

***Pseudomonas* spp. and *Stenotrophomonas maltophilia* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

Summary

This report contains data voluntarily reported to the Health Protection Agency of bacteraemia due to *Pseudomonas* spp., *Stenotrophomonas* spp. and other closely related species in England, Wales, and Northern Ireland from 2004 to 2008. These analyses are based on data extracted from our voluntary surveillance database on the 17th June 2009 for the period between 2004 and 2008. The data presented here differ in some instances from data in earlier publications due to the addition of late reports to the database.

- Since 2004, there has been a 26% increase in the number *Pseudomonas* spp. bacteraemia reported to the HPA (3150 reports in 2004 compared with 3975 reports in 2008). In 2008, 85% of *Pseudomonas* spp. bacteraemia were identified to species level (3389 reports), with 93% of these identified as *P. aeruginosa*.
- For *Stenotrophomonas* spp. bacteraemia, there has been a 14% increase in the number of bacteraemias reported to the HPA between 2004 and 2007 (769 reports in 2007 compared with 674 in 2004); however, there has been a 25% decrease in the number of reports in 2008 (573 reports) compared with 2007 (769 reports).
- The increase in reports for *Pseudomonas* spp. is markedly higher than the 16% increase in reports for all bacteraemia (80,890 to 94,093) via the voluntary surveillance scheme (provisional as of 24th February, 2009) during the same time period. Increased reporting may be due to increased incidence or increased ascertainment. Reports for 2008 are provisional as of 17th June, 2009 and increase slightly due to late reporting.
- The overall incidence in 2008 for *Pseudomonas* spp. bacteraemia was 7.1 cases/100,000 population in England, Wales, and Northern Ireland. It is more commonly reported among those aged 65 years and older, especially among males. There was a significant decrease in the proportion of isolates testing non-susceptible to gentamicin, decreasing from 9% in 2004 to 4% in 2008; and imipenem, decreasing from 12% in 2007 to 9% in 2008. There were no significant changes in non-susceptibility for ciprofloxacin (11%), ceftazidime (7%), piperacillin/tazobactam (6%), or meropenem (10%).
- The overall incidence in 2008 for *Stenotrophomonas maltophilia* bacteraemia is 1.0 cases/100,000 population in England, Wales, and Northern Ireland. In comparison to *Pseudomonas* spp., rates of *Stenotrophomonas* spp. bacteraemia are more evenly distributed across the age groups examined. As with *Pseudomonas* spp. rates are higher in males than females of the equivalent age. There were no significant changes in non-susceptibility for ticarcillin/clavulanate (8%), ceftazidime (24%), or co-trimoxazole (4%).

Acknowledgements

We would like to acknowledge the valuable contributions of our colleagues in laboratories across England, Wales, and Northern Ireland and, the support from colleagues within the Health Protection Agency's Antibiotic Resistance Monitoring and Reference Laboratory. Feedback and specific queries about this report are welcome and can be sent to hcai.amrdivision@hpa.org.uk.

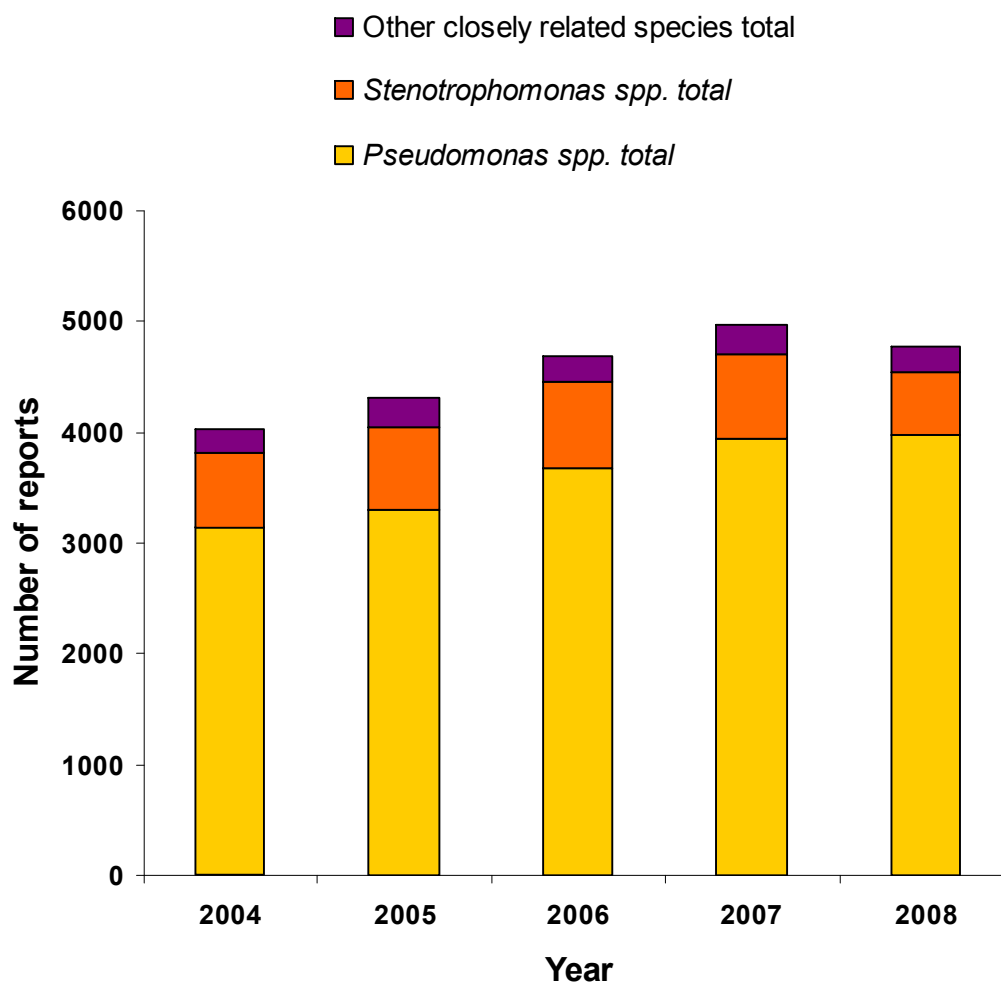
***Pseudomonas* spp. and *Stenotrophomonas maltophilia* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

Trends in reports

There has been an 4% decrease (Figure 1) in the total bacteraemia reports of *Pseudomonas* spp., *Stenotrophomonas* spp., and other closely related species reported via the voluntary surveillance scheme in 2008 (4777 reports), compared to 2007 (4966 reports).

Since 2004 there has been a 18% increase in bacteraemia reports for *Pseudomonas* spp., *Stenotrophomonas* spp. and other closely related species from 4033 to 4777 reports in 2008. This increase is similar to the 16% increase in reports for all bacteraemia (80,890 to 94,093) via the voluntary surveillance scheme during the same time period (provisional as of 24th February 2009),. The increase may be due to either increased incidence and/or increased ascertainment. Reports for 2008 are provisional as of 17th June, 2009 and the number of reported cases of bacteraemia will almost certainly increase slightly as late reports are received.

Figure 1. *Pseudomonas* spp. and *Stenotrophomonas* spp. and other closely related species bacteraemia reports: 2004 to 2008*



* Data extracted 17 June, 2009

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Completeness of laboratory reports

The number of laboratories voluntarily reporting data for *Pseudomonas* spp. and *Stenotrophomonas* spp. bacteraemia has decreased marginally from 191 in 2004 to 179 in 2008 (Table 1). The percentage of laboratories reporting drug susceptibility data increased from 84% in 2004 to 94% in 2008. The decreased number of reporting laboratories is probably due to consolidation of laboratories at trust level.

Table 1. Laboratories reporting *Pseudomonas* spp., and *Stenotrophomonas* spp. bacteraemia (England, Wales and Northern Ireland): 2004 to 2008*

| | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|-------------|-------------|-------------|-------------|-------------|
| Number of reporting laboratories | 191 | 193 | 196 | 181 | 179 |
| Laboratories identifying to species level | 99% | 99% | 100% | 100% | 99% |
| Laboratories reporting susceptibility data | 84% | 89% | 91% | 92% | 94% |
| Laboratories identifying to species level and reporting susceptibility data | 83% | 88% | 91% | 92% | 93% |

* Data extracted 17 June, 2009

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Species-specific data

Table 2 gives a breakdown of numbers of reports by species from 2004 to 2008:

- Since 2004, there has been a 26% increase in the number *Pseudomonas* spp. bacteraemia reported to the HPA (3150 in 2004 compared with 3975 reports in 2008). In 2008, 85% of *Pseudomonas* spp. bacteraemia were identified to species level (3389 reports), with 93% of the latter identified as *P. aeruginosa*.
- With the exception of two reports, all bacteraemia due to *Stenotrophomonas* spp. in 2008 were attributed to *S. maltophilia*. The number of *Stenotrophomonas* spp. reports increased by 15% from 674 in 2004 to 796 in 2007; however, there has been a 25% decrease in the number of reports in 2008 (573 reports) compared with 2007 (769 reports).
- Of the closely related genera, bacteraemia were most frequently reported for *Sphingomonas* spp. (81 reports), and *Brevundimonas* spp. (45 reports).

Table 2. Bacteraemia reports of *Pseudomonas* spp, *Stenotrophomonas* spp, and other closely related genera, England, Wales, and Northern Ireland: 2004-2008*

| | 2004 | 2005 | 2006 | 2007 | 2008 |
|--|-------------|-------------|-------------|-------------|-------------|
| <i>Pseudomonas aeruginosa</i> | 2441 | 2624 | 2887 | 3100 | 3158 |
| <i>Pseudomonas fluorescens</i> | 68 | 57 | 56 | 67 | 73 |
| <i>Pseudomonas putida</i> | 61 | 66 | 78 | 67 | 75 |
| <i>Pseudomonas stutzeri</i> | 51 | 59 | 76 | 89 | 83 |
| <i>Pseudomonas</i> spp., other named | 29 | 27 | 38 | 58 | 69 |
| <i>Pseudomonas</i> spp., species not recorded | 500 | 469 | 545 | 554 | 517 |
| <i>Pseudomonas</i> spp. total | 3150 | 3302 | 3680 | 3935 | 3975 |
| <i>Stenotrophomonas maltophilia</i> | 674 | 753 | 774 | 759 | 571 |
| <i>Stenotrophomonas</i> spp., species not recorded | 0 | 0 | 9 | 10 | 2 |
| <i>Stenotrophomonas</i> spp. total | 674 | 753 | 783 | 769 | 573 |
| <i>Brevibacterium</i> spp. total | 11 | 14 | 13 | 15 | 16 |
| <i>Brevundimonas</i> spp. total | 31 | 30 | 29 | 48 | 45 |
| <i>Burkholderia</i> spp. total | 47 | 44 | 35 | 46 | 29 |
| <i>Comamonas</i> spp. total | 30 | 32 | 31 | 19 | 25 |
| <i>Flavimonas</i> spp. total | 34 | 48 | 35 | 19 | 12 |
| <i>Ralstonia</i> spp. total | 9 | 15 | 14 | 16 | 15 |
| <i>Shewanella</i> spp. total | 4 | 3 | 7 | 4 | 6 |
| <i>Sphingomonas</i> spp. total | 43 | 64 | 68 | 95 | 81 |

* Data extracted 17 June, 2009

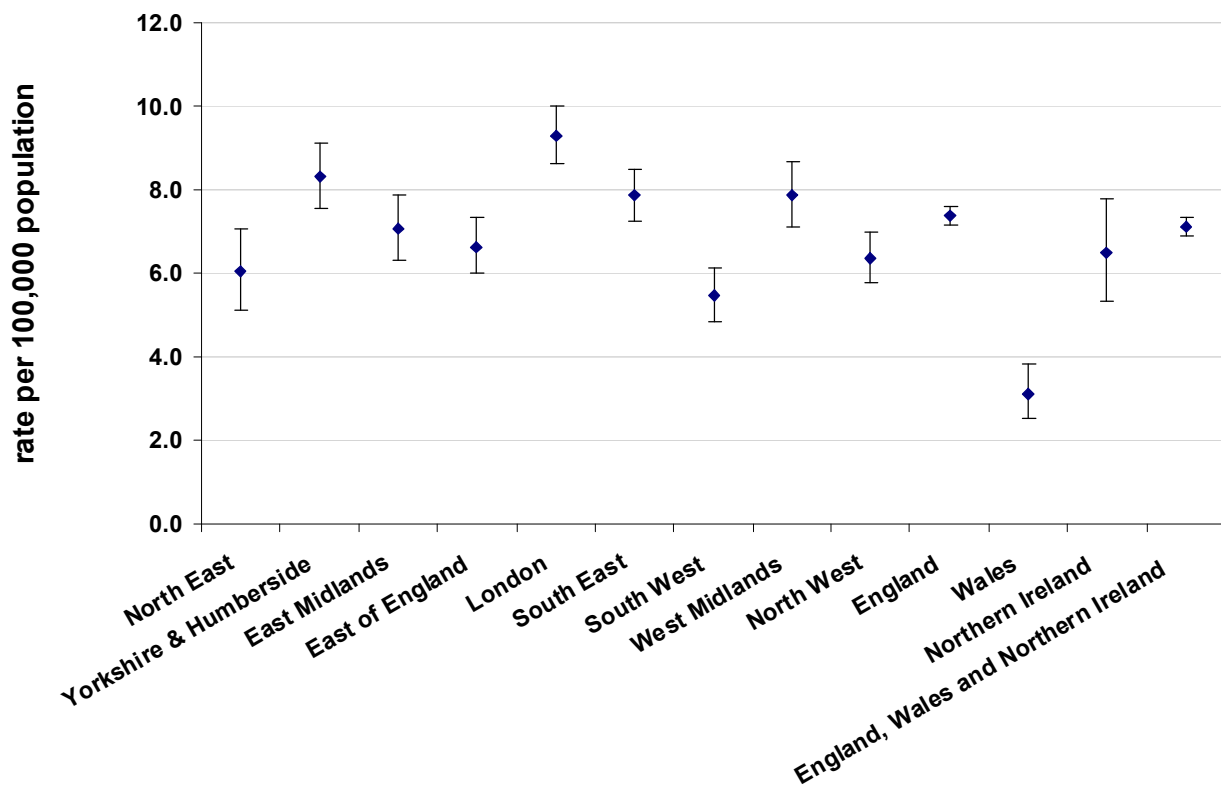
***Pseudomonas* spp. and *Stenotrophomonas maltophilia* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

Distribution by region

Figures 2 and 3 show regional distributions of *Pseudomonas* spp. and *S. maltophilia* bacteraemia in 2008, respectively.

For *Pseudomonas* spp., the overall reported incidence for England, Wales, and Northern Ireland was 7.1 cases/100,000 population. Regions/countries with high incidence include London (9.3/100,000 population), and Yorkshire and Humberside (8.3 per 100,000); low incidences were noted for Wales (3.1/100,000) and the South West (5.5/100,000). As data collection is based on a voluntary reporting system, it is important to note that regional incidence rates are affected by completeness of regional reporting.

Figure 2. Region-specific rates of *Pseudomonas* spp. bacteraemia: England, Wales, and Northern Ireland, 2008*



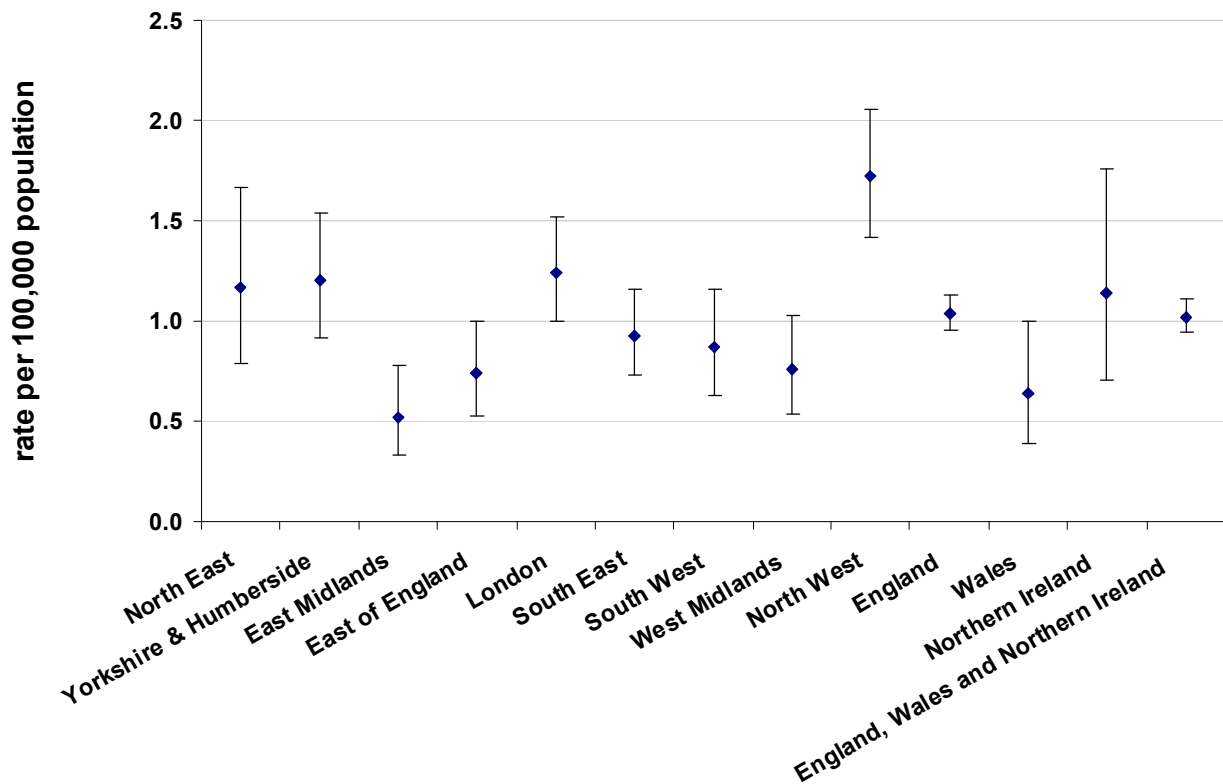
* Data extracted 17 June, 2009; rates are calculated using 2007 mid-year resident population estimates based on the 2001 census for England, Wales, and Northern Ireland.

***Pseudomonas spp. and Stenotrophomonas maltophilia* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

Distribution by region (continued)

For *S. maltophilia*, the overall reported incidence for England, Wales, and Northern Ireland was 1.0 cases/100,000 population. Regions/countries with high incidence include North West (1.7/100,000), and London (1.2/100,000 population); low incidences were noted for East Midlands (0.5/100,000), Wales (0.6/100,000) and West Midlands (0.8/100,000).

Figure 3. Region-specific rates of *S. maltophilia* bacteraemia: England, Wales, and Northern Ireland, 2008*



* Data extracted 17 June, 2009; rates are calculated using 2007 mid-year resident population estimates based on the 2001 census for England, Wales, and Northern Ireland.

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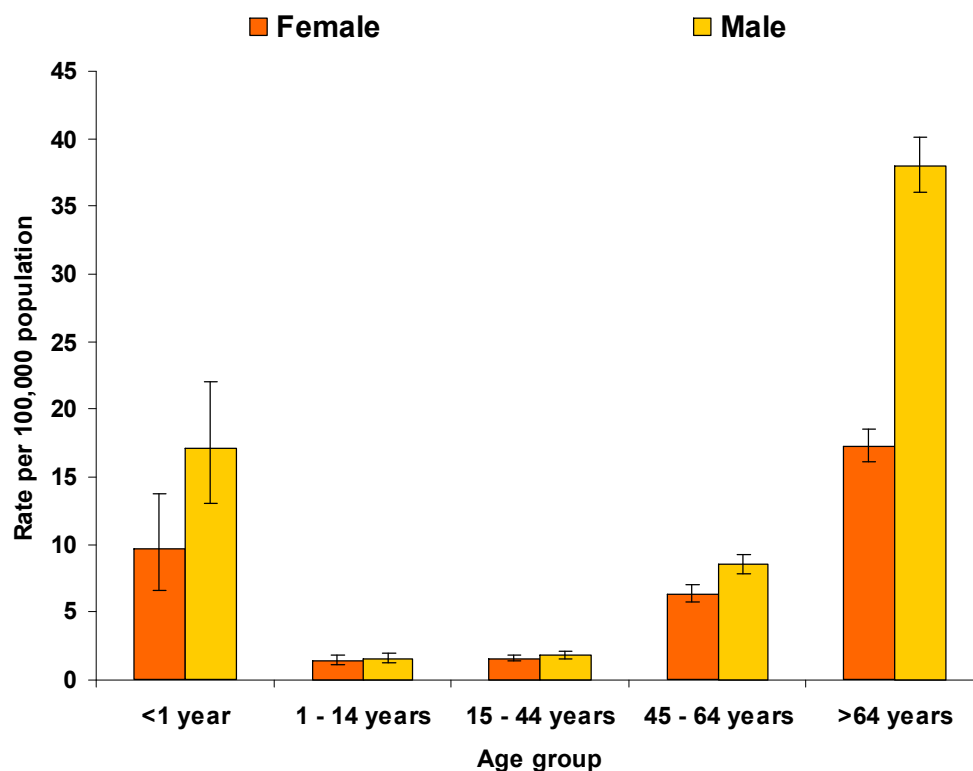
Age and sex distribution

Figures 4 and 5 show the age and sex distribution (incidence per 100,000 population) of bacteraemia reports for *Pseudomonas* spp, and *Stenotrophomonas* spp, respectively.

For *Pseudomonas* spp. the proportion of reports was higher in males than in females among all patient age-groups, with the highest rates recorded for males aged 65 and over (38 cases per 100,000 population).

In comparison to *Pseudomonas* spp., rates of *Stenotrophomonas* spp. bacteraemia are more evenly distributed across the age groups examined. As with *Pseudomonas* spp. rates are higher in males than females of the equivalent age.

Figure 4. *Pseudomonas* spp. bacteraemia reports in 2008 by age and sex*

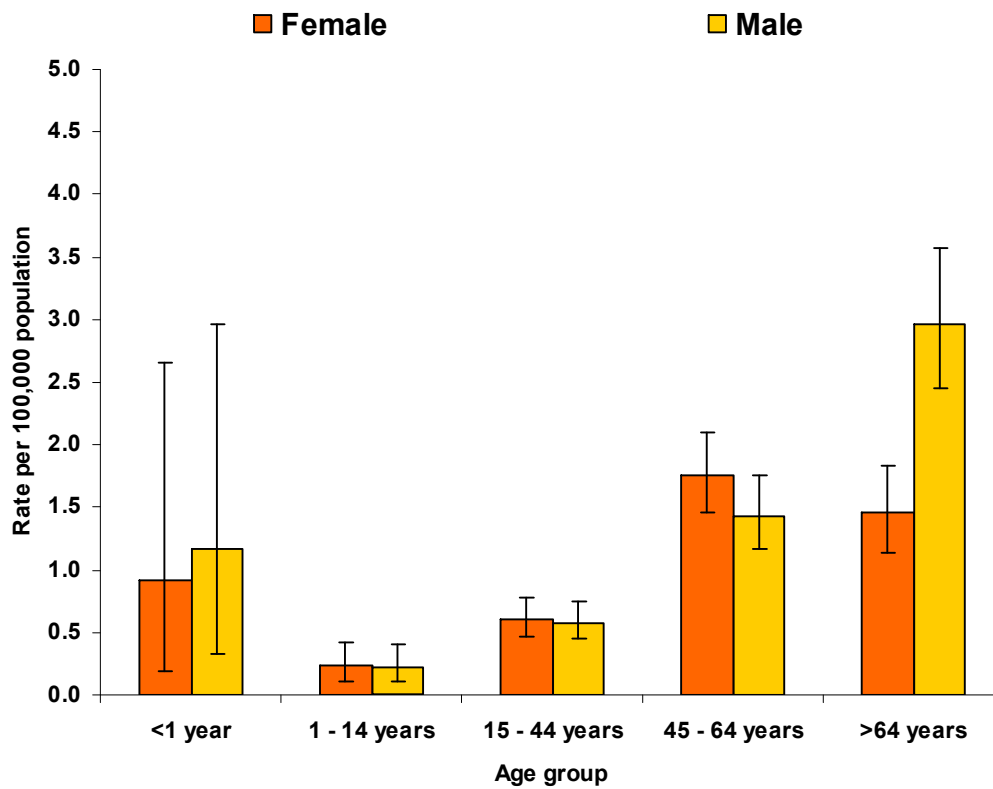


* Data extracted 17 June, 2009

***Pseudomonas* spp. and *Stenotrophomonas maltophilia* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

Age and sex distribution (continued)

Figure 5. *Stenotrophomonas* spp. bacteraemia reports in 2008 by age and sex*



* Data extracted 17 June, 2009

***Pseudomonas* spp. and *Stenotrophomonas maltophilia* bacteraemia in England, Wales, and Northern Ireland, 2004 to 2008**

Antimicrobial susceptibility

Tables 3 and 4 present antibiotic susceptibility data for *Pseudomonas aeruginosa*, and for *Stenotrophomonas maltophilia*, respectively.

For *P. aeruginosa*, there has been a significant ($P<0.0001$) decrease in the proportion of isolates testing non-susceptible to gentamicin, falling from 9% in 2004 to 4% in 2008. In addition, the proportion of isolates testing non-susceptible to imipenem has significantly ($P<0.05$) decreased between 2007 and 2008, falling from 12% to 9% respectively. There were no significant changes in non-susceptibility for ciprofloxacin (11%), ceftazidime (7%), piperacillin/tazobactam (6%), or meropenem (10%).

Table 3. Antibiotic susceptibility for *P. aeruginosa* bacteraemia reports, England, Wales and Northern Ireland, 2003-2007*

| <i>P. aeruginosa</i> | | 2004 | 2005 | 2006 | 2007 | 2008 |
|-------------------------------------|----------------------------------|-------------|-------------|-------------|-------------|-------------|
| Total reports: | | 2441 | 2624 | 2887 | 3100 | 3158 |
| Piperacillin/ Tazobactam | % Non-susceptible | 6% | 4% | 4% | 5% | 6% |
| | Reports with susceptibility data | 1252 | 1600 | 1985 | 2325 | 2490 |
| Imipenem | % Non-susceptible | 8% | 7% | 11% | 12% | 9% |
| | Reports with susceptibility data | 668 | 777 | 965 | 1147 | 1111 |
| Meropenem | % Non-susceptible | 8% | 8% | 10% | 9% | 10% |
| | Reports with susceptibility data | 647 | 886 | 1087 | 1397 | 1714 |
| Ceftazidime | % Non-susceptible | 7% | 7% | 7% | 8% | 7% |
| | Reports with susceptibility data | 1605 | 1883 | 2213 | 2515 | 2484 |
| Ciprofloxacin | % Non-susceptible | 12% | 12% | 12% | 12% | 11% |
| | Reports with susceptibility data | 1821 | 2088 | 2393 | 2647 | 2657 |
| Gentamicin | % Non-susceptible | 9% | 7% | 5% | 5% | 4% |
| | Reports with susceptibility data | 1893 | 2121 | 2415 | 2755 | 2785 |

* Data extracted 17 June, 2009

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Antimicrobial susceptibility (continued)

The British Society for Antimicrobial Chemotherapy (BSAC) guidelines state that disk diffusion susceptibility results for quinolones are temperature dependent. Current clinical guidance recommends co-trimoxazole or ticarcillin/clavulanate in patients where co-trimoxazole is not suitable. For *S. maltophilia*, there were no significant changes in non-susceptibility for ticarcillin/clavulanate (8%), ceftazidime (24%), or co-trimoxazole (4%).

Table 4. Antibiotic susceptibility for *S. maltophilia* bacteraemia reports, England, Wales and Northern Ireland, 2004-2008*

| <i>S. maltophilia</i> | | 2004 | 2005 | 2006 | 2007 | 2008 |
|-------------------------------------|----------------------------------|-------------|-------------|-------------|-------------|-------------|
| Total reports: | | 674 | 753 | 774 | 759 | 571 |
| Ticarcillin/ Clavulanate | % Non-susceptible | 10% | 13% | 3% | 12% | 8% |
| | Reports with susceptibility data | 40 | 63 | 62 | 110 | 60 |
| Co-trimoxazole | % Non-susceptible | 4% | 7% | 4% | 4% | 4% |
| | Reports with susceptibility data | 106 | 189 | 217 | 243 | 223 |
| Ceftazidime | % Non-susceptible | 21% | 22% | 20% | 22% | 24% |
| | Reports with susceptibility data | 381 | 375 | 417 | 434 | 310 |

* Data extracted 17 June, 2009