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Hepatitis C strategy for England

The Department of Health has released the *Hepatitis C Strategy for England* for consultation (1). This strategy is part of the wider overall plan for combating infectious diseases as outlined by the Chief Medical Officer in *Getting Ahead of the Curve* (2) and will form the basis of a hepatitis C action plan to be drawn up by the end of the year. Hepatitis C is now known to be a global public health problem and the World Health Organization estimates that there are 170 million carriers of the virus worldwide (3). The chronic complications of hepatitis C infection include cirrhosis and primary liver cancer, although progression to these outcomes occurs over many years. In England, there are an estimated 200,000 people who are chronically infected with hepatitis C – a large proportion of these are unaware of their infection.

The main aims of the strategy are to prevent new cases of hepatitis C infection occurring, to increase testing so as to identify those individuals with chronic infection, to ensure that those who are infected can receive specialist advice and to deliver the appropriate treatment through co-ordinated pathways of patient care.

The acquisition routes for hepatitis C infection have been well documented and in England injecting drug use is the principal risk factor for infection (4). Therefore, the strategy proposes the strengthening of health promotion messages on harm minimisation and on preventing initiation into injecting. Other actions include strengthening the provision of services such as needle exchange schemes and those for the treatment of drug dependency in line with the Government's overall drug strategy.

The hepatitis C strategy proposes that such interventions be monitored nationally using outcome indicators that track a reduction in the prevalence of hepatitis C in recent injectors. The strategy also highlights the importance of targeting harm minimisation messages and providing information about hepatitis C infection to prisoners, especially to young people entering the prison system. It is also suggested that schools could provide information about hepatitis C and the risk factors associated with acquiring infection.

The strategy encourages the offering of hepatitis C testing in a range of clinical settings, including to those attending drug treatment centres, as part of a national standard of good practice. National outcome indicators will be used to track increased hepatitis C testing. The importance of raising awareness of hepatitis C infection in the general population and increasing the awareness and knowledge amongst

primary care health professionals is also stressed. The strategy encourages and promotes the use of good practice guidelines for those working in the skin piercing and tattooing business in addition to the use of infection control guidelines in the clinical setting. Screening of all blood donors for hepatitis C infection was introduced in England in 1991 and viral inactivation of blood products in 1984 – viral inactivation was introduced in 1984 and full coverage was not until 1985. The risk of acquiring hepatitis C infection in England through either of these two routes is now very low, although prior to these dates some recipients of blood and blood products were infected.

The development of managed clinical networks and co-ordinated pathways of patient care to make specialist treatment centres around the country accessible to all is proposed. Currently, the National Institute for Clinical Excellence (NICE) guidelines recommend interferon alpha and ribavirin for the treatment of patients with moderate or severe liver damage as a result of their hepatitis C infection (5).

Copies of the document *Hepatitis C strategy for England* are available to download from the Department of Health website at <http://www.doh.gov.uk/cmo/hcvstrategy>. Printed copies can be obtained from: Department of Health, PO Box 777, London, SE1 6XH; tel: 08701 555 455; fax: 01623 724524; email: doh@prolog.co.uk. Comments are invited by 15 November 2002.

1. *Hepatitis C strategy for England*. London: Department of Health, 2002. Available at <<http://www.doh.gov.uk/cmo/hcvstrategy>>
2. Chief Medical Officer. *Getting Ahead of the Curve: the Chief Medical Officer's strategy for infectious disease and other aspects of health protection*. London: Department of Health, 2002. Available at <www.doh.gov.uk/cmo/idstrategy/idstrategy2002.pdf>
3.) WHO. Hepatitis C. *Wkly Epidemiological Rec* 1997; 72: 65-72.
4. Ramsay ME, Balogun MA, Collins M, Balraj V. Laboratory surveillance of hepatitis C virus infection in England and Wales: 1992 to 1996. *Comm Dis Public Health* 1998; 1 (2): 89-94.
5. National Institute for Clinical Excellence. *Guidance on the use of ribavirin and interferon alpha for hepatitis C. Technology Appraisal Guidance –No 14*. London: National Institute for Clinical Excellence, October 2000. Available online at <http://www.nice.org.uk/cat.asp?c=11657>.

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Genital chlamydial infection: the most commonly diagnosed sexually transmitted infection

New data on diagnoses made in genitourinary medicine (GUM) clinics (KC60 returns) in England, Wales, and Northern Ireland show that the recent increases (1) in diagnoses of sexually transmitted infections (STI) continued in 2001. This reflects a continued deterioration in sexual health particularly among men who have sex with men (MSM) and young heterosexuals, and an increasing burden on GUM clinic services.

In 2001, genital chlamydial infection became the most common STI seen in GUM clinics with 71,055 diagnoses. This is the first time in 30 years that a bacterial STI has been the most commonly diagnosed STI and may reflect increased prevalence as well as increased awareness and case-finding.

Diagnoses of primary and secondary syphilis rose by 144% (252 to 614) in males and 36% (75 to 102) in females. The rise was particularly high (187%) in MSM. The high number of cases in males reflects the outbreaks seen in the London and North West regions (2,3).

Cases of uncomplicated gonorrhoea rose by 8% in males (14,721 to 15,900) and 6% in females (6404 to 6785) between 2000 and 2001. Among MSM, diagnoses rose by 20% (2935 to 3532). Diagnoses of genital herpes simplex infection rose by 5% (6471 to 6791) in males and 6% (10,460 to 11,062) in females, and diagnoses of genital warts by 2% (34,843 to 35,497) in males and 3% (31,268 to 32,196) in females. Although these increases are not as high as for those seen for the bacterial STIs, diagnoses of viral STIs represent a considerable disease burden.

As in previous years, the burden of STIs falls among young heterosexuals and MSM. In 2001, 42% of females with gonorrhoea and 36% of females with genital chlamydial infection were under 20 years of

age. In view of the severe long-term complications associated with untreated STIs and their potential role in facilitating HIV transmission, these data emphasise the need to improve STI prevention and control strategies.

Provisional data are available at <http://www.phls.co.uk/topics_az/hiv_and_sti/epidemiology/sti_data.htm#CurrentDataTables>. A complete review of the 2001 dataset will be published by the PHLS to coincide with World AIDS Day on 1 December.

1. PHLS, DHSS&PS and the Scottish ISD D 5 Collaborative Group. *Sexually transmitted infections in the UK: new episodes seen at genitourinary medicine clinics, 1995 to 2000*. London: Public Health Laboratory Service, 2001.
2. Dodds JP, Nardonne A, Mercey D, Johnson AM. Increase in high risk sexual behaviour among homosexual men, London 1996-8: cross sectional questionnaire study. *BMJ* 2000; **320**:1510-1.
3. Doherty L, Fenton KA, Jones J, Paine TC, Higgins SP, Williams D, et al. Syphilis: old problem, new strategy. *BMJ* 2002; **325**:153-6.

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Contamination of organic spinach with *Salmonella enterica* serovar Enteritidis Phage Type 1

On Friday 9 August 2002 the Food Standards Agency was alerted to a presumptive *Salmonella* isolated from United Kingdom (UK) grown organic spinach, found during routine quality control. The spinach was either packaged on its own, or used as an ingredient in bagged, ready-to-eat salad leaves, and was distributed nation-wide. None of the product was exported outside the UK. Microbiological testing of the spinach for the presence of pathogens was negative when it harvested, and again on arrival at the processing plant, but positive after packaging. The isolate was forwarded to the PHLS Laboratory of Enteric Pathogens (LEP) and has been confirmed as *Salmonella enterica* serovar Enteritidis Phage Type (PT) 1. The organism is resistant to nalidixic acid (Nx) and shows reduced susceptibility to ciprofloxacin (Cp). The affected product lines, which had use-by dates of 8, 9, or 10 August, were withdrawn voluntarily on Friday 9 August and point-of-sale notices were posted in relevant outlets.

Salmonella Enteritidis PT 1 is currently the second most common phage type of *S. Enteritidis* in England and Wales after PT4. There have been 665 isolates so far during 2002, of which 426 are resistant to Nx and show reduced susceptibility to Cp. Twenty-nine per cent of these were linked with foreign travel, particularly to Spain, Portugal, the Canary Islands, and the Balearics.

During the summer of 2000, two large outbreaks of *S. Typhimurium* were linked to consumption of lettuce (1). As a result of these outbreaks the Local Authorities Co-ordinators of Regulatory Services (LACORS) and the PHLS Co-ordinated Food Liaison Group programme undertook a study of bagged, ready-to-eat salad vegetables in 2001, co-ordinated by the PHLS Environmental Surveillance Unit (2,3). Out of 3851 samples tested, *Salmonella* spp were detected in five samples (*S. Newport* PT33 (1); *S. Umbilo* (3); *S. Durban* (1)) of retail bagged, ready-to-eat salad leaves. Nineteen cases of *S. Newport* PT33 infection were subsequently identified throughout England and Wales. The outbreak strain of *S. Newport* PT33 isolated from the salad and human cases had a unique plasmid profile. With one exception all isolates of *S. Newport* PT33 were sensitive to the antibiotics used to determine the resistance profiles of *Salmonella*; a single strain exhibited resistance to ampicillin only. Comprehensive investigations revealed no further contaminated product.

Consultants in communicable disease control or environmental health officers who are investigating cases of *S. Enteritidis* PT 1 without a history of recent foreign travel might wish to ask about consumption of bagged, ready-to-eat salad leaves (name of product, brand, use-by date and place where purchased). Sarah O'Brien (020 8200 6868 ext 4422) or Mark Reacher (020 8200 6868 ext 3431) at the PHLS Communicable Disease Surveillance Centre would be interested to hear about any cases of infection with *S. Enteritidis* PT1 that might be linked to the consumption of organic spinach.

1. Long SM, Adak GK, O'Brien SJ, Gillespie IA. General outbreaks of infectious intestinal disease linked with salad vegetables and fruit, England and Wales, 1992-2000. *Commun Dis Public Health* 2002; **5** (2): 101-5.
2. PHLS. *Salmonella* newport infection associated with the consumption of ready-to-eat salad. *Comm Dis Rep CDR Wkly* [serial online] **11** (26): news. Available at <<http://www.phls.org.uk/publications/cdr/PDFfiles/2001/cdr2601.pdf>>.
3. Little CL, Sagoo SK, Mitchell RT. Microbiological examination of prepared ready-to-eat salad vegetables from retail and catering premises in the United Kingdom. *International Association of Food Protection, 89th Annual Meeting, 30th June-3rd July 2002, San Diego, CA, USA*.

Outbreak of legionnaires' disease in Barrow-in-Furness – update

As of 17:00 on 13 August 2002, the outbreak control team was aware of 116 confirmed cases of legionnaires' disease that fitted the standard case definition for the outbreak of legionnaires' disease in Barrow-in-Furness (1). There have been three deaths among confirmed cases, giving a case-fatality rate of 2.7%, which is considerably lower than observed in previous outbreaks in the United Kingdom.

A national cascade to general practitioners has been carried out and details about the outbreak were posted on Cumbria and Lancashire Health Protection Unit's website at <www.healthprotection.org.uk>. This has revealed ten cases from other parts of the country with a connection to Barrow-in-Furness.

In terms of risk factors, the only common exposure linking cases remains having visited the centre of Barrow during July. In two cases there remains some doubt about the exact exposure but investigations are continuing. Figure 1 shows the epidemic curve for the outbreak (by onset date and date of admission, smoothed using three-day rolling average); figure 2 shows onset date (raw data). Figure 3 shows the age distribution of cases in standard ten-year age bands.

Figure 1 Epidemic curve by date of onset and date of admission (three day rolling average)

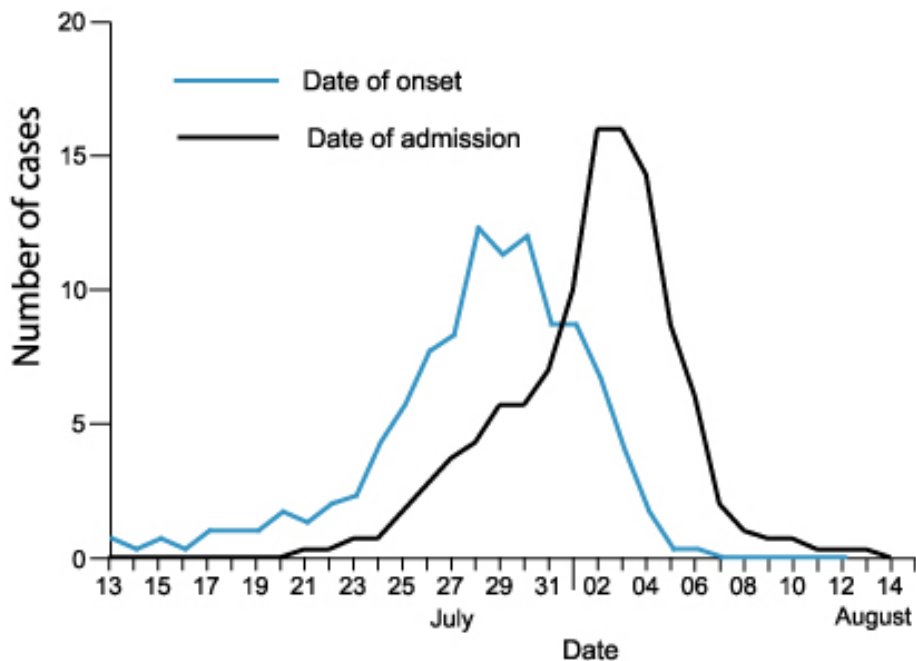


Figure 2 Confirmed cases of legionnaires' disease by date of onset of symptoms

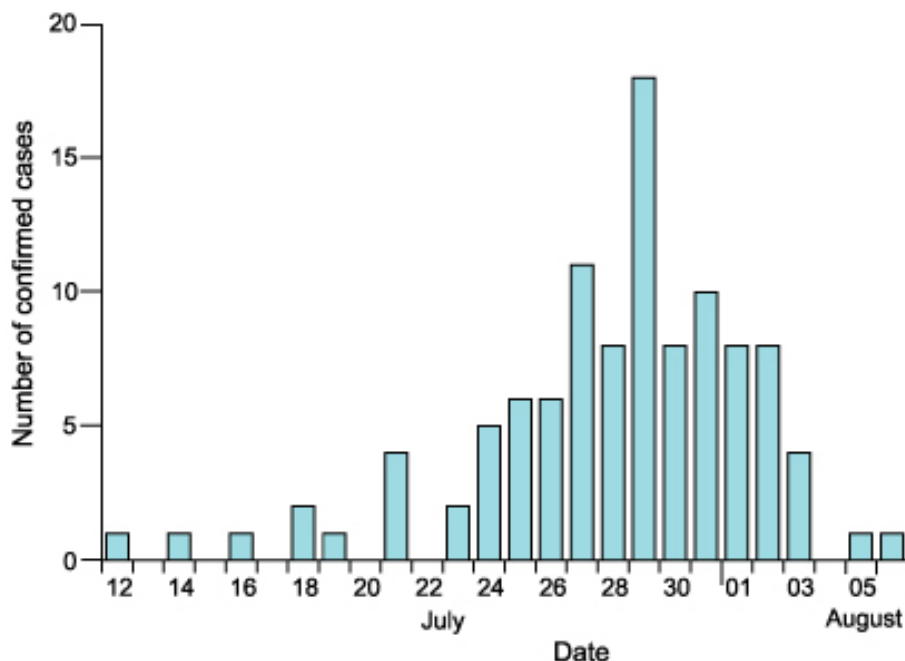
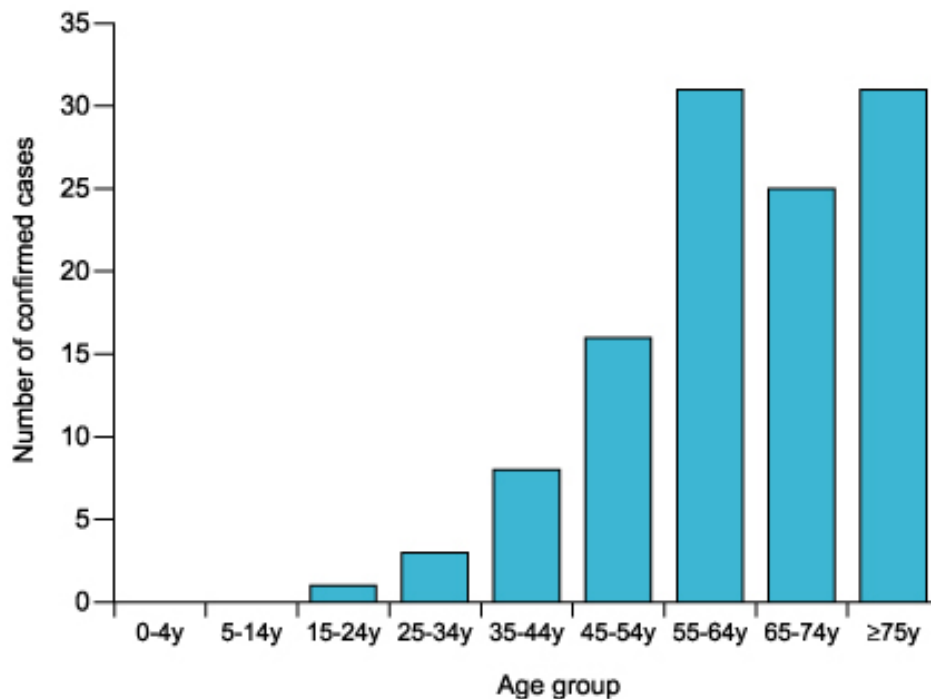


Figure 3 Confirmed cases of legionnaires' disease by age group



There has been considerable success in recovering microbiological evidence (both positive and negative) in support of the hypothesis that the outbreak source was the air-conditioning plant at the council-owned leisure centre. The suspected plant was heavily colonised with *Legionella pneumophila* serogroup 1, MAB 2 (Benidorm). Samples taken from other plants in the area failed to show legionella spp. There has also been a remarkable rate of recovery of viable specimens from patients. In the first three specimens to grow legionella, the bacteria are indistinguishable from those demonstrated in the air conditioning plant.

Given the other evidence that points to the source of the outbreak, it has been decided to concentrate on descriptive epidemiology rather than carrying out an analytical study at this stage. Detailed questions are therefore being asked about exact movements of cases within the town centre. Although microbiological, epidemiological, and environmental investigations continue, there is very strong evidence to suggest that the source of the outbreak was the air conditioning plant at the council-owned leisure centre.

1. PHLS. Outbreak of legionnaires' disease in Barrow-in-Furness. *Commun Dis Rep CDR Wkly* [serial online] 2002 [cited 14 August 2002]; 12 (32): news. Available at <<http://www.phls.org.uk/publications/cdr/archive02/News/news3202.html>>

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Sir William Stewart appointed as shadow chair of the Health Protection Agency

The PHLS has welcomed the appointment of Sir William Stewart FRS as shadow Chair of the proposed Health Protection Agency (HPA). As shadow chair Sir William will have a key role to play working with the Department of Health over the coming months on important preparations to establish the new agency.

Sir William is currently the Chair of the Microbiological Research Authority (responsible for the Centre for Applied Microbiology and Research) that will be one of the bodies forming the HPA, and already has close links with the PHLS. Sir William was also Chief Scientific Advisor to the UK government from 1990 to 1995, and is President of the Royal Society of Edinburgh.

Sir William said of his appointment: "I am delighted to be asked to take on this very important and challenging new responsibility. The HPA is about protecting the public health of our people and in the rapidly changing world of the 21st century, international as well as domestic issues are having an increasing impact on public health. It is, therefore, important that we have an organisation which can rapidly tackle biological, chemical, nuclear and radiation issues in a joined up and coherent way. I believe that the HPA can do that.

"The existing organisations have strengths, good staff and international reputations. I want to build further on these and look forward to meeting the chairs and staff of all the organisations to discuss how this might be best achieved."



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Bacteraemia

Last updated: 15 August 2002
Next update due: 19 September 2002

Pseudomonas spp and *Stenotrophomonas maltophilia* bacteraemia, England and Wales: 2001

Key points

- 2340 reports of *Pseudomonas* spp bacteraemias were received in 2001, a 12% increase on 2000. Seventy-seven per cent of these reports were for *Pseudomonas aeruginosa*.
- The comprehensiveness of susceptibility reporting provided for *Pseudomonas* spp varied according to the species, region and antimicrobial.
- There was a 29% increase in the number of reports of *Stenotrophomonas maltophilia* bacteraemias between 2000 and 2001.
- Although the main antimicrobial for the treatment of *S. maltophilia* infections is co-trimoxazole, susceptibility to this antimicrobial is still rarely reported.

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This report carries details of bacteraemias due to *Pseudomonas* spp, *Stenotrophomonas maltophilia*, and related species diagnosed from specimens collected during 2001. These bacteria were isolated from blood culture, with or without cerebrospinal fluid (CSF), by laboratories across England and Wales. Rates were calculated using 2000 resident population denominators for each region or age group. As in last month's bacteraemia report¹, the regional analyses were carried out according to the new English regional boundaries (as of 1 April 2002).

Pseudomonas spp

There were 2340 reports of *Pseudomonas* spp bacteraemia in 2001 (table 1). Over three-quarters of the *Pseudomonas* spp (1801 reports; 77%) were reported as *Pseudomonas aeruginosa*. A further 17% of reports did not provide identification to species level, a slight improvement compared with 2000, when 20% of isolates were not identified further than the genus. There were 151 reports of bacteraemia due to genera closely related to *Pseudomonas*, over half of which (84; 56%) concerned *Comamonas* species. Due to the small numbers involved these will not be examined further.

Regional distribution

Of the regions that did not change their regional boundaries in April 2002, Eastern region provided the largest increase (42%) in the number of reports of *Pseudomonas* spp compared with 2000 (table 2). London and the South West also reported increased numbers of *Pseudomonas* spp bacteraemias compared with 2000, whereas the West Midlands and Wales had 4% and 12% fewer reports respectively. The reporting rate for *Pseudomonas* spp bacteraemias in England and Wales in 2001 was 4.42 per 100,000 population (figure 1). The region-specific rates ranged from 6.01/100,000 in the North East to 2.84/100,000 in the North West.

Table 1 Laboratory reports of of *Pseudomonas*, *Stenotrophomonas* and related species, England and Wales: 2001

	Number of reports
<i>Pseudomonas aeruginosa</i>	1801
<i>P. alcaligenes</i>	1
<i>P. fluorescens</i>	62
<i>P. putida</i>	32
<i>P. stutzeri</i>	43
<i>Pseudomonas</i> not fully identified	394
<i>P. pickettii</i>	7
Total	2340
<i>Stenotrophomonas maltophilia</i>	514
<i>Stenotrophomonas</i> not fully identified	1
Total	515
genera closely related to pseudomonads	151
<i>Burkholderia cepacia</i>	15
<i>B. pseudomallei</i>	0
<i>Brevibacterium</i> not fully identified	7
<i>Brevundimonas diminuta</i>	4
<i>B. vesicularis</i>	11
<i>Brevundimonas</i> not fully identified	1
<i>Comamonas acidovorans</i>	24
<i>C. testosteroni</i>	3
<i>C.</i> not fully identified	57
<i>Shewanella putrefaciens</i>	3
<i>Sphingomonas paucimobilis</i>	25
<i>Sphingomonas</i> not fully identified	1

Table 2 Laboratory reports of *Pseudomonas* spp and *S. maltophilia* bacteraemia by geographic area, England and Wales: 2001

	<i>Pseudomonas</i> spp		<i>S. maltophilia</i>	
	no	(%)	no	(%)
North East	155	(7)	24	(5)
Yorkshire & Humberside	272	(12)	41	(8)
East Midlands	203	(9)	26	(5)
Eastern	289	(12)	49	(10)
London	270	(12)	47	(9)
South East	332	(14)	61	(12)
South West	217	(9)	53	(10)
West Midlands	292	(12)	112	(22)
North West	196	(8)	56	(11)
Wales	114	(5)	45	(9)
England and Wales	2340	(100)	514	(100)

Figure 1 Region-specific rates* of *Pseudomonas* spp bacteraemia with 95% confidence intervals, England and Wales: 2001

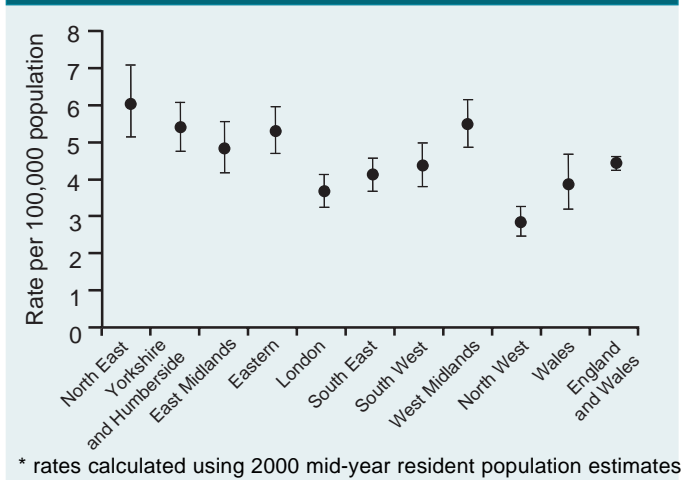


Table 3 *Pseudomonas* spp and *S. maltophilia* bacteraemia laboratory reports, England and Wales: 2001

	resistant	%*	sensitive	no information	% of total
<i>Pseudomonas aeruginosa</i> (n=1801)					
Gentamicin	55	(5)	1113	633	(35)
Ciprofloxacin	109	(10)	1011	681	(38)
Imipenem	30	(6)	496	1275	(71)
Ceftazidime	52	(5)	927	822	(46)
Meropenem	6	(6)	98	1697	(94)
Piperacillin/tazobactam	31	(5)	626	1144	(64)
Not fully identified and other <i>Pseudomonas</i> spp (n=539)					
Gentamicin	8	(5)	150	381	(71)
Ciprofloxacin	13	(9)	128	398	(74)
Imipenem	2	(6)	34	503	(93)
Ceftazidime	12	(10)	111	416	(77)
Meropenem	3	(8)	37	499	(93)
Piperacillin/tazobactam	9	(9)	94	436	(81)
<i>Stenotrophomonas maltophilia</i> (n=514)					
Gentamicin	183	(53)	165	166	(32)
Ciprofloxacin	195	(62)	122	197	(38)
Imipenem	140	(93)	11	363	(71)
Ceftazidime	33	(12)	242	239	(46)
Meropenem	29	(71)	12	473	(92)
Piperacillin/tazobactam	40	(20)	161	313	(61)

* as a percentage of reports with susceptibility information

Antimicrobial susceptibility

Sixty-seven per cent (1214/1801) of *Pseudomonas aeruginosa* isolates had susceptibility data reported for at least one antimicrobial agent. By comparison, only 32% of the other and incompletely identified *Pseudomonas* spp were accompanied by susceptibility results.

Gentamicin was the antimicrobial for which information on susceptibility was most often given for both *P. aeruginosa* (65%; 1168/1801) and for the incompletely identified and other *Pseudomonas* spp, followed by ciprofloxacin, ceftazidime, and piperacillin/tazobactam (table 3). Information on imipenem and meropenem susceptibility was reported least often. For all antimicrobials other than meropenem, susceptibility was more often reported for *P. aeruginosa* than the other *Pseudomonas* species.

Resistance to the various antibiotics was similarly reported in *P. aeruginosa* and the incompletely identified and other *Pseudomonas* spp. For both groups 5% of isolates were reported as resistant to gentamicin, and 6% as resistant to imipenem. Ten per cent of *P. aeruginosa* isolates were resistant to ciprofloxacin, compared with 9% of the incompletely identified and other *Pseudomonas* spp. Six per cent of the *P. aeruginosa* isolates were reported as resistant to meropenem, and 5% to piperacillin/tazobactam, compared with 8% and 9% respectively of the other *Pseudomonas* spp. The greatest difference in resistance was for ceftazidime, with 5% of *P. aeruginosa* isolates resistant to ceftazidime, compared with 10% among the other *Pseudomonas* spp. The reliability of these results is, however, undermined by the scarcity of susceptibility information among the other *Pseudomonas* spp, and the small numbers involved.

Regional breakdowns of antimicrobial susceptibility reporting are shown in figures 2-5. The proportion of isolates without information on antimicrobial susceptibility varied by region, although regions tended to be fairly consistent across different antimicrobials. For example, Wales, Eastern, and South East regions had a smaller percentage of isolates with no susceptibility information than the overall level across England and Wales for all antimicrobials (gentamicin, ciprofloxacin,

imipenem, ceftazidime and piperacillin/tazobactam). The East Midlands had the highest proportion of isolates with no susceptibility information for every antimicrobial, followed by the North East.

Antimicrobial resistance also varied between the regions, with resistance in the East Midlands, South West, and North West regions being generally lower than the England and Wales average for all antimicrobials. No region had consistently higher than average rates of resistance. Resistance to gentamicin was reported in 14% of isolates in Wales, compared with only 1% in the South West. These regional differences may be due to use of British Society of Antimicrobial Chemotherapy (BSAC) breakpoints. Those regions where a majority of laboratories use the BSAC guidelines are likely to report higher rates of resistance, as the guidelines are quite narrow and may incorrectly report some sensitive isolates as intermediate.

Resistance to ciprofloxacin was also highest in Wales (18% of isolates for which susceptibility was recorded) and lowest in the South West (6%). No resistance was reported to imipenem in the North East or East Midlands, although very few isolates (7/104 and 9/166 respectively) included susceptibility information for imipenem in these regions. The South East recorded the highest level of resistance to

Figure 2 Gentamicin susceptibility data for *P. aeruginosa* bacteraemia laboratory reports, England and Wales: 2001

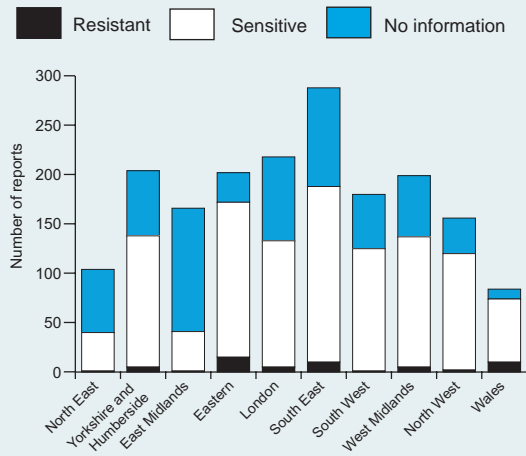


Figure 3 Ciprofloxacin susceptibility data for *P. aeruginosa* bacteraemia laboratory reports, England and Wales: 2001

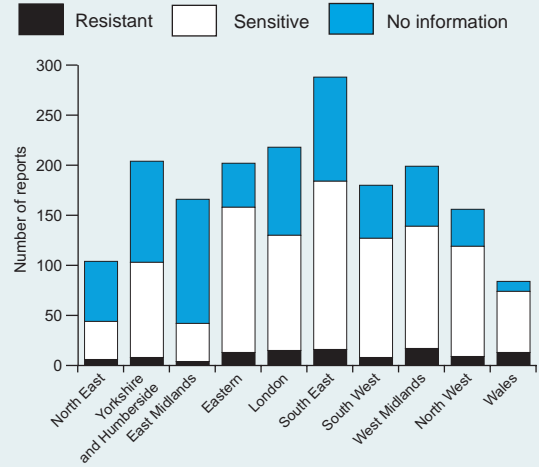


Figure 4 Ceftazidime susceptibility data for *P. aeruginosa* bacteraemia laboratory reports, England and Wales: 2001

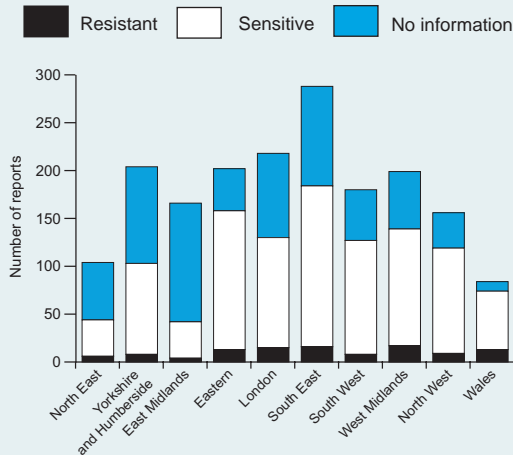


Figure 5 Imipenem susceptibility data for *P. aeruginosa* bacteraemia laboratory reports, England and Wales: 2001

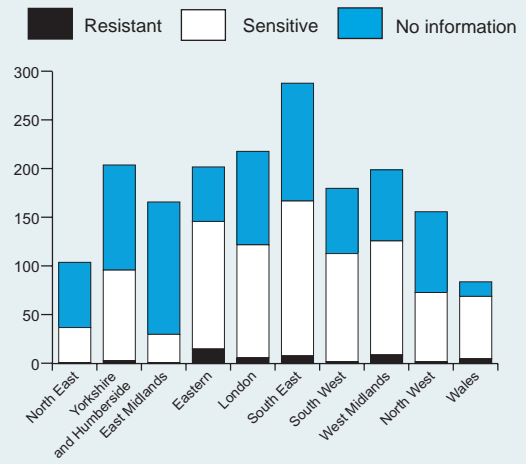


Figure 6 Piperacillin/tazobactam susceptibility data for *P. aeruginosa* bacteraemia laboratory reports, England and Wales: 2001

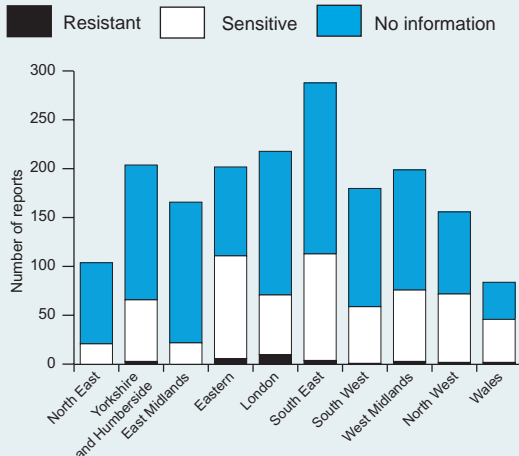


Figure 7 Age-specific rates of *Pseudomonas* spp bacteraemia per 100,000 population: England and Wales, 2001

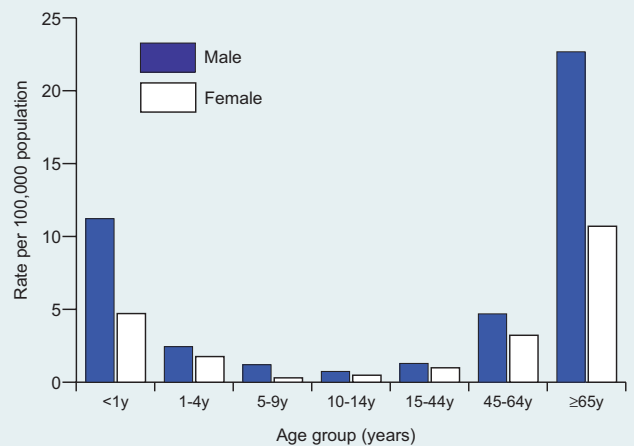


Table 4 Multiple antibiotic resistance patterns for *Pseudomonas aeruginosa* bacteraemia laboratory reports, England and Wales: 2001

		Gentamicin			Ciprofloxacin			Imipenem			Ceftazidime			Piperacillin/tazobactam			multiple resistance*	
		resistant (%)#	sensitive	no info	resistant (%)#	sensitive	no info	resistant (%)#	sensitive	no info	resistant (%)#	sensitive	no info	resistant (%)#	sensitive	no info	(%)#	resistant
Gentamicin	resistant (n=55) sensitive (n= 1082)				25 (47)	28	2	4 (19)	17	34	8 (17)	38	9	7 (28)	18	30	(0)	0/10
Ciprofloxacin	resistant (n= 109) sensitive (n= 980)	25 (23)	83	1				9 (16)	46	54	10 (11)	82	17	7 (14)	44	58	(0)	0/24
Imipenem	resistant (n= 30) sensitive (n= 493)	4 (14)	25	1	9 (30)	21	0				6 (23)	20	4	6 (35)	11	13	(0)	0/13
Ceftazidime	resistant (n= 49) sensitive (n= 905)	8 (18)	36	5	10 (21)	37	2	6 (30)	14	29				12 (48)	13	24	(0)	0/8
Piperacillin/tazobactam	resistant (n=29) sensitive (n= 596)	7 (26)	20	2	7 (25)	21	1	6 (67)	3	20	12 (57)	9	8				(0)	0/5
		18 (3)	567	11	44 (8)	519	33	11 (4)	277	308	13 (3)	483	100					

* resistant to gentamicin, ciprofloxacin, impenam, ceftazidime, and piperacillin/tazobactam
as a percentage of reports with susceptibility information

imipenem at 10%. Resistance to ceftazidime ranged from 2% in the South West to 10% in Eastern region.

No *P. aeruginosa* isolates had information on susceptibility to meropenem in either Wales or the South West. No resistance was reported to meropenem in Yorkshire and Humberside, East Midlands, West Midlands, or the North West, although very few isolates had susceptibility information in these regions. One resistant isolate was reported in each of the North East and London, and two resistant isolates in each of Eastern and South East regions. No isolates were reported as resistant to piperacillin/tazobactam in the North East or East Midlands, although 14% were resistant in London. All other regions reported 2-5% of isolates as resistant to this antimicrobial. No isolates were reported as resistant to all of gentamicin, ciprofloxacin, imipenem, ceftazidime and piperacillin/tazobactam (table 4).

Age distributions

Rates of *Pseudomonas* spp bacteraemias were higher in

males than females for all age groups (figure 7). For both sexes, rates were highest in those aged over 65 years, followed by babies aged under one year.

Stenotrophomonas maltophilia

There were 514 reports of *Stenotrophomonas maltophilia* bacteraemia in 2001 (table 1). All regions whose boundaries did not alter in April 2002 experienced considerable increases in the number of *S. maltophilia* reports in 2001 compared with 2000, except London, which had exactly the same number (table 2). The West Midlands and South West experienced the greatest increases in the number of reports compared with 2000: 83% and 84% respectively. The reporting rate for England and Wales overall in 2001 was 0.97 per 100,000 population (figure 8). The region with the highest rate was the West Midlands (2.10/100,000), where the rate was over twice the overall rate for England and Wales. The region with the lowest rate was the East Midlands (0.62/100,000), closely followed by London (0.64/100,000).

Figure 8 Region-specific rates of *S. maltophilia* bacteraemia per 100,000 population with 95% confidence intervals: England and Wales, 2001

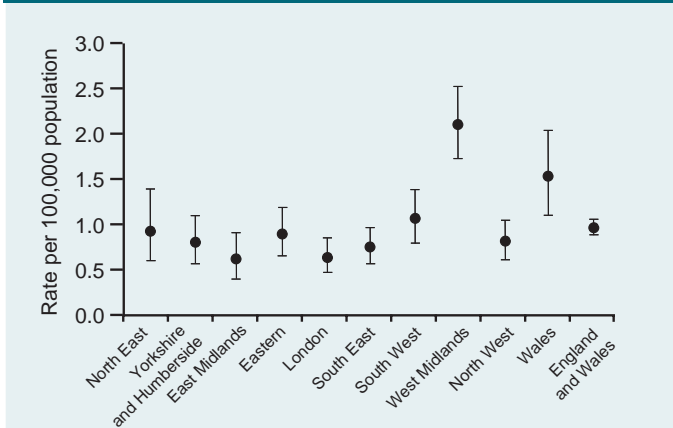
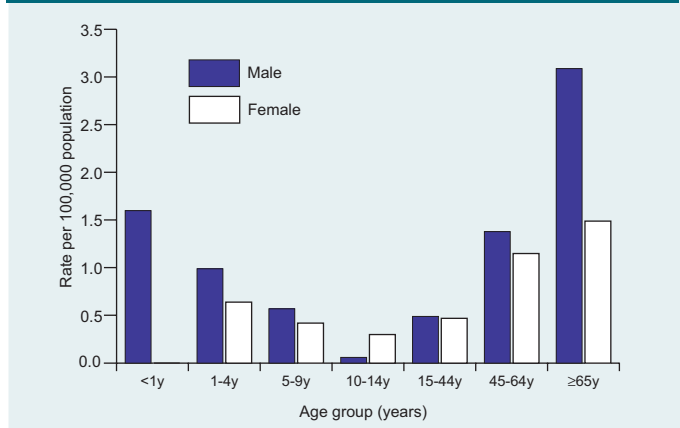


Figure 9 Age-specific rates of *S. maltophilia* bacteraemia per 100,000 population: England and Wales, 2001



Antimicrobial susceptibility

Overall, 72% of *Stenotrophomonas maltophilia* bacteraemia isolates had information on susceptibility for at least one antimicrobial. The major antimicrobial agent used in the treatment of *S. maltophilia* infections, however, is co-trimoxazole and only 17 isolates (3%) included susceptibility results for this antimicrobial. One was from Eastern region, and two were from each of the North East, North West, and South East. Three of the isolates were from Yorkshire and Humberside, and seven were from London, – this represents 15% of the *S. maltophilia* isolates from London. All 17 isolates were reported as susceptible to co-trimoxazole.

A number of antimicrobials that are less reliable against *S. maltophilia* were reported more commonly than co-trimoxazole. As with *Pseudomonas* spp, antimicrobial susceptibility information was given most commonly for gentamicin (only 32% of reports did not contain this information), followed by ciprofloxacin, ceftazidime, and piperacillin/tazobactam (table 3). Imipenem and meropenem were least frequently reported, possibly because *S. maltophilia* has a carbapenemase and is inherently resistant to imipenem. Apart from imipenem, resistance among *S. maltophilia* isolates was highest for meropenem (71%), ciprofloxacin (62%), gentamicin (53%), and piperacillin/tazobactam (20%). Twelve per cent of isolates were reported as resistant to ceftazidime.

Age distributions

Age-specific rates of *S. maltophilia* bacteraemias were considerably higher in males, except in the 10 to 14 year and 15 to 44 year age groups (figure 9). No reports of bacteraemias due to *S. maltophilia* were received for females less than one year. For both males and females, rates were highest in those aged over 65 years.

Discussion

There was an increase in the number of reports of both *Pseudomonas* spp and *S. maltophilia* bacteraemias in England and Wales in 2001, compared with 2000². It is not clear whether this reflects improved reporting or indicates a real increase. Reports of *Pseudomonas* spp increased by 12% compared with 2000, although an increase was only seen in certain regions. The number of reports identified as *P. aeruginosa* increased by 17%, and the proportion of *Pseudomonas* spp that were *P. aeruginosa* also increased from 74% in 2000 to 77% in 2001, reflecting the decrease in the proportion of incompletely identified *Pseudomonas* spp, from 20% to 17% between 2000 and 2001. The number of *S. maltophilia* reports also increased by 29% compared with 2000. Increases in the number of reports were seen in all regions where comparisons were possible (*ie* those that had not experienced boundary changes), apart from London.

Although the proportion of reports with antimicrobial susceptibility information had increased slightly for most antimicrobials compared with 2000, a third of *P. aeruginosa* isolates and 28% of *S. maltophilia* isolates did not include information on susceptibility to any antimicrobial. Certain regions were consistently better at reporting antimicrobial susceptibilities. For example, Eastern, and South East regions were among the better reporters for both *P. aeruginosa* and *S. maltophilia*. Certain antimicrobials also

tended to be reported more frequently: susceptibility information on gentamicin, ciprofloxacin and ceftazidime was given for more than half of *P. aeruginosa* and *S. maltophilia* isolates.

The proportion of *Pseudomonas* spp and *S. maltophilia* isolates that were reported as resistant to the various antimicrobials increased in 2001 compared with 2000, although it is difficult to say whether this represents a true increase or reflects the improvement in susceptibility reporting. Rates of resistance were similar between *P. aeruginosa* and the incompletely identified and other *Pseudomonas* spp. This is probably because many of the isolates that were not identified to the species level are likely to be *P. aeruginosa*.

A UK survey of antimicrobial resistance in *Pseudomonas aeruginosa* carried out in 1999³ found similar rates of resistance to those reported here for 2001, based on data for all *P. aeruginosa* infection types (but excluding cystic fibrosis patients where this survey, like others, found much higher rates of resistance). The greatest discrepancy between the survey results and those reported here was for gentamicin. Eleven per cent of isolates were resistant to gentamicin in the survey (9% of non-cystic fibrosis patients), compared with 5% in the results reported here. The higher rate of resistance in the survey may be because the BSAC breakpoints were applied, and these tend to categorise many *P. aeruginosa* isolates as intermediately resistant to gentamicin. For the other antimicrobials, the difference between the resistance rates was between 2 and 3%. The resistance observed in the survey was higher than the routine results reported here for imipenem too; 8% compared with 6%. The survey isolates were less resistant than those reported here for ciprofloxacin, ceftazidime, meropenem and piperacillin/tazobactam.

A 1998 analysis of data from a 1993 survey illustrated problems with routine diagnostic laboratories' ability to detect resistance in *P. aeruginosa*⁴. There was a low frequency of false sensitive results, due to some extent to the high number of sensitive isolates examined. Resistant isolates (whichever antimicrobial was being considered) had a much higher chance of being mis-identified. Depending on the antibiotic, between 26 and 73% of resistant isolates were correctly identified as resistant. It was suggested that this is because routine methods find it difficult to identify the low-level stepwise resistance that is common in *P. aeruginosa*. In addition, there was much variation between laboratories in susceptibility testing methods. Since then, the introduction of the BSAC disc testing method has in general improved the quality of susceptibility reporting, and increasing numbers of laboratories are now using this method. The 1999 survey found that the accuracy of correct reporting of resistant isolates varied from 61% to 100%, depending on the antibiotic³.

It was surprising that no *P. aeruginosa* isolates resistant to all of gentamicin, ciprofloxacin, imipenem, ceftazidime and piperacillin/tazobactam were reported in 2001, given its inherent resistance to many drug classes and ability to acquire resistance through mutation⁵. This may be due to the small number of isolates that were tested against all five antibiotics. For example, only four of the isolates resistant to piperacillin/tazobactam were also tested for resistance to the other four (table 4). The ARMRL regularly

receives multiply resistant *P. aeruginosa* isolates. These are mostly from cystic fibrosis patients, although a few are from burns and other sources, occasionally including bacteraemias. Antibiotics that warrant testing against such organisms include tobramycin (which has the best inherent antipseudomonal activity of any aminoglycoside) and the polymyxins (though resistance even to these is seen in some cystic fibrosis isolates).

S. maltophilia is inherently resistant to imipenem, so the 11 reports of isolates sensitive to this antimicrobial are unlikely. The more commonly reported antimicrobials are less reliable against this species. The type of susceptibility test used influences the result, as does the temperature at which susceptibility testing is carried out. As noted before, the most important antimicrobial to test against *S. maltophilia* is co-trimoxazole, yet only 17 isolates were tested for susceptibility to this antimicrobial in England and Wales in 2001. All were reported as susceptible.

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