



**CDSC (NI)**

***STAPHYLOCOCCUS AUREUS***  
**BLOOD CULTURES IN**  
**NORTHERN IRELAND:**

**APRIL 2004 - MARCH 2005 (YEAR 4)**

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## Executive Summary

The frequency of new MRSA bacteraemia reports among hospital patients in Northern Ireland has shown a first and significant annual downturn during four years of monitoring by the Communicable Disease Surveillance Centre Northern Ireland (CDSC (NI)).

This report relates to the year April 2004-March 2005 and records a total of 568 cases or patient episodes of *Staphylococcus aureus* (*S. aureus*) bacteraemia – some 109 or 16 per cent fewer than the previous year.

Significantly, the number of these patients recorded as having the Methicillin Resistant *Staphylococcus aureus* or MRSA, was also found to have fallen during the same period by 65 to a total of 242 – a decrease of 21 per cent.

Under this mandatory surveillance programme, data is collected and analysed on the frequency of both *Staphylococcus aureus* and Methicillin Resistant *Staphylococcus aureus* detection in all twelve hospital trusts in Northern Ireland. Ten of the twelve trusts recorded a decrease in the rate of MRSA.

*S. aureus* patient episodes (including MRSA) reported here are those confirmed through blood tests submitted by hospital patients. However, these confirm only the presence of the *S. aureus* and cannot point to either its clinical significance or its source - which could be either a hospital or a community-acquired one.

## Introduction

This report describes data from *Staphylococcus aureus* bacteraemia (blood stream infections) surveillance in Northern Ireland from April 2004 to March 2005. *S. aureus* surveillance has been carried out in Northern Ireland since April 2001 and been mandatory since April 2002. The results from each of the three preceding years have been published previously<sup>1-3</sup>.

This report also includes data for the period April 2001 to March 2005 for analysis of trends in the four years of surveillance.

### Data Sources and Analyses

The twelve acute Trusts in Northern Ireland participate in the DHSSPS mandatory surveillance of *S. aureus* bacteraemias through the submission of data to CDSC (NI) on a quarterly basis. The variables and definitions used for this submission are those agreed with data providers, as previously detailed<sup>1</sup>. All analyses contained in this report were performed on a Trust basis. Due to the small number of acute Trusts in Northern Ireland they have not been categorised by type, for example specialist Trusts.

Rates described in this report are all patient episodes per 1,000 occupied bed days, calculated using the formula below. The denominator used for this calculation is derived from the KH03 dataset, overnight bed occupancy data as supplied by DHSSPS on a quarterly basis. All rates have been calculated for both individual Trusts and Northern Ireland as a whole.

$$\text{Trust rate} = \left( \frac{\text{Number of } S.\textit{aureus} \text{ bacteraemias in time period}}{\text{Number of occupied bed days in time period}} \right) \times 1000$$

## Results

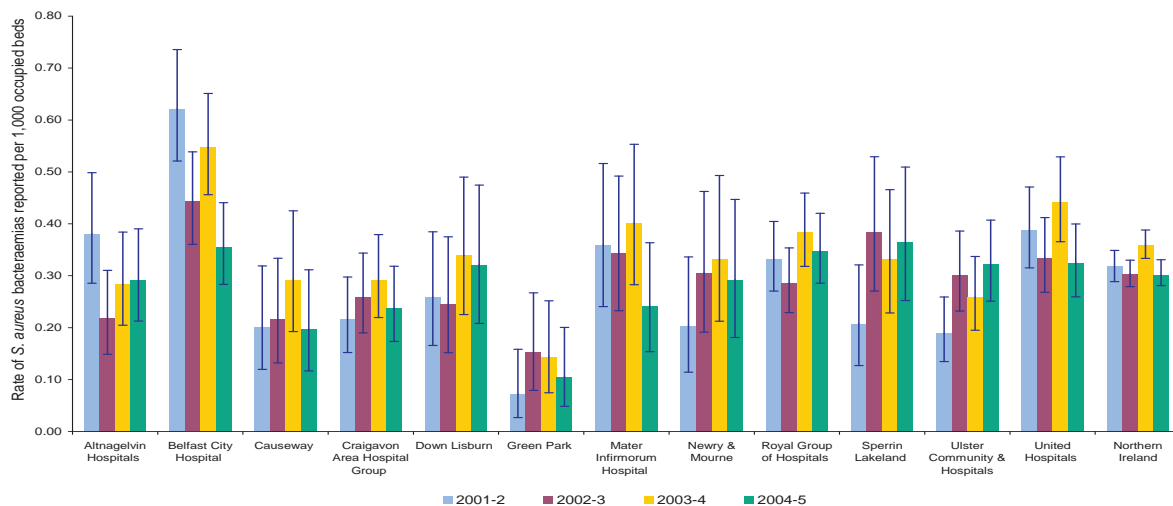
### *Staphylococcus aureus*

During the surveillance period April 2004 – March 2005, 568 *S. aureus* patient episodes were reported in Northern Ireland, a decrease of 109 (16%) on the previous year (677). This figure includes all *S. aureus* bacteraemias, both Methicillin Sensitive (MSSA) and Methicillin Resistant (MRSA) isolates. The overall rate of *S. aureus* bacteraemias per 1,000 occupied beds was 0.30, 16% lower and a statistically significant difference ( $p < 0.01$ ) compared with the previous year (0.36). Nine of the twelve trusts reported lower *S. aureus* rates than the previous year (figure 1).

**Table 1: Number and Rate of patient episodes of *S. aureus* bacteraemia (MRSA and MSSA) with 95% confidence intervals, April 2004-March 2005, Northern Ireland**

Trust	Patient Episodes	Rate	Lower	Upper
Altnagelvin Hospitals	45	0.29	0.21	0.39
Belfast City Hospital	83	0.36	0.28	0.44
Causeway	18	0.20	0.12	0.31
Craigavon Area Hospital Group	45	0.24	0.17	0.32
Down Lisburn	25	0.32	0.21	0.47
Green Park	9	0.11	0.05	0.20
Mater Infirmorum Hospital	23	0.24	0.15	0.36
Newry & Mourne	21	0.29	0.18	0.45
Royal Group of Hospitals	108	0.35	0.29	0.42
Sperrin Lakeland	34	0.36	0.25	0.51
Ulster Community & Hospitals	70	0.32	0.25	0.41
United Hospitals	87	0.32	0.26	0.40
<b>Northern Ireland</b>	<b>568</b>	<b>0.30</b>	<b>0.28</b>	<b>0.33</b>

**Figure 1: Rate per 1,000 bed days of patient episodes of *S. aureus* Bacteraemia by Trust with 95% confidence intervals, April 2001 - March 2005, Northern Ireland**



## Methicillin Resistant *Staphylococcus aureus* (MRSA)

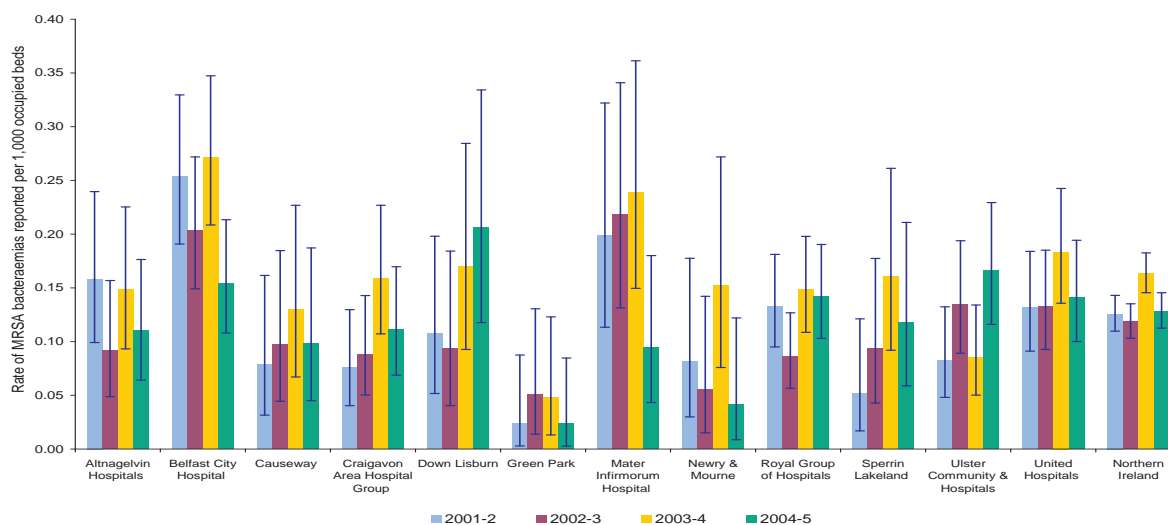
During the surveillance period 242 of the *S. aureus* patient episodes were reported to be caused by Methicillin Resistant *Staphylococcus aureus* (MRSA). This is a reduction of 65 (21%) from the previous year (307). The rate of MRSA patient episodes per 1,000 bed days was 0.13, a 21% decrease on the previous year (0.16), a statistically significant difference ( $p < 0.01$ ).

**Table 2: Number and Rate of patient episodes of MRSA bacteraemia with 95% confidence intervals, April 2004 -March 2005, Northern Ireland**

Trust	Patient Episodes	Rate	Lower	Upper
Altnagelvin Hospitals	17	0.11	0.06	0.18
Belfast City Hospital	36	0.15	0.11	0.21
Causeway	9	0.10	0.05	0.19
Craigavon Area Hospital Group	21	0.11	0.07	0.17
Down Lisburn	16	0.21	0.12	0.33
Green Park	2	0.02	0.00	0.08
Mater Infirmorum Hospital	9	0.09	0.04	0.18
Newry & Mourne	3	0.04	0.01	0.12
Royal Group of Hospitals	44	0.14	0.10	0.19
Sperrin Lakeland	11	0.12	0.06	0.21
Ulster Community & Hospitals	36	0.17	0.12	0.23
United Hospitals	38	0.14	0.10	0.19
<b>Northern Ireland</b>	<b>242</b>	<b>0.13</b>	<b>0.11</b>	<b>0.15</b>

Ten of the twelve acute Trusts reported lower rates of MRSA patient episodes than for the previous year. In most cases the large fluctuations in rates are due to relatively small changes in the numbers of actual patient episodes since the numbers involved are so small. This is evident from the wide confidence intervals displayed for the individual Trusts in Figure 2.

**Figure 2: Rate per 1,000 bed days of patient episodes of MRSA Bacteraemia by Trust with 95% confidence intervals, April 2001 - March 2005, Northern Ireland**

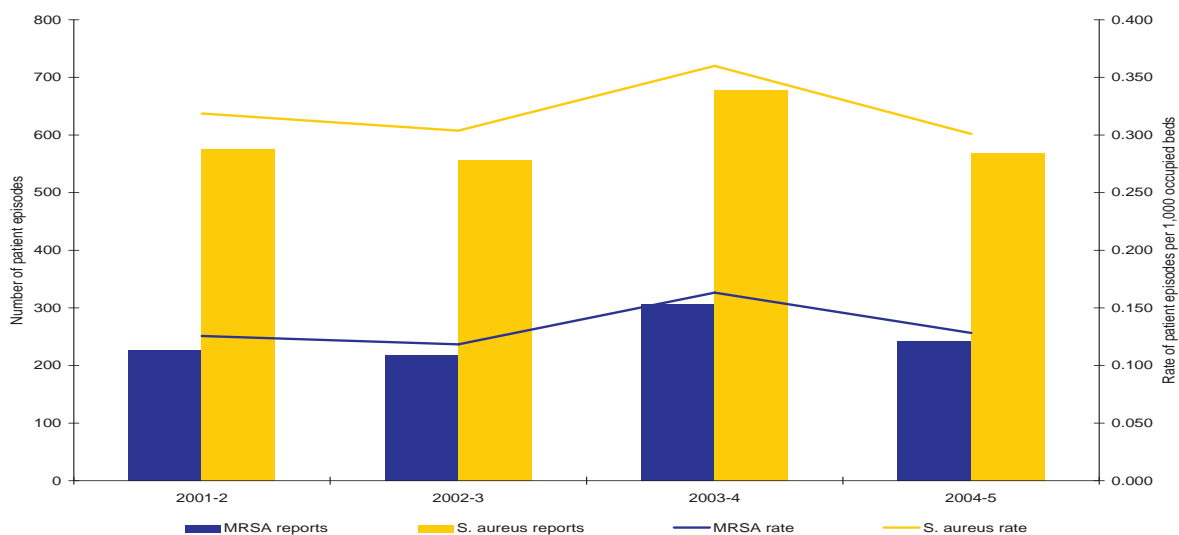


## Data trends

During the course of the first three years of surveillance the overall numbers of *S. aureus* and MRSA patient episodes rose in Northern Ireland, significantly so from year 2 to year 3<sup>3</sup>. During this, the fourth year of surveillance the numbers reported have decreased significantly from last year. For most of the individual Trusts, as for Northern Ireland as a whole, the period April 2003 to March 2004 had the highest reported rates documented over the four years of this surveillance programme.

The actual number of *S. aureus* reports for the period April 2004 - March 2005 have fallen below those reported in the first year of surveillance (from 576 to 568), as have the rates of patient episodes (from 0.32 to 0.30 patient episodes per 1,000 bed days) (figure 3). The number of MRSA reports has fallen to a level which although slightly higher than that of 2001-2 the rate of patient episodes is now equal to that reported during the first year of surveillance, since the numbers of beds occupied has increased year on year (from 227 to 242 patient episodes; rate of 0.13 per 1,000 bed days). This is similar to the trends reported from surveillance in England<sup>4</sup>.

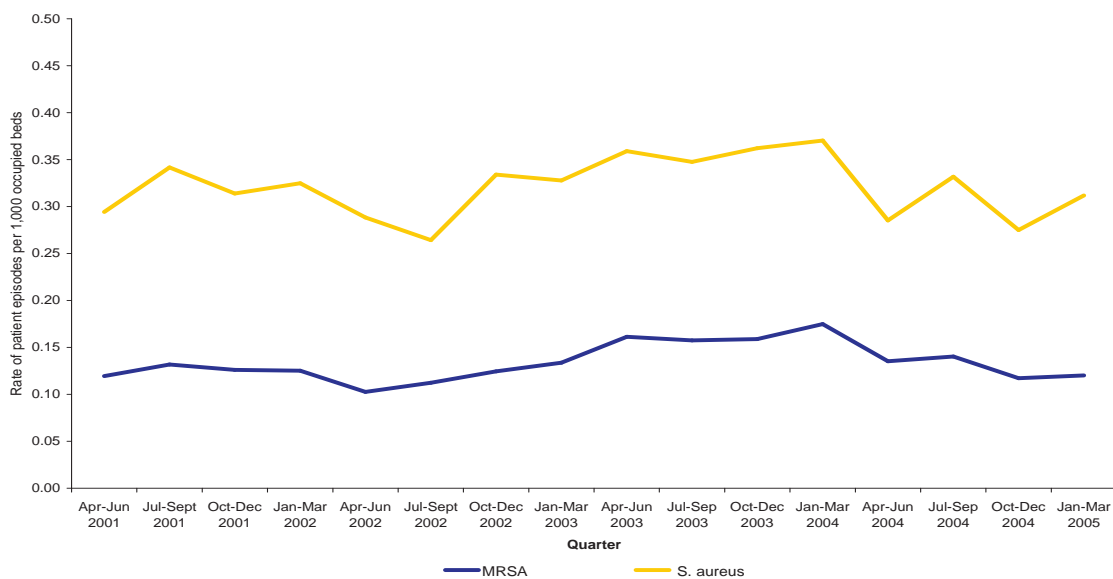
**Figure 3: Number and rates of *S. aureus* (MRSA +MSSA) and MRSA reports April 2001 - March 2005, Northern Ireland**



The rates of MRSA reported for Northern Ireland for 2004-5 are broadly similar to those reported elsewhere for other areas of the UK<sup>4-6</sup>. A similar decline in the rate of MRSA patient episodes during this surveillance period in comparison to the previous year has been reported in England<sup>4</sup> and Wales<sup>5</sup>. Rates published for acute trusts in Scotland during the four-year surveillance period 2001-2005 have shown the levels of MRSA to have remained relatively stable throughout<sup>6</sup>.

The decreases described here which have occurred between years 3 and 4 of the surveillance scheme are further supported through the use of quarterly data. Figure 4 shows the rates of bacteraemia patient episodes as reported on a quarterly basis for both all *S. aureus* and MRSA alone. The rates have been decreasing over the course of the last year, following a peak during January - March 2004.

**Figure 4: Rates of *S. aureus* and MRSA reports in Northern Ireland on a quarterly basis April 2001 - March 2005**



The Northern Ireland data shows rates of *S. aureus* and MRSA bacteraemias to have followed a similar pattern, rising and falling together over the past four years. The percentage of all *S. aureus* isolates reported to be MRSA in Northern Ireland has also followed the same pattern and not declined consistently, as has been the case in England<sup>4</sup> (Table 3).

**Table 3: Proportion of *S. aureus* Bacteraemias which were MRSA (%), April 2001- March 2005**

Trust	Year 1	Year 2	Year 3	Year 4
Altnagelvin Hospitals	41.5	41.9	52.4	37.8
Belfast City Hospital	40.7	46.0	49.6	43.4
Causeway	38.9	45.0	44.4	50.0
Craigavon Area Hospital Group	35.1	34.0	54.5	46.7
Down Lisburn	41.7	38.1	50.0	64.0
Green Park	33.3	33.3	33.3	22.2
Mater Infirmorum Hospital	55.2	63.3	59.5	39.1
Newry & Mourne	40.0	18.2	45.8	14.3
Royal Group of Hospitals	40.0	30.2	38.7	40.7
Sperrin Lakeland	25.0	24.3	48.5	32.4
Ulster Community & Hospitals	43.6	44.4	32.7	51.4
United Hospitals	34.0	39.8	41.5	43.7
Northern Ireland	39.4	39.0	45.3	42.6

## Discussion

The four years of bacteraemia surveillance described in this report includes information on the reports of *S. aureus*, including MRSA. The total numbers of *S. aureus* and MRSA rose during the third year of surveillance, as reported previously, but during the twelve months of this reporting period a reduction has been observed in Northern Ireland as a whole, in both *S. aureus* and MRSA reports. The percentage of *S. aureus* patient episodes reported to be MRSA has also fallen during this period.

Although the results presented here show a fall in the levels of *S. aureus* and MRSA in Northern Ireland in comparison to the previous twelve months, they should still be viewed with caution taking the following into account:

- Trusts with different clinical mixes and specialties will have differing proportions of patients at high risk of MRSA infection.
- In the absence of speciality information and other risk-factor data, it is not possible to comment on inter-Trust variations.
- Reports of *S. aureus* (including MRSA) patient episodes from a Trust may relate to patients who became infected in, and were reported by, another Trust. Since data are collected without patient identifiers, the removal of duplicates is not possible.
- Figures for individual trusts should be viewed with caution. In some instances, the large fluctuations in rates are due to relatively small changes in *S. aureus* and MRSA patient episodes, as witnessed by the wide statistical confidence intervals.
- Episodes of bacteraemia relating to patients resident in non-acute Trusts, e.g. in long-stay facilities in Community Trusts, may have been omitted from these analyses.
- The results collated are of infections which have been identified by testing within a hospital, no distinction can be made between where the infection was actually acquired i.e. hospital or community acquired infections.
- The data includes all reports of *Staphylococcus aureus* isolated from blood cultures, with no indication of the clinical significance of the isolate.
- This dataset contains no information relating to patient outcome.

The Northern Ireland Statistics and Research Agency (NISRA) have carried out a separate analysis of death certificates where *S. aureus* and MRSA are mentioned (see <http://www.nisra.gov.uk>).

### Acknowledgements

The collection and validation of reports for the surveillance of *S. aureus* bacteraemias is carried out by Trust microbiologists, laboratory staff and infection control teams throughout Northern Ireland.

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# Appendix

## Abbreviations

<b>CDSC (NI)</b>	Communicable Disease Surveillance Centre (Northern Ireland)
<b>DHSSPS</b>	Department of Health, Social Services and Public Safety
<b>MRSA</b>	Methicillin resistant <i>Staphylococcus aureus</i>
<b>MSSA</b>	Methicillin sensitive <i>Staphylococcus aureus</i>
<b><i>S. aureus</i></b>	<i>Staphylococcus aureus</i>

## Definitions

**'S. aureus patient episodes' (SA PE)** is defined as the total number of patients from whom BC set(s) collected during the quarter grew *S aureus*. If repeat specimens were collected from a single patient, and the patient was considered to have had two episodes of bacteraemia, then they should be counted as two patients. As an arbitrary measure, if positive blood culture sets are collected more than 14 days apart, they should be considered as reflecting different episodes.

**'MRSA patient episodes' (MRSA PE)** is defined as the total number of patients from whom BC set(s) collected during the quarter grew MRSA. If repeat specimens were collected from a single patient, and the patient was considered to have had two episodes of bacteraemia, then they should be counted as two patients. As an arbitrary measure, if positive blood culture sets are collected more than 14 days apart, they should be considered as reflecting different episodes.