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## Consultation on guidelines for managing outbreaks of sexually transmitted infections

The PHLS, in consultation with the Association of Genitourinary Medicine (AGUM), the Public Health Medicine Environmental Group (PHMEG), and the Medical Society for the Study of Venereal Diseases (MSSVD) has produced, for the first time in Britain, draft guidance on the local management of outbreaks of sexually transmitted infections. The guidance was written to help improve local and regional responses to outbreaks of STIs, and is written primarily for those most likely to be involved in the management of these incidents – public health specialists, consultants in communicable disease control, directors of public health, genitourinary medicine physicians, and regional epidemiologists. It outlines the principles of outbreak investigation and proposes a framework for districts to approach the management of local outbreaks. The guidance also highlights the roles of key players in outbreak control, and includes strategies for improving inter-agency and inter-disciplinary working.

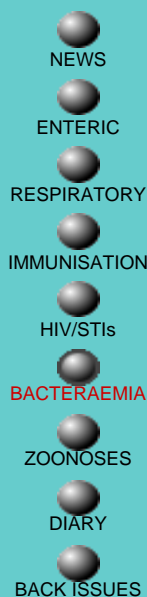
The guidelines were drawn up in response to recent outbreaks (1-5) and the marked increases in the reported incidence of sexually transmitted infections. These signify a failure in public health control measures for which more radical, nationally coordinated approaches have been suggested (6). Although the recently produced Sexual health strategy (7) identified a range of priority areas for intervention, relatively little guidance has been available on the identification and management of STI outbreaks, or regarding the resources required for effective disease control.

The draft guidance is currently out for wider consultation with members of the PHMEG, MSSVD, and AGUM until 14 December 2001. Comments are also invited from other individuals or groups with a specialist interest in this area. A PDF copy of the draft guidance is available in the Advice and guidelines section of the PHLS website at <[www.phls.co.uk/advice/index.htm#S](http://www.phls.co.uk/advice/index.htm#S)>. All comments regarding its structure and content should be addressed to Dr Kevin Fenton, Consultant Epidemiologist, HIV/STI Division, PHLS Communicable Disease Surveillance Centre, 61 Colindale Avenue, London NW9 5EQ, email [kfenton@phls.org.uk](mailto:kfenton@phls.org.uk).

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## ***Pseudomonas* spp and *Stenotrophomonas maltophilia* bacteraemia, England and Wales: 1999 and 2000**

The main features of *Pseudomonas* spp and *Stenotrophomonas maltophilia* bacteraemia reporting in 1999 and 2000 were:

- A small increase in the numbers of *Pseudomonas* spp bacteraemia reports in 2000 compared to 1999; three quarters of all reports in both years were of *P. aeruginosa*.
- West Midlands region had the highest reporting rate by population for *Pseudomonas* spp bacteraemias and the North West the lowest.
- Reporting of antimicrobial susceptibilities varied by organism, antimicrobial and region: the most complete reporting was of gentamicin susceptibility for *P. aeruginosa* in Eastern region, where only 11% of reports lacked this information.
- The highest reported resistance rates in *P. aeruginosa* bacteraemias in 2000 were 17% gentamicin resistance in Wales, 21% ciprofloxacin resistance in Wales and 12% ceftazidime resistance in London. These results have to be interpreted with caution given the incompleteness of susceptibility reporting and because much resistance is borderline.
- Most *P. aeruginosa* bacteraemia isolates remain sensitive to relevant antibiotics.
- There were much smaller numbers of *S. maltophilia* bacteraemias, with similar numbers in both years.
- Wales had the highest reporting rate by population for *S. maltophilia* bacteraemias.
- Antibiotic susceptibility information reported for *S. maltophilia* bacteraemias suggests widespread testing against antibiotics with little activity against this organism. A third of *S. maltophilia* isolates were tested against imipenem, despite being inherently very resistant to this antibiotic.
- More appropriate antibiotic testing for *S. maltophilia* should be encouraged, namely co-trimoxazole.

This review concentrates on *Pseudomonas* spp and *S. maltophilia* bacteraemias in 1999 and 2000, although table 1 gives data on bacteraemias due to closely related genera. The latter account for only small numbers of bacteraemias and will not be examined further.

**Table 1 Bacteraemia laboratory reports of *Pseudomonas*, *Stenotrophomonas*, and related species, England and Wales**

	1999	2000
<b><i>Pseudomonas</i> spp</b>		
<i>Pseudomonas aeruginosa</i>	1450	1535
<i>Pseudomonas alcaligenes</i>	2	2
<i>Pseudomonas fluorescens</i>	39	49
<i>Pseudomonas putida</i>	38	23
<i>Pseudomonas stutzeri</i>	36	54
<i>Pseudomonas</i> sp	368	378
<i>Pseudomonas</i> other named	16	43
<b>Total</b>	<b>1949</b>	<b>2084</b>
<b>Total <i>Stenotrophomonas maltophilia</i></b>	<b>438</b>	<b>400</b>
<b>genera closely related to pseudomonads</b>		
<i>Burkholderia cepacia</i>	24	22
<i>Burkholderia pseudomallei</i>	1	3
<i>Brevibacterium</i> sp	5	5
<i>Brevundimonas diminuta</i>	7	7
<i>Brevundimonas vesicularis</i>	7	12

<i>Comamonas acidovorans</i>	20	13
<i>Comamonas</i> sp	1	2
<i>Comamonas testosteroni</i>	5	3
<i>Ralstonia pickettii</i>	8	6
<i>Shewanella putrefaciens</i>	3	2
<i>Sphingomonas paucimobilis</i>	20	30
<i>Sphingomonas</i> sp	1	2
<b>Total</b>	<b>102</b>	<b>107</b>

Laboratory reports are for isolates cultured from blood or the central nervous system, the overwhelming majority being bacteraemia reports. Reports are analysed according to the date of the specimen. Rates are calculated using 1999 mid-year resident population estimates as denominators for each region and age group.

There were 2084 *Pseudomonas* spp bacteraemias reported in 2000 (table 1), a 7% increase on the total in 1999 (1949). Seventy-four of the reports in 2000 were specified as *P. aeruginosa*, and 6% as other named *Pseudomonas* species. A further 18% specified only the genus and 2% were reported as 'other named *Pseudomonas*'. It is likely that many of these are also *P. aeruginosa*. There were much smaller numbers of *S. maltophilia* bacteraemia reports: 400 in 2000 and 438 in 1999. Numerically this makes *Pseudomonas* spp bacteraemias slightly less common than *Klebsiella* spp bacteraemias (1) and about five times less common than *E. coli* bacteraemias (2), while *S. maltophilia* bacteraemias are reported at a similar level to *Citrobacter* spp bacteraemias (1).

The West Midlands region accounted for the highest proportion (15%) of reports for both genera in 2000 (table 2). The proportion of *Pseudomonas* spp reports from individual regions was similar in both years.

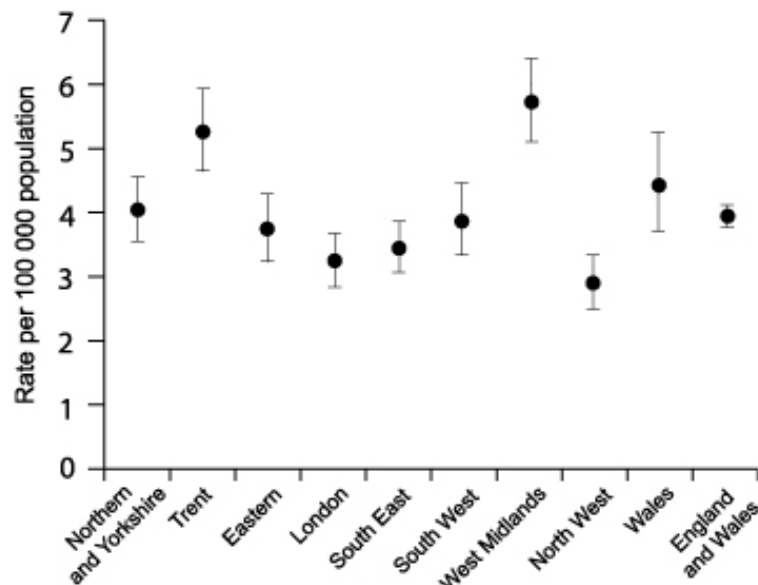
**Table 2 *Pseudomonas* spp and *Stenotrophomonas maltophilia* bacteraemia laboratory reports, England and Wales: 1999 and 2000**

<i>Pseudomonas</i> spp	1999	(%)	2000	(%)
Northern and Yorkshire	232	(12%)	256	(12%)
Trent	246	(13%)	271	(13%)
Eastern	162	(8%)	203	(10%)
London	248	(13%)	237	(11%)
South East	238	(12%)	300	(14%)
South West	183	(9%)	191	(9%)
West Midlands	261	(13%)	305	(15%)
North West	237	(12%)	191	(9%)
Wales	142	(7%)	130	(6%)
<b>England and Wales</b>	<b>1949</b>	<b>(100%)</b>	<b>2084</b>	<b>(100%)</b>
<i>Stenotrophomonas maltophilia</i>	1999	(%)	2000	(%)
Northern and Yorkshire	29	(7%)	41	(10%)
Trent	27	(6%)	53	(13%)
Eastern	26	(6%)	35	(9%)
London	63	(14%)	47	(12%)
South East	40	(9%)	41	(10%)
South West	52	(12%)	29	(7%)
West Midlands	70	(16%)	61	(15%)
North West	82	(19%)	57	(14%)
Wales	49	(11%)	36	(9%)
<b>England and Wales</b>	<b>438</b>	<b>(100%)</b>	<b>400</b>	<b>(100%)</b>

In 2000, the overall reporting rate for *Pseudomonas* spp bacteraemia for England and Wales was 3.96 per 100,000 population, with the West Midlands having the highest reporting rate (5.72/100,000) and the North West the lowest (2.90/100,000) (figure 1). The overall rate of *Pseudomonas* spp reports for England and Wales in 2000 was slightly higher than 1999 (3.70/100,000), with notable increases being seen in the Eastern and South East regions, from 2.99 to 3.75 and 2.74 to 3.45 per 100,000 respectively.

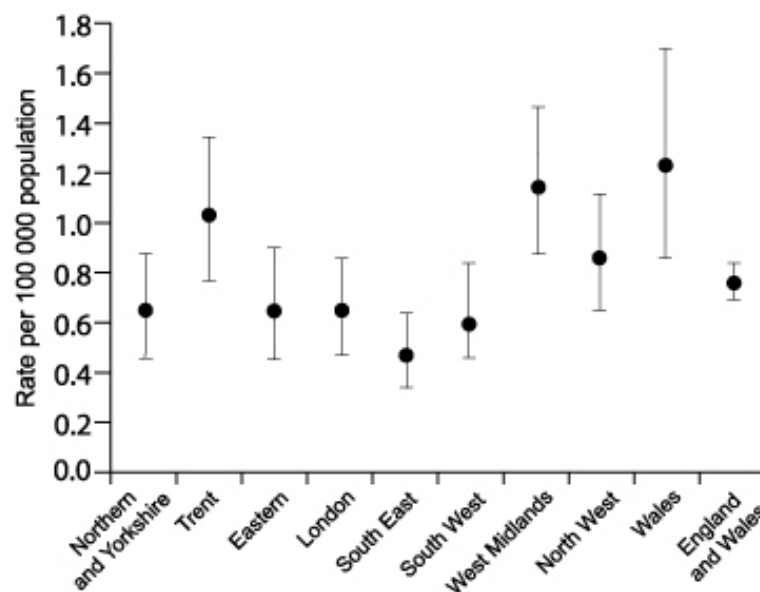
**Figure 1 Rate of reported cases of *Pseudomonas* spp bacteraemia (95% confidence intervals) per 100,000 population, England and Wales: 2000**

**Figure 1 Rate of reported cases of *Pseudomonas* spp bacteraemia (95% confidence intervals) per 100,000 population, England and Wales: 2000**



The overall rate of reporting for *S. maltophilia* bacteraemias was 0.76 per 100,000 population in 2000, Wales having the highest rate at 1.23 per 100,000, and the South East the lowest, at 0.47 per 100,000 (figure 2). Overall rates of *S. maltophilia* bacteraemia reporting in England and Wales fell slightly from the 0.83 per 100,000 seen in 1999. The largest changes in rates between the two years were seen in Trent (from 0.52 to 1.03/100,000) and the South West (1.05 to 0.59/100,000), although these should be interpreted with caution given the small number of reports within any one region.

**Figure 2 Rate of reported cases of *Stenotrophomonas maltophilia* bacteraemia (95% confidence intervals) per 100,000 population, England and Wales: 2000**



### Antimicrobial susceptibility

As noted in previous reviews, bacteraemia reports often lack full information on antimicrobial susceptibility (1-3). The proportions of reports with susceptibility information were generally highest for *P. aeruginosa* and much lower for other speciated and non-speciated pseudomonads (table 3). Gentamicin was the antimicrobial for which there was most complete reporting (62% of reports), followed by ciprofloxacin (59%), and ceftazidime (53%). Information on susceptibility to piperacillin/tazobactam and imipenem was lacking in a higher proportion of reports (66 and 73% respectively). In this context, 5% of *P. aeruginosa* bacteraemia reports indicated gentamicin resistance, 9% ciprofloxacin, and 4% ceftazidime.

**Table 3 *Pseudomonas* spp and *Stenotrophomonas maltophilia* bacteraemia laboratory reports, England and Wales: 2000**

	resistant	(%)	sensitive	(%)	no information	(%)
<b><i>Pseudomonas aeruginosa</i> (1535)</b>						
Gentamicin	73	(5%)	873	(57%)	589	(38%)
Ciprofloxacin	133	(9%)	77	(5%)	625	(41%)

Imipenem	20	(1%)	398	(26%)	1117	(73%)
Ceftazidime	62	(4%)	745	(49%)	728	(47%)
Meropenem	16	(1%)	12	(1%)	1507	(98%)
Piperacillin & tazocin	24	(2%)	493	(32%)	1018	(66%)
<b>Other and non-speciated <i>Pseudomonas</i> spp (549)</b>						
Gentamicin	4	(1%)	57	(10%)	488	(89%)
Ciprofloxacin	5	(1%)	48	(9%)	496	(90%)
Imipenem	1	(0%)	18	(3%)	530	(97%)
Ceftazidime	2	(0%)	41	(7%)	506	(92%)
Meropenem	3	(1%)	8	(1%)	538	(98%)
Piperacillin & tazocin	1	(0%)	25	(5%)	523	(95%)
<b><i>Stenotrophomonas maltophilia</i> (400)</b>						
Gentamicin	75	(19%)	117	(29%)	208	(52%)
Ciprofloxacin	112	(28%)	77	(19%)	211	(53%)
Imipenem	73	(18%)	18	(5%)	309	(77%)
Ceftazidime	25	(6%)	132	(33%)	243	(61%)
Meropenem	14	(4%)	9	(2%)	377	(94%)
Piperacillin & tazocin	26	(7%)	73	(18%)	301	(75%)

Reporting of susceptibility information was slightly poorer for *S. maltophilia*, with just over half (208) of reports including this information. Nineteen per cent (19%) of these reports indicated gentamicin resistance, 28% ciprofloxacin, and 6% ceftazidime. Imipenem resistance was reported in 18% of these bacteraemias, although *S. maltophilia* is inherently resistant to it.

Examining gentamicin, ciprofloxacin, ceftazidime, and imipenem susceptibility reporting for *P. aeruginosa* by region in more detail (figures 3-7), it is clear that individual regions report susceptibility to gentamicin and ciprofloxacin similarly, while ceftazidime susceptibility is reported slightly less frequently, and imipenem susceptibility only seems to be reported with any regularity by Wales. Thus Eastern region reported gentamicin and ciprofloxacin susceptibility information most often, in 89% and 87% of reports respectively, while Wales reported ceftazidime susceptibility information most often, in 63% of reports. For all these antimicrobials Northern and Yorkshire region had the poorest record for reporting susceptibilities. Focusing on Eastern region, as it had the highest level of completeness of gentamicin and ciprofloxacin susceptibility information, 7% and 12% of *P. aeruginosa* bacteraemias were resistant to these agents respectively. These levels are slightly higher than the national average, which could indicate that this is a closer approximation to the real level of resistance given the better reporting in this region, or that there is more resistance here. The highest proportion of reports indicating gentamicin resistance came from Wales (17%) and London (13%), where 20% and 27% of reports respectively did not contain gentamicin susceptibility information. This possibly suggests that gentamicin resistance is more common in these areas compared to the rest of England, although data are limited. For ceftazidime resistance in the *P. aeruginosa* bacteraemia reports, 7% or fewer reports indicated ceftazidime resistance, other than those from London where this figure was 12%, against 34% of the reports lacking ceftazidime susceptibility information.

**Figure 3 Gentamicin susceptibility data for *Pseudomonas aeruginosa* bacteraemia laboratory reports, England and Wales: 2000**

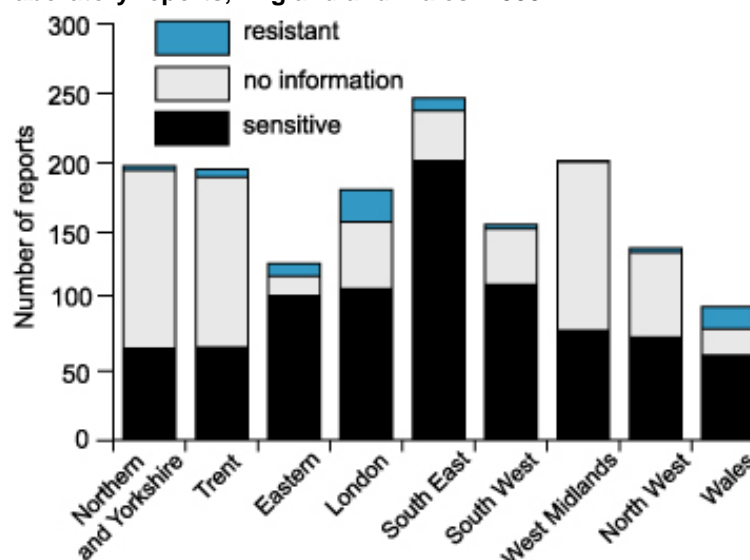


Figure 4 Ciprofloxacin susceptibility data for *Pseudomonas aeruginosa* bacteraemia laboratory reports, England and Wales: 2000

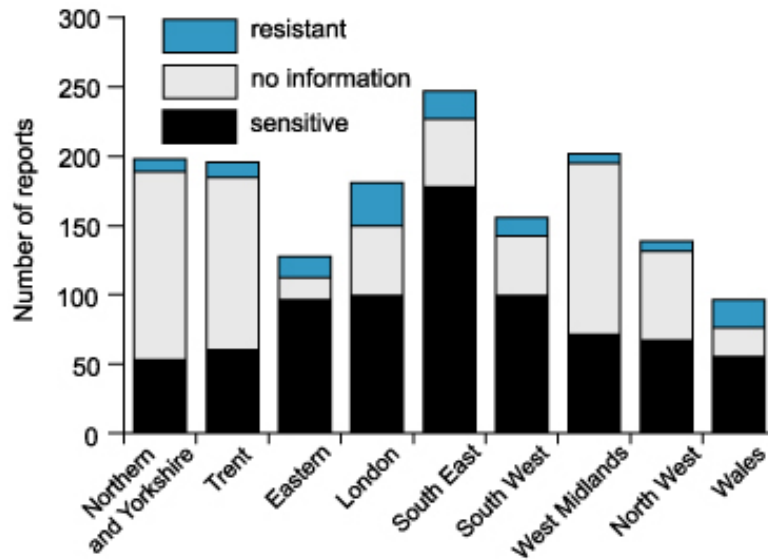


Figure 5 Ceftazidime susceptibility data for *Pseudomonas aeruginosa* bacteraemia laboratory reports, England and Wales: 2000

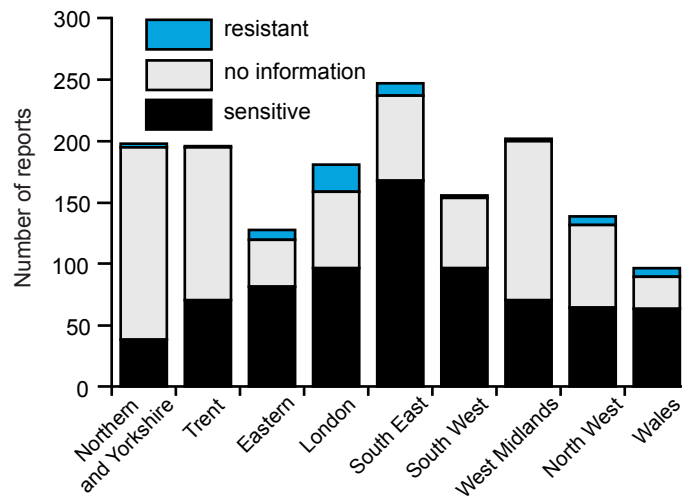
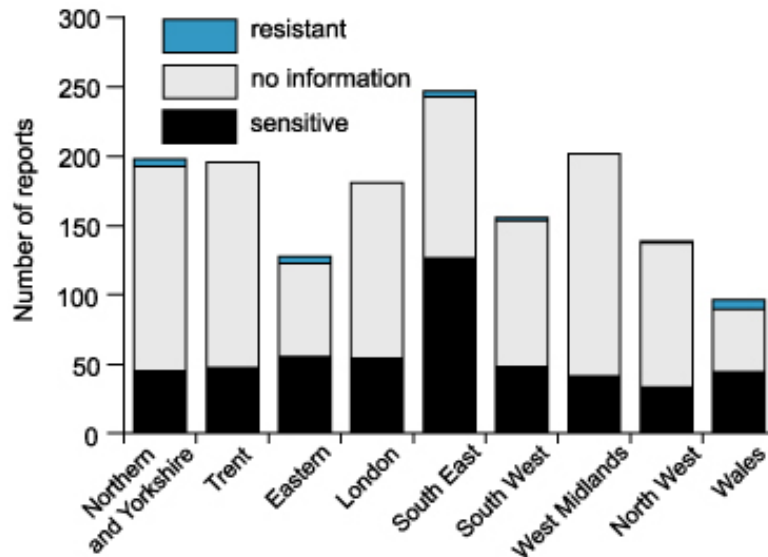
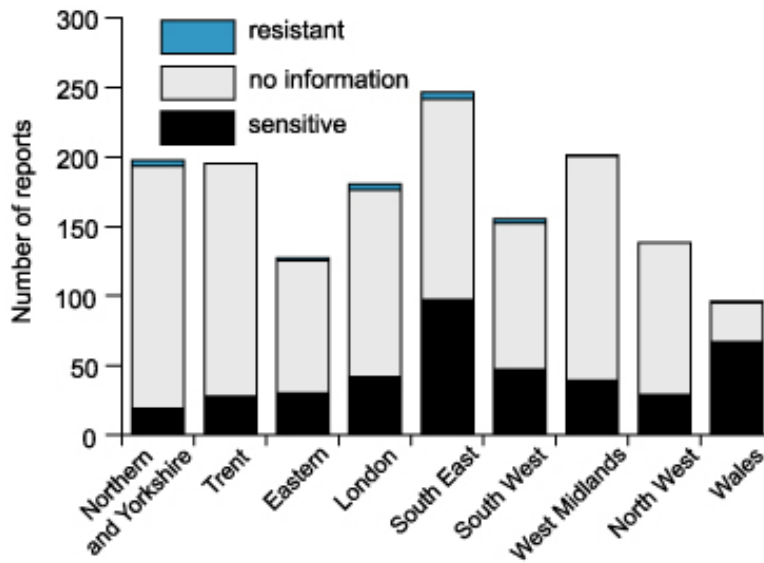


Figure 6 Piperacillin susceptibility data for *Pseudomonas aeruginosa* bacteraemia laboratory reports, England and Wales: 2000



**Figure 7** Imipenem susceptibility data for *Pseudomonas aeruginosa* bacteraemia laboratory reports, England and Wales: 2000



Turning to the reported susceptibility of *S. maltophilia*, a similar picture pertains as for the *P. aeruginosa* bacteraemia reports, with only 9% and 14% of reports from Eastern region lacking information on susceptibilities to gentamicin and ciprofloxacin respectively (figures 8 to 12). London was the region which reported ceftazidime susceptibility in *S. maltophilia* most frequently, slightly ahead of Wales and Eastern region, this being indicated in 68% of reports. Focusing again on the regions with the best susceptibility reporting, 34% of *S. maltophilia* bacteraemia isolates reported from Eastern region were gentamicin-resistant and 66% ciprofloxacin-resistant, while 23% from London were ceftazidime-resistant. Less than 4% (14) of *S. maltophilia* isolates had information on co-trimoxazole susceptibility.

**Figure 8** Gentamicin susceptibility data for *Stenotrophomonas maltophilia* bacteraemia laboratory reports, England and Wales: 2000

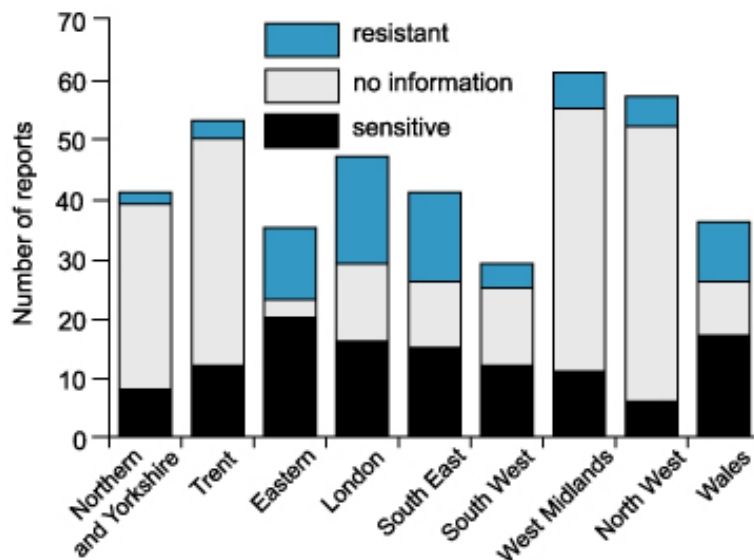


Figure 9 Ciprofloxacin susceptibility data for *Stenotrophomonas maltophilia* bacteraemia laboratory reports, England and Wales: 2000

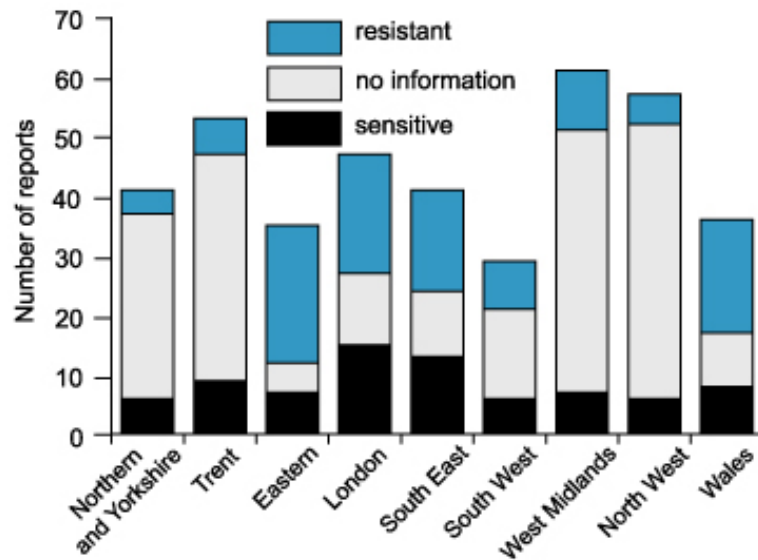


Figure 10 Ceftazidime susceptibility data for *Stenotrophomonas maltophilia* bacteraemia laboratory reports, England and Wales: 2000

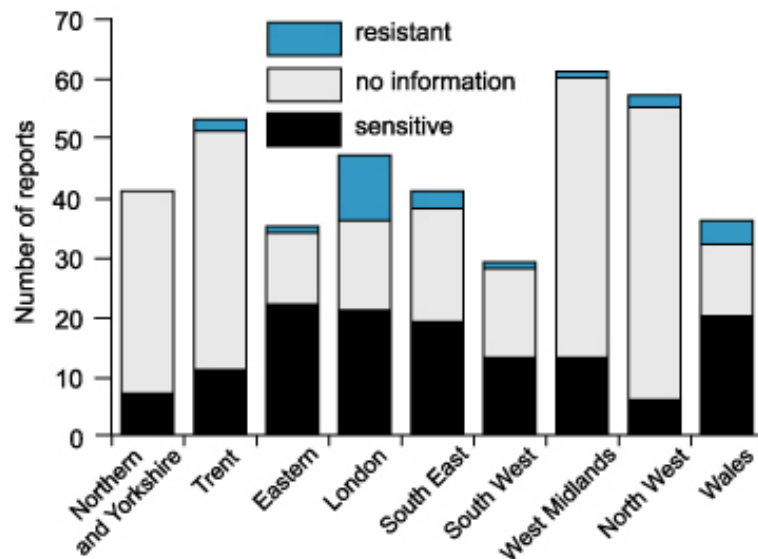
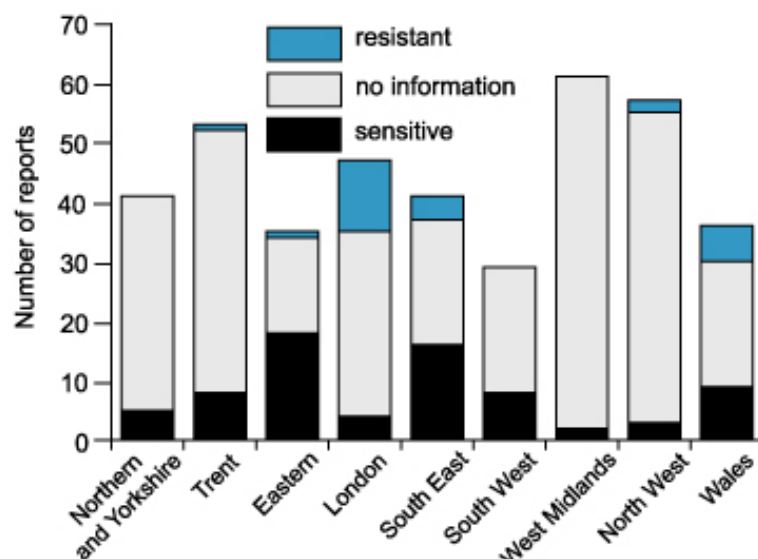
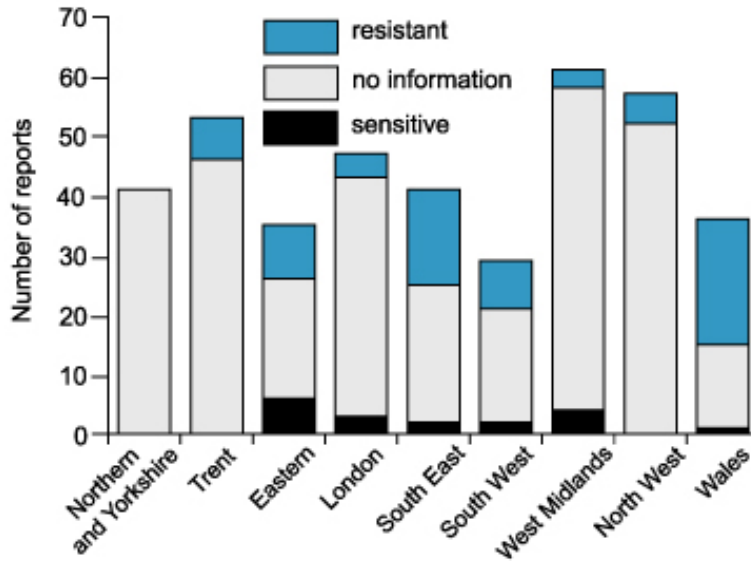


Figure 11 Piperacillin susceptibility data for *Stenotrophomonas maltophilia* bacteraemia laboratory reports, England and Wales: 2000



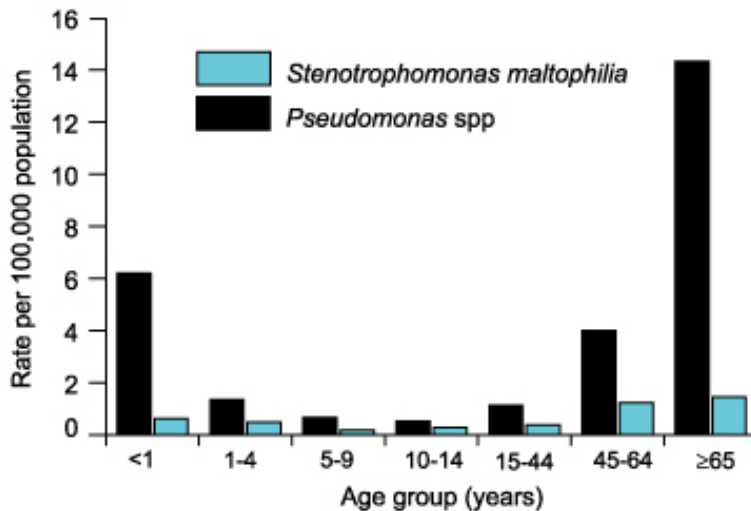
**Figure 12 Imipenem susceptibility data for *Stenotrophomonas maltophilia* bacteraemia laboratory reports, England and Wales: 2000**



### Age distribution

Reported *Pseudomonas* spp and *S. maltophilia* bacteraemias differ in their age distribution beyond the obvious rate differences due to *Pseudomonas* spp bacteraemias being much more common (figure 13). The highest rate of *Pseudomonas* spp bacteraemias is seen in the over 65 year olds, followed by a peak in the under-ones and then in the 45 to 64 year age group. This is against a general picture of rates falling from the under-ones peak to a low in the 10 to 14 age group, rising again to the main peak in the over-65 year olds. Although the highest rate for *S. maltophilia* bacteraemias is also in the over-65s, however, bacteraemias are more evenly spread from 45 years on, rates in the 45 to 64 and over 65 age groups being very similar. And at the other end of the age range, *S. maltophilia* bacteraemias also appear to be more evenly spread across the under-ones and 1 to 4 years age groups.

**Figure 13 Age-specific *Pseudomonas* spp & *Stenotrophomonas maltophilia* bacteraemia reporting rates per 100,000 population, England and Wales: 2000**



## Discussion

The completeness of reporting of antimicrobial susceptibilities is very variable across the regions and this hampers interpretation of susceptibility information.

The antimicrobials tested against *P. aeruginosa* were mostly appropriate, moreover, resistance rates in *P. aeruginosa* of less than 10% for gentamicin, ciprofloxacin, and ceftazidime, as found in these voluntary laboratory reports, agree with those found in a sentinel survey with standardized sensitivity testing (4). Caution is, however, needed since much routine sensitivity testing in the UK is still non-standardized and by Stokes' method (5). Analysis shows that this method is poor at detecting the low-level stepwise resistance that commonly accumulates in pseudomonads.

Reporting of *S. maltophilia* susceptibility was less appropriate than that for *P. aeruginosa*. *S. maltophilia* is inherently resistant to imipenem having a carbapenemase that destroys the drug. This makes the 18 (5%) reports of imipenem-sensitive *S. maltophilia* bacteraemia seem unlikely. Also, sensitivity to ceftazidime varies with the medium; UK laboratories generally use DST or IsoSensitest agar on which *S. maltophilia* often appears sensitive to this and other cephalosporins, while on Mueller Hinton agar it often appears resistant. The reasons are unclear, as is the answer to which is the best medium (6). Gentamicin sensitivity varies with the test temperature (7), and results should also be treated with caution. The standard treatment for serious *S. maltophilia* infection is co-trimoxazole (not trimethoprim alone), a drug that is rarely reported. Ciprofloxacin has borderline activity; possible treatment alternatives for the few co-trimoxazole resistant strains are ticarcillin/clavulanate, or possibly aztreonam and co-amoxiclav, but these should not be considered except where co-trimoxazole is contraindicated.

It is hoped that the new version of CoSurv will improve reporting from laboratories using this method of reporting once mapping of laboratory codes to CoSurv has taken place. In the meantime, we would ask that bacteraemia reports on pseudomonads and allied genera (except *S. maltophilia*) include information on their susceptibility to gentamicin, ciprofloxacin, ceftazidime, imipenem (or meropenem), and, if available piperacillin/tazobactam. For *S. maltophilia* the most critical antimicrobial to report is cotrimoxazole.

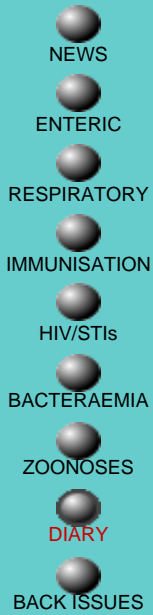
## Acknowledgements

These reports would not be possible without the enduring weekly contributions from microbiology colleagues in laboratories across England and Wales, without whom there would be no surveillance data, and the continuing efforts of regional epidemiologists in encouraging laboratory reporting. Laboratory reporting is the bedrock of national surveillance. In addition, the support from colleagues within the PHLS, and the Central Public Health Laboratory in particular, is valued in the preparation of the reports.

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## PanCeltic 2001 Conference

A three day microbiology meeting hosted by the Irish Society of Clinical Microbiologists will be held at the Europa Hotel, Belfast from Friday 16 November to Sunday 18 November 2001. Fridays' sessions will focus on surveillance programmes, including hospital acquired, and surgical site infections. The following day's programme will cover antibiotic stewardship programmes in the community and hospitals such as factors influencing prescribing in general practice and antibiotic stewardship programmes in veterinary medicine. The meeting will conclude with a discussion of microbiology in the 21st century, and free paper sessions on Sunday. The deadline for abstract submission is Friday 5 October. Day delegates are welcome. For further information please contact Mary Graham, PanCeltic 2001 Conference Secretariat, Directorate of Corporate Affairs, The Royal Hospitals, Belfast, BT12 6BA (tel: 028 9089 4702 or 9089 4685; fax: 028 9024 5281; email: [mary.graham@royalhospitals.n-i.nhs.uk](mailto:mary.graham@royalhospitals.n-i.nhs.uk)).