Surveillance of MRSA in General Intensive Care Units

2010 Data

EXECUTIVE SUMMARY

- This report represents the 2010 data from the National meticillin-resistant *Staphylococcus aureus* (MRSA) in ICU Prevalence Surveillance Study. The project is being carried out without the allocation of additional resources locally and reflects the desire and enthusiasm of healthcare professionals to share data publically that is scientifically collected and analysed. MRSA figures in this report refer mostly to MRSA colonisation in general intensive care units (ICUs). No direct information on MRSA infection was collected. Thirty-three ICUs participated in 2010, stratified by ICU type: (i) level 2/3 ICUs (n = 19) (such ICUs contain both ICU and high dependency unit patients) & (ii) level 3 ICUs (n = 14) (ICU patients only).

- ICU bed occupancy and isolation room occupancy rates are high in both the level 2/3 (87% and 84%, respectively) and level 3 ICU groups (90% and 87%, respectively).

- There are large differences in single room resources; four of the ICUs do not have any single rooms and 36% fall below the recommendation of one single bed to every four ICU beds as set out in the 2005 national MRSA guidelines. While all single rooms are equipped with hand sinks, only 45% have anterooms. Only four of the ICUs (12%) could successfully isolate all of their MRSA patients when surveyed. Level 2/3 ICUs could isolate on average 61% of MRSA patients surveyed while level 3 ICUs could isolate 82%.

- All ICUs screen for MRSA colonisation on admission to ICU. However, there are differences in screening protocols between hospitals, precluding direct comparisons of MRSA figures.

- The prevalence of MRSA in level 2/3 ICUs was 8.2% in 2010 (range = 1.9 – 22.4%, median = 10.2%) and 9.3% (range = 1.8% - 18%, median = 10.1%) in level 3 ICUs. The prevalence of MRSA was significantly higher in level 3 ICUs compared to the level 2/3 group in 2008 and 2009 but no significant difference was reported in 2010. Due to the difference in patient case-mix between groups level 3 ICUs cater for a more acute patient population with a higher risk of acquiring MRSA prior to ICU admission and post admission through increased intensity of care.

- The weekly proportion of MRSA that were ICU-acquired was 0.7% in level 2/3 ICUs in 2010 (range = 0 - 3.9%, median = 0.64%) and 0.7% in level 3 ICUs (range = 0 – 1.4%, median = 0.9%). The majority of ICUs (88%) show a proportion of MRSA acquisition of <1.5%, therefore figures on MRSA acquisition are low in the majority of general ICUs.
• The aim of this surveillance project is to provide some estimate of MRSA prevalence and acquisition in general ICUs in Ireland within the limited resources available locally and nationally for surveillance. Since ICUs vary considerably in case mix, size and the provision of isolation rooms, direct comparisons between ICUs are inappropriate.

SECTION 1: INTRODUCTION

The meticillin-resistant Staphylococcus aureus (MRSA) in intensive care unit (ICU) point prevalence study commenced in April 2008. The primary objective of the study is to provide a weekly snapshot of MRSA in the critical care setting that requires minimal if any additional resources. The project is currently overseen by the MRSA in ICU steering committee (Appendix A). The first report was produced in August 2009 providing the initial baseline results of the project.

This report is a summary of 2010 data with comparisons from previous years. The main purpose of this report is to allow individual ICUs monitor trends over time, assess the impact of any interventions that were put in place and plan for future resource requirements. The data does not allow direct comparison of results between individual ICUs.

SECTION 2: METHODS AND LIMITATIONS

The methodology for submitting data is outlined in version 9 of the protocol (1). Participants complete the survey once weekly and capture ICU data on a single day on MRSA prevalence, transmission, bed occupancy, isolation capabilities and information on ICU nursing staff/agency staff. For consistency, participants complete the census on the same day each week. Baseline information on ICU data such as infection control resources, MRSA screening and diagnostic practices and the organisational aspect of ICU care in place are also collected at an annual level. Data is feedback to participants on a quarterly and annual basis to enable ICUs to monitor trends over time.

2.1 Definitions used

ICU type

• A ‘level 2/3 ICU’ unit contains a combination of true ICU patients (i.e., level 3 patients) and coronary care unit (CCU) or high dependency unit (HDU) patients, (i.e., level 2 patients or a variable combination of these groups).

• A ‘level 3 ICU’ contains only patients classified as ICU patients and excludes those from CCUs and HDUs.

Hospital category

• ‘Tertiary’ hospital refers to a large hospital, which accepts transfers from other hospitals such as county hospitals.
A ‘General’ hospital refers to a smaller hospital such as a county hospital.

The data presented in this report need to be interpreted bearing several caveats in mind (Appendix B).

*Note that figures for previous years have been updated and may vary from previously published data.*

### SECTION 3: RESULTS

#### 3.1 Participating ICUs

A breakdown of the 33 ICUs that participated in 2010 are outlined in Table 1.0. There were 19 level 2/3 and 14 level 3 ICUs.

**Table 1: Participating hospitals in 2010 by hospital category, hospital bed capacity and ICU type**

<table>
<thead>
<tr>
<th>Hospital Category</th>
<th>Hospital bed capacity</th>
<th>Level 2/3 ICU</th>
<th>Level 3 ICU</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>&lt;150</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>General</td>
<td>150-300</td>
<td>7</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>General</td>
<td>300-450</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Private</td>
<td>&lt;150</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Private</td>
<td>300-450</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Regional/Tertiary</td>
<td>&gt;450</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Regional/Tertiary</td>
<td>300-450</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Specialist</td>
<td>&lt;150</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>19</td>
<td>14</td>
<td>33</td>
</tr>
</tbody>
</table>

Definitions of hospital category and ICU type are provided in Section 2.1.

#### 3.2 Summary of 2010 Baseline Data

An annual baseline questionnaire was sent around to all participating ICUs in 2010 to capture background information on ICU type, available facilities and the organisational aspect of ICU care in
place. Twenty one ICUs responded (7 level 3 ICUs, 14 level 2/3 ICUs) giving a 64% response rate. A summary of the data is presented below:

**MRSA screening and diagnosis:**

- All participants screen for MRSA colonisation on admission to ICU and weekly thereafter.
- There is wide variation in the types of screening sites tested. While 95% (n = 20) of ICUs screen nasally for MRSA only 48% (n = 10) screen the nasal, groin, wound and medical device sites as recommended by the 2005 SARI MRSA guidelines (2).
- All ICUs (n = 21) use selective culture for diagnosis of MRSA, and then plate directly rather than using broth enrichment.

**Decolonisation Practices:**

- 71% (n = 15) of ICUs use mupirocin for decolonisation of all MRSA patients, while 29% (n = 6) of ICUs use mupirocin only for mupirocin-susceptible strains.
- 86% (n = 18) of ICUs surveyed test all MRSA isolates for mupirocin resistance.
- All ICUs (n = 21) use an antiseptic scrub as part of the routine decolonisation protocol, 86% of these use chlorohexidine.

**Surveillance:**

- 52% (n = 11) of ICUs carry out surveillance of MRSA infections; Of these 36% (n = 4) use CDC definitions, 9% (n = 1) use HELICS definitions and the rest use other local definitions.
- A breakdown of the type of infections under surveillance include: bloodstream infections (100%, n = 11), urinary tract infections (45%, n = 5), surgical site infections (36%, n = 4), and ventilator associated pneumonia (36%, n = 4).

**Infection control:**

- 67% of ICUs (n = 14) have an infection prevention & control strategic service plan in place. Of these, all have incorporated the SARI MRSA 2005 guidelines.
- 100% of ICUs (n = 21) have an annual infection control plan. Of these, 95% have incorporated the SARI MRSA 2005 guidelines.

**Hand hygiene:**

- **Sink to Bed Ratio:** 81% (n = 17) of ICUs have a minimum of 1 sink per 3 ICU beds, as recommended in the SARI MRSA 2005 guidelines.
- **Waste Bins:** All ICUs (n = 21) use hand free waste bins.
- **Alcohol hand rub:** All have alcohol hand rub available for staff beside each ICU bed.
- **Education:** All have a hand hygiene education programme.
- **Audits:** 95% carry out hand hygiene audits – out of these, 19% carry them out annually, 48% 6-monthly and 29% 3-monthly or monthly.
Environmental Cleaning:

- 38% (n = 8) of ICUs routinely clean the ICU with detergent and disinfectant; 62% (n = 13) clean with detergent only
- 90% (n = 19) clean the bed space of an MRSA patient with detergent and disinfectant; 10% (n = 2) clean with detergent only.
- 43% (n = 9) of ICUs have waterproof computer keyboards that can be easily disinfected

Contact Precautions:

- 100% (n = 21) use gloves and aprons when in contact with an MRSA patient
- 100% (n = 21) change bed curtains after discharge of an MRSA patient
- 33% (n = 7) carried out an audit on contact precautions in the last 6 months

3.3 Single room facilities

Large differences in single room resources were reported among the 33 participating ICUs in 2010 (table 2). Four ICUs were reported as having no single rooms to isolate patients (table 2). Of the remaining 29 ICUs, there were a total of 77 single rooms ranging from 1 to 10 per ICU. The ratio of single beds to ICU beds* ranged from 1:9 to 1:1 with 36% of ICUs falling below the recommendation of one single bed to every four critical care beds as set out in the 2005 national MRSA guidelines. The majority (58%, n=45) of single rooms are found within level 3 ICUs (table 2). Sixty-nine percent of ICUs with single rooms have one to two single rooms. ICUs with five or more single rooms are predominantly level 3 ICUs with a hospital bed capacity of >450. One level 2/3 ICU has 9 single rooms. All single rooms were found to be equipped with hand sinks but only 45% were found to have anterooms.

* ICU beds refers to the average number of available ICU beds were calculated by taking an average of the weekly numbers of ICU beds available that were captured during the 2010 time period.

Table 2: Number of single rooms by ICU type and hospital bed capacity in 2010

<table>
<thead>
<tr>
<th>ICU type</th>
<th>Number of single rooms</th>
<th>Hospital Bed Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;150</td>
</tr>
<tr>
<td>Level 2/3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=32 single rooms)</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Level 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=45 single rooms)</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>
3.4 Bed Occupancy
In 2010, ICU bed occupancy and isolation room occupancy were high in both level 2/3 (87% and 84%, respectively) and level 3 ICUs (90% and 87%, respectively). However, this is an underestimate of the true occupancy of ICUs as this project only accounts for patients within the ICU and not those receiving intensive care ‘off-site’, e.g., in a theatre recovery or hospital ward area, the level of which is substantial.

3.5 MRSA Prevalence
The overall prevalence of MRSA (colonisation and infection) in level 2/3 ICUs increased from 7.1% in 2008 (median = 6.1%) to 7.7% in 2009 (median = 8.2%) to 8.2% in 2010 (median = 10.2%), (Figure 1). In level 3 ICUs, MRSA prevalence decreased from 11.4% in 2008 (median = 13%) to 10.2% in 2009 (median = 9.5%) to 9.3% (median = 10.1%) in 2010 (Figure 1). The prevalence of MRSA was significantly higher in level 3 ICUs compared to the level 2/3 group when comparing data over the 2008 – 2010 time period. No significant difference in prevalence between both groups was observed when comparing data from 2010 only.

Data on MRSA prevalence reflects mostly patients colonised with MRSA upon admission to the ICU. No direct information on MRSA infection was collected.

Figure 2 illustrates the quarterly trends of MRSA prevalence for all quarters from 2008 to 2010.

Figure 1. Box plot of MRSA prevalence in Irish ICUs by ICU type from 2008 to 2010. The number of participating ICUs within each group is highlighted above the box plot.

Explanation of box (or box-and-whiskers) plot: The bottom and top of the box are the 25th and 75th percentile (the lower and upper quartiles, respectively, so the box represents the interquartile range or IQR). The band near the middle of the box is the 50th percentile or the median. The ends of the whiskers represent the lowest data point still within 1.5 times the IQR of the lower quartile, and the highest data point still within 1.5 times the IQR of the upper quartile. Any data point not included
between the whiskers is plotted as an outlier with a circle. Box plots are used to display differences between populations or categories without making any assumptions of the underlying statistical distribution. They help to indicate the degree of dispersion (spread) and skewness in the data, and identify outliers.

**Figure 2.** Quarterly trends on MRSA Prevalence in Irish ICUs by ICU type, 2008 – 2010. Weekly data is averaged quarterly per ICU and a median calculated per ICU group (level 2/3 and level 3). The number of ICUs that provided quarterly data (ICU count) varied across the study period from 29 to 34 as shown in the data table.

### 3.6 MRSA acquisition in ICU

Transmission of MRSA in the ICU was monitored by capturing the weekly proportion of MRSA that were ICU-acquired. The mean proportion of MRSA that were acquired in the ICU varied in level 2/3 ICUs from 0.6% in 2008 (median = 0.5%) to 0.6% again in 2009 (median = 0.64%) to 0.72% in 2010 (median = 0.64%), (Figure 3). In level 3 ICUs, the mean prevalence varied from 0.8% in 2008 (median = 0.9%) to 0.7% in 2009 (median = 0.5%) to 0.7% in 2010 (median = 0.9%), (Figure 3). No difference in MRSA acquisition was observed when comparing data from both groups.

The majority of ICUs in 2010 (88%) had an overall proportion of ICU-acquired MRSA of <1.5%, therefore figures on MRSA acquisition remain low in the majority of general ICUs in Ireland.

Figure 4 illustrates the quarterly trends on the average weekly proportion of MRSA that are ICU-acquired for all quarters from 2008 to 2010.
Figure 3. Boxplot on the weekly proportion of MRSA that were acquired in the ICU by ICU type, 2008 – 2010. Weekly data was averaged annually per ICU and a mean calculated per ICU group (level 2/3 and level 3). The number of participating ICUs within each group is highlighted above the box plot. See Figure 1 for an explanation of the box plot.

Figure 4. Quarterly trends on the average weekly proportion of MRSA that are ICU-acquired by ICU type, 2008 – 2010. Weekly data is averaged quarterly per ICU and a mean calculated per ICU group (level 2/3 and level 3). The number of ICUs that provided quarterly data (ICU count) varied across the study period from 29 to 34 as shown in the data table.
3.7 MRSA Isolation and isolation room requirements

In level 2/3 ICUs the percentage of MRSA patients that were isolated in a single room was 61% in 2010, similar to what was observed in 2009 (63%) (Table 3). In the level 3 group on average 82% of all MRSA patients were isolated in 2010, an increase from 70% in 2009 (Table 3). Out of all participating ICUs, only 12% (4 of 33) of ICUs were capable of isolating all of their MRSA patients in a single room in 2010. There are several reasons for this, including lack of isolation room availability, isolation room occupancy for other reasons, e.g., a risk assessment prioritises other patients with infectious disease for a room, (e.g., ‘open’ tuberculosis), or insufficient staff available to care for a patient in an isolation room.

In 2010, 24% of all level 2/3 ICU patients were isolated in a single room compared to 36% of level 3 ICU patients. In the level 2/3 ICUs, 5.4% of patients in 2010 required isolation for infection control reasons but could not be isolated compared to 5.2% in level 3 ICUs.

This data does not include isolation of patients in designated cohort areas.

Table 3. Summary of weekly data captured on isolation of ICU patients in single rooms from 2008 - 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>MRSA patients isolated(^a) (%)</th>
<th>ICU patients in isolation(^b)</th>
<th>ICU patients requiring isolation but not isolated(^c)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level 2/3</td>
<td>Level 3</td>
<td>Level 2/3</td>
</tr>
<tr>
<td>2008</td>
<td>67%</td>
<td>73%</td>
<td>21%</td>
</tr>
<tr>
<td>2009</td>
<td>63%</td>
<td>70%</td>
<td>21%</td>
</tr>
<tr>
<td>2010</td>
<td>61%</td>
<td>82%</td>
<td>24%</td>
</tr>
</tbody>
</table>

\(^a\) This represents the percentage of all MRSA patients surveyed that were isolated each year within each ICU group. This includes MRSA patients within ICUs without single rooms.

\(^b\) This includes patients isolated in a single room for any reason (does not have to be for infection control reasons).

\(^c\) This includes patients requiring isolation for infection control reasons but not isolated.

3.8 Staffing:

Information was collected once a week on the number of nursing staff on duty for direct care in the ICU and the percentage of which were agency staff. Information was only collected from Q2 2010 to Q4 2010 inclusive. Figures for 2010 are summarised below (Table 4.0).

The ratio of nursing staff to ICU patient in level 2/3 ICUs was 0.7 (range: 0.4 - 1.2; median = 0.6) and in level 3 ICUs was 0.8 (range: 0.4 - 1.0; median = 0.9) Table 4. On average 1% (range: 0 - 9.6%) of the nursing staff providing direct care in level 2/3 ICUs were agency staff compared to 1% (range: 0 - 4.7%) in level 3 ICUs.
### Table 4. Summary of Staffing levels in ICU in 2010

<table>
<thead>
<tr>
<th>Ratio of Nursing Staff to ICU Patients</th>
<th>% of Nursing Staff that are Agency Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU Type</td>
<td>ICU Type</td>
</tr>
<tr>
<td>Level 2/3 (0.4 - 1.2)</td>
<td>Level 3 (0.4 - 1.0)</td>
</tr>
<tr>
<td>1% (0 - 9.6%)</td>
<td>1% (0 - 4.7%)</td>
</tr>
</tbody>
</table>

### SECTION 3: CONCLUSIONS

While there are several limitations to using a simple point prevalence surveillance tool, this project has allowed the collation of national data within current resources which have provided valuable insights into the burden of MRSA in Irish ICUs. The prevalence of MRSA is significantly higher in level 3 ICUs compared to level 2/3 ICUs when data over 2008 – 2010 is compared. This is most likely due to the difference in patient case-mix between groups. Level 3 ICUs cater for a more acute patient population with a higher risk of acquiring MRSA prior to ICU admission and post admission through increased intensity of care.

Since the prevalence of MRSA increases in high-risk patient groups, ICU data should ideally be stratified by ICU acuity (i.e., APACHE score) to allow robust comparison and avoid misinterpretation of the parameters measured. The association between intensity of care and risk for MRSA acquisition is well described. ICUs with more ‘at-risk’ patient populations are more prone to higher rates of MRSA acquisition for a number of reasons including more staff to patient contact, higher use of medical devices compared to units with less acute patients and more selective pressures induced by antibiotic therapy. This type of risk stratification is not possible with the current protocol as it was designed so that the burden of data collection was kept to a minimum. Moreover, many ICUs do not capture APACHE scores on all ICUs patients. It is therefore important to emphasise, the limitations of using a simple surveillance tool such as this point prevalence survey. A point prevalence survey only captures ICU data at a particular point in time on a single day each week rather than incidence data which capture data every day in the ICU over a particular period of time. Therefore, the purpose of this tool is for ICUs to compare their own data on MRSA over time at a local level and feedback this back to local infection prevention and control teams. It is unsuitable to compare individual ICUs.

As recommended in national MRSA guidelines, all ICUs screen for MRSA colonisation on admission to ICU and weekly thereafter. However, different hospitals are using screening methodologies with different levels of sensitivity. Moreover there are large differences in single room resources between ICUs. Effective control of MRSA in a hospital setting hinges on early detection and early isolation of positive patients. It is difficult to control MRSA transmission within a unit when the population of patients admitted have a high prevalence of MRSA on admission. While all patients are being screened upon admission, there is still a large delay in the diagnosis of MRSA using culture alone, which can take up to 48 hours or longer. Once the results are available there are often no isolation rooms available to accommodate MRSA patients therefore making the problem of containing MRSA a difficult one. An improvement in the time to diagnose patients along with an improvement in isolation room resources would enhance efforts to minimise ICU transmission of MRSA.
5.0 Appendix

APPENDIX A: MRSA IN ICU STEERING COMMITTEE

The MRSA in ICU Prevalence study was developed by members of the SARI (Strategy for the Control of Antimicrobial Resistance in Ireland) Infection Control Sub-Committee. A Steering Group was established from the members of the SARI Infection Control Sub-Committee and staff from the Health Protection Surveillance Centre in 2007 to oversee the survey and provide guidance in its development and implementation. In March 2009, members of the Irish Association of Critical Care Nurses (IACCN) and the Intensive Care Society of Ireland (ICSI) joined the steering group.

Members of the steering group include:

- Dr Fidelma Fitzpatrick, Consultant Microbiologist, Health Protection Surveillance Centre (HPSC) & Beaumont Hospital, Dublin (Chair)
- Professor Hilary Humphreys, Consultant Microbiologist, Royal College of Surgeons in Ireland & Beaumont Hospital, Dublin
- Dr Maria Donnelly, Director of ICU, The Adelaide and Meath Hospital, Dublin Incorporating the National Children's Hospital (representative of the Intensive Care Society of Ireland). **Joined January 2010**
- Dr Brian Marsh, Director of ICU, Mater Misericordiae University Hospital. **Joined January 2010**
- Ms Sheila Donlon, Infection prevention and control Nurse Manager, HPSC
- Ms Fiona Roche, Surveillance Scientist, HPSC
- Ms Mairead Twohig, Infection Control, Our Lady of Lourdes Hospital Drogheda (representing the Infection Prevention Society)
- Ms Teresa Farrell, Infection Control, Sligo General Hospital (representing the Infection Prevention Society)
- Ms. Katie Wedgeworth, Lecturer, School of Nursing Midwifery & Health Systems and Programme leader of the Graduate Diploma in Nursing Studies (Critical Care), University College Dublin, representing IACCN and **who joined in March 2009**
- Ms Martha Hanlon, CNM3 ICU & HDU, Mater Misericordiae University Hospital. **Joined later in 2009**
APPENDIX B: CAVEATS

- As this is a point prevalence study, not all cases of MRSA colonisation and infection within the ICU each week are reported. Each week a proportion is calculated to reflect a snapshot in time and then this is averaged over a longer time period (i.e., quarterly and yearly). Only confirmed results are recorded on the weekly census.

- The rules that apply to a point prevalence survey have not been applied to calculate the weekly proportion of ICU-acquired MRSA, to better capture a sense of the problem of MRSA transmission in ICUs. For this analysis, it was decided that each week only new acquisitions of ICU-acquired MRSA that occurred during that week were captured and those patients who acquired MRSA during the week still had to be present within the ICU on the day the census was taken in order to be included in the survey. The figures do not reflect data collected on all patients within the ICU over the three quarter period. It is only a snapshot of the ICU at one point in time each week. This analysis provides a crude estimate of the problem of MRSA transmission in ICUs. It is by no means a definitive rate.

- Due to the large variability in ICUs in acuity, size and the provision of infection prevention and control resources, it is inappropriate to make direct comparisons between ICUs. Hospitals with more ‘at-risk’ specialities are likely to experience a higher rate of MRSA colonisation/infection than hospitals with more ‘low-risk’ specialities. Hospitals should ideally be stratified into common cohort groups to allow comparison of ICU performance however, data capture of a robust measure of patient acuity (e.g. APACHE score) was too onerous to collect. ICUs are only stratified by ICU type to account for general ICUs that cater for mixed categories of patients i.e., high dependency and coronary care patients. In this report hospitals may compare their ICU to others of a similar grouping but it should be stressed that any comparisons are crude.

- Hospital laboratories are using different MRSA screening methodologies with different levels of sensitivity which will in turn have an impact on a hospital’s MRSA prevalence.

- In this study the definition of an isolation room is a basic single room that does not necessarily have additional infection prevention and control features such as an anteroom and negative pressure ventilation. There are differences between hospitals in the number and quality of isolation rooms. Therefore hospitals have varying capacities to effectively isolate patients appropriately to reduce the spread of MRSA.

- The number of MRSA cases reported, particularly for smaller hospitals, may be low at a quarterly level and small differences in the numerator or denominator may dramatically affect the rates calculated. It is therefore not recommended to make comparisons between hospitals.
REFERENCES
