1534

Percentage may not add up to 100 due to rounding error.

Examining these data more closely across the English regions and Wales reveals improvements in the range of 3% to 16% in the proportions of reports with susceptibility information compared to 1999 in the West Midlands, Wales, and the South East for all four antimicrobials against *E. coli* and *Proteus spp/Morg. morganii*. Eastern region had a 13% decrease in ampicillin/amoxycillin susceptibility reported for both *E. coli* and *Proteus spp/Morg. morganii*.

Of the bacteraemia reports for *E. coli* in 2000 in which susceptibilities were reported, 55% were resistant to ampicillin/amoxycillin (57% in 1999), 30% to trimethoprim (28% in 1999), 3% to gentamicin (2.4% in 1999) and 5% to ciprofloxacin (3.7% in 1999). The equivalent figures for *Proteus spp/Morg. morganii* were 32% ampicillin/amoxycillin resistant (31% in 1999), 55% trimethoprim resistant (64% in 1999), 1.2% gentamicin-resistant (2.4% in 1999) and 2.7% ciprofloxacin-resistant (3.4% in 1999). This should be set in the context of *P. mirabilis* (which accounts for about two-thirds of these bacteraemia reports) being inherently more susceptible to antimicrobials than *P. vulgaris* and *Morg. morganii*, which are inherently resistant to ampicillin/amoxycillin.

Discussion

Reported rates were consistently higher for Wales than for the English regions for all the pathogens reported here. This was often on the basis of much smaller numbers of infections, probably reflecting

good reporting across a smaller population. It is, however, unclear whether these reported rates are an approximation to the 'true' level, to which other regions should aspire, as this assumes a similar distribution of disease across different areas. An audit of reporting in 1998 and 1999 in the South West Region following the introduction of enhanced surveillance of invasive Group A streptococcal disease showed that 89.4% of group A streptococcal bacteraemias had been reported (1), which would suggest that the true rate for the South West would not be much higher than that seen here (figure 1). The US surveillance results indicated a wide geographical variation in rates (2).

Many bacteraemia reports did not include information on the antimicrobial susceptibility of the pathogen. For some antimicrobials this might indicate that the reporter felt it was not worthwhile reported particular susceptibilities – for example, that of penicillin in the streptococci, on the assumption that all are susceptible, and trimethoprim in *E. coli* bacteraemias as this would not be an appropriate agent to use for a septicaemia. As susceptibility reporting was also lacking for other highly relevant agents, this may indicate that this extra reported is considered too onerous. It is anticipated that the developments in laboratory reported (new CoSurv module and the Routinely Generated Susceptibility Data system) and the introduction of automated zone readers to PHLS laboratories should make this easier by automatically retrieving this information from laboratory computer systems once mapping of laboratory codes has taken place. There is good coverage of laboratory reported across England and Wales, so it is important that this aspect of its quality is addressed urgently, as these reports provide an early warning of changing antimicrobial susceptibility in important pathogens. The PHLS is greatly indebted to all the laboratories in England and Wales that help maintain this national surveillance through their regular and voluntary reports.

Some areas have made big improvements in the proportions of reports with susceptibility information, for instance the West Midlands, Wales, and the South East as regards *E. coli* and *Proteus spp/Morg. morganii* bacteraemias. This suggests that major efforts have been made to improve the quality of reported in these areas. The improvements in the West Midlands and the South East are particularly notable given the large numbers of reports (1622 and 1392 respectively in 2000, compared to 362 in Wales). The 16% increase in reports in the West Midlands also suggests that coverage of laboratory reporting might be increasing (the West Midlands has also shown improvements in the quality and quantity of *Staphylococcus aureus* bacteraemia reporting (1).

To date, there have been no confirmed reports of penicillin resistance in the group A, C, and G streptococci, but reported erythromycin resistance in 1999 and 2000 ranges from 2.8% in group A streptococci to 15% in group G streptococci. Ampicillin resistance in *E. coli* continues at high levels, and we are fortunate in England and Wales that susceptibility to gentamicin and ciprofloxacin still remains high in *E. coli* and *Proteus spp/Morg. morganii*. Analysis for *E. coli* indicates that reported trends in amoxicillin, gentamicin, ciprofloxacin, and trimethoprim resistance rates up to 1997 are mirrored in those seen among bacteraemia isolates sent to the Laboratory of Enteric Pathogens for serotyping, despite inherent biases in referred isolates (4). This agreement between the two different data sources supports the validity of the routine data analysed here, at least for *E. coli*.

In addition to enhancing the quality of the data through improved reporting of pathogens' antimicrobial susceptibilities, it is also important to address susceptibility testing methods, to ensure that information from different laboratories can be compared in building up the regional and national picture and biases reduced. This is predicated on using a quantitative, standardized method and testing an agreed core set of antimicrobials for key pathogens, such as amoxicillin/ampicillin, ciprofloxacin, gentamicin, cefuroxime, ceftazidime and meropenem for *E. coli* and *Proteus spp* bacteraemias.

1. CDSC South West. *Invasive Group A Streptococcal Disease, 1998-1999, South West Region*. Gloucester: CDSC South West, 2000. Report can be obtained from S. Wheeler at CDSC South West: email swheeler@phls.org.uk

2. Schuchat A, Hilger T, Zell E, Farley MM, Reingold A, Harrison L, et al. Active bacterial core surveillance of the emerging infections program network. *Emerging Infectious Diseases* 2001; 7: 92-9.

3. CDSC. *Staphylococcus aureus* bacteraemia: England and Wales, January to December 2000. *Commun Dis Rep CDR Wkly* [serial online] 2001 [cited 12 March 2001]; 11 (7): bacteraemia..

4. Livermore DM, Threlfall EJ, Reacher MH, Johnson AP, James D, Cheasty T, et al. Are routine sensitivity test data suitable for the surveillance of resistance? Resistance rates amongst *Escherichia coli* from blood and CSF from 1991-1997, as assessed by routine and centralized testing. *J Antimicrob Chemother* 2000; 45: 205-11.

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[Back to top](#)