

# Embedding a hospital-wide culture of infection control to reduce MRSA bacteraemia rates

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## Abstract

Coping with increasing demands on staff and time and the scrutiny of the Department of Health, the infection control team at Worcestershire Acute Trust reduced the prevalence of Methicillin-Resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* by focusing on MRSA screening, environmental cleanliness and antibiotic stewardship. Set with a task of bringing all clinical and managerial staff together, the team got every directorate undertaking its own audit and root cause analysis. The appointment of a new MRSA screening clerk caused an increase in screening compliance to over 90%.

## Introduction

Worcestershire Acute Hospitals NHS Trust provides a wide range of services to a population of around 550,000 people in Worcestershire as well as caring for patients from surrounding counties. It has 748 beds spread across three hospital sites: Worcestershire Royal hospital (WRH), the 20-year old Alexandra hospital (ALX) at Redditch and Kidderminster hospital. The hospitals are within 20 miles of each other. WRH is a newly-built private finance initiative (PFI) development with an older block. The Kidderminster hospital combines a purpose-built independent treatment centre with buildings housing medical beds and a general practice unit.

The infection control team is made up of eight infection control and audit nurses, three administrative

posts and two seconded nurses, all working to reduce healthcare-associated infection.

In addition, the hospital supplies an infection control service to several primary care hospitals in the surrounding area of Bromsgrove, Evesham and Malvern. Most diagnostic work, including liquid tuberculosis culture and virology, is carried out in-house on the WRH and ALX sites.

## Challenges

The team struggled to cope – losing its head nurse coupled with poor accommodation, wide-flung hospitals sites and an increasing workload. In September 2007, the hospital's MRSA blood stream infections (BSI) rate was noted by the Department of Health, which led to a difficult inspection and a long

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list of tasks. The DH wanted to see evidence that the hospital had achieved change and if it was being reflected by a decrease in infection rates.

### MRSA rates

There was a failure to screen risk groups and to communicate results to teams as patients with MRSA bacteraemia moved through hospitals. Identifying patients that needed screening had also become more difficult after broadening the risk groups in September 2007.

### Antibiotic prescription

During six months of rounds, 330 prescriptions were reviewed and 14.3% of patients were found to be on antibiotics for more than five days without good reason. The hospital wanted to improve the stewardship of prescription.

### Culture change

For a large organisation to change its culture, new practices would have to be adopted at every level to reduce MRSA BSI rates.

### Rates of *C. difficile* associated disease (CDAD)

The hospital realised that regular weekly self-audit needed to be introduced in ward areas to control infection. Additional inspections by infection control nurses had to be enforced.

### Actions

The hospital was faced with a huge task to embed a culture of infection control on all levels and ensure that clinical and managerial staff worked together. At the same time, members of the infection control team would have to focus on several activities where progress could be made to control and reduce infection rates.

### MRSA screening

Universal screening for MRSA has yet to be introduced nationally and business cases for rapid screening methods are still in their working stages. Laminated charts listing all the screening categories had only proved partially successful. Therefore, in November 2007, the hospital introduced a new administrative post. The post holder reviews all the admissions to certain targeted wards on a daily basis. This involves

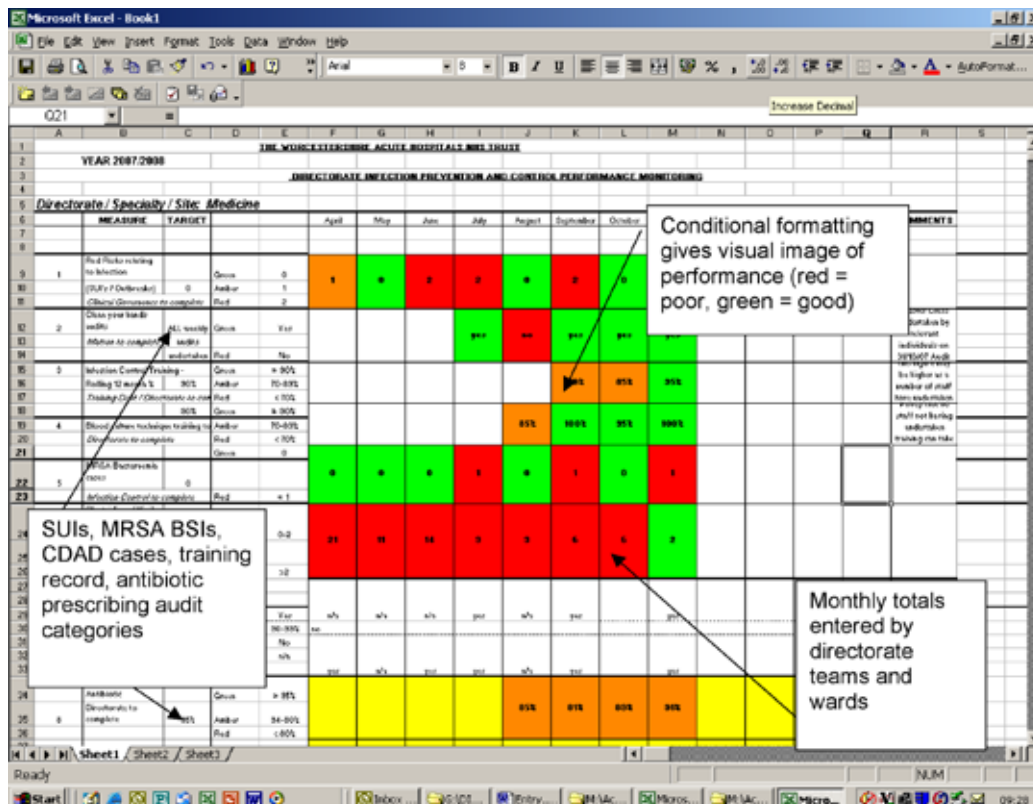
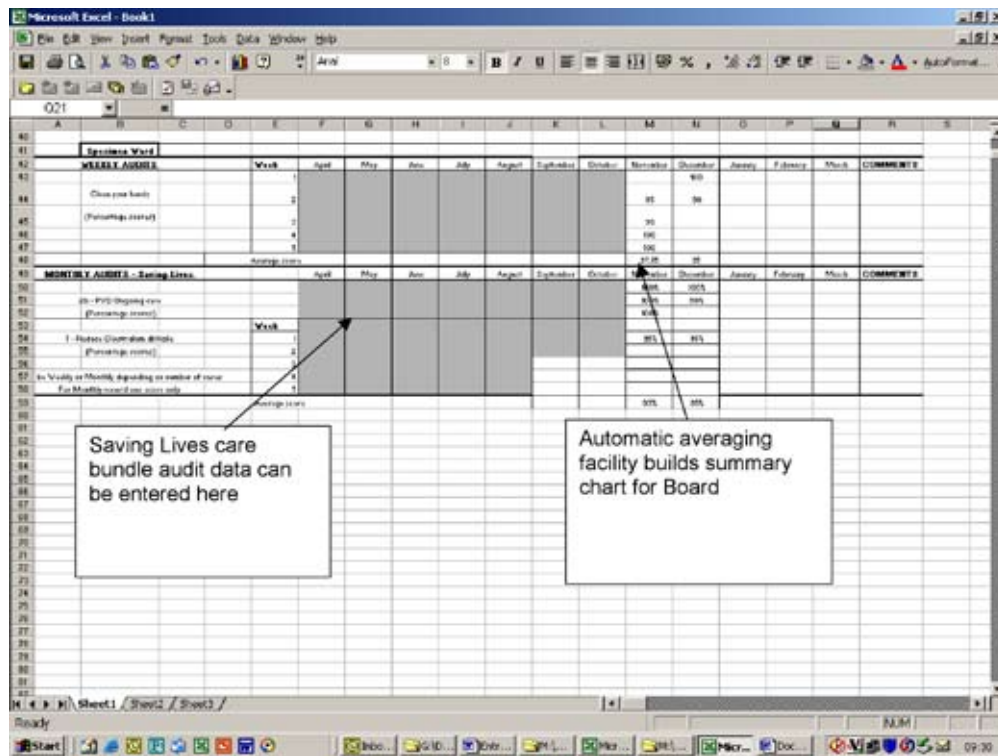


Figure 1. Worksheet from Balanced Scorecard, Section 1



**Figure 2. Worksheet from Balanced Scorecard Section 2**

checking the previous MRSA status of each admission in the laboratory record – something which was very badly done by clinicians. The clerk also checks whether the patient has any previous admissions. A finding of either previous positive MRSA status, previous admission or nursing home provenance would prompt a check for an MRSA screen on admission. If tests fail to reach the laboratory, the clerk is then responsible for chasing up the matter and reminding the ward.

### ***Cleanyourhands campaign***

The hospital decided to re-launch the Cleanyourhands campaign with Pipamedia talking boxes. These are triggered by movement and can be programmed to deliver a variety of short, instructional messages, for example, 'gel hands now'. The boxes are tamper-proof and can be programmed to turn off at night or at mealtimes. This infection control venture was highlighted in the media thus further educating the wider community.

### ***Root cause analysis of all MRSA BSIs and CDAD deaths within the agreed Department of Health timeframe***

The team persuaded the clinicians to complete investigations on all cases within five days. One

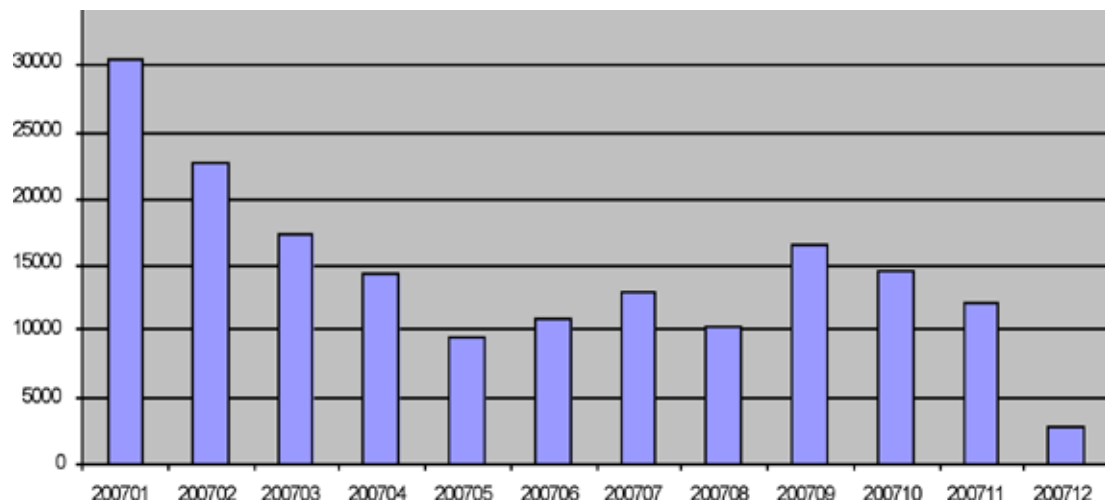
member of staff was appointed to chase up progress and devised a spreadsheet to monitor developments. General managers, matrons, secretaries and clinicians were recruited to assist in the task.

### ***Environmental cleanliness***

WRH has contract cleaning so it was harder to influence practice. But ALX has in-house cleaning so there is more capacity to influence practices. The team introduced a programme of rolling steam cleaning to all ward areas. A rapid response cleaning team then undertakes terminal cleaning of barrier rooms and closed bays.

### ***Antibiotic stewardship***

The team mounted a threefold programme of antibiotic stewardship, which comprised very selective antibiotic sensitivity reporting, a full review of the antibiotic guidelines with the removal of all cephalosporins and quinolones – except for one or two specialised indications (for example, cefalexin for the treatment of urinary tract infection in pregnancy or patient allergy to penicillin) and antibiotic rounds for two wards where prescriptions are reviewed weekly and jointly with the pharmacy team.



**Figure 3. Ciprofloxacin use, medical directorate ALX January – December 2007**

***Infection control audit within directorates***

The team got every directorate undertaking its own audit and root cause analysis. The Department of Health had provided the hospital with an Excel spreadsheet containing a balanced scorecard for recording the performance of the directorates. It was ready to use after considerable tailoring by the team and several training sessions. Figures 1 and 2 show a representative worksheet for a fictitious directorate. Conditional formatting gives visual checks on progress – green for satisfactory, red for risk. Now an automatic averaging facility is being built for at-a-glance results. One member of staff has also been assigned the task of regularly monitoring the completion of the balanced

scorecard and prompting those departments that may have fallen behind with their audits.

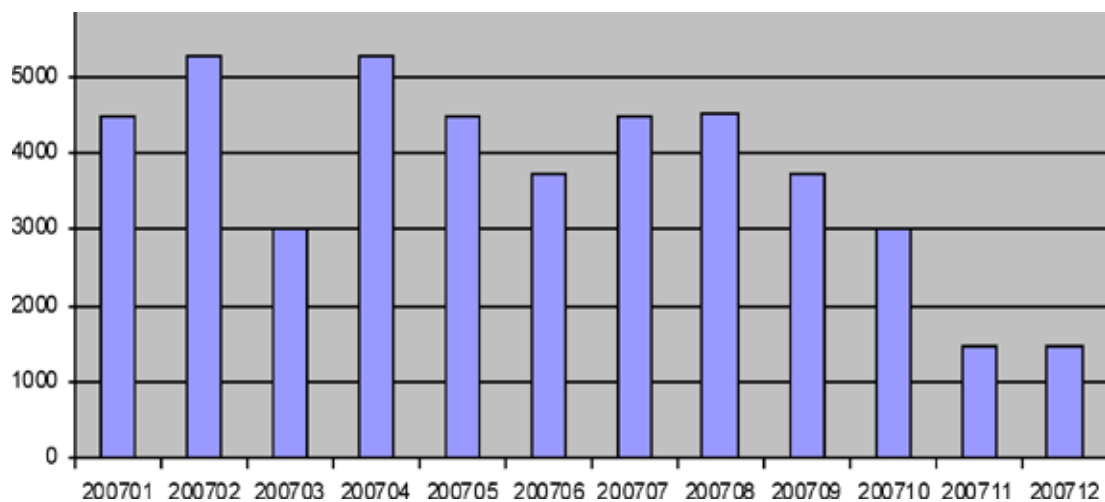
**Outcomes**

***MRSA rates***

One hospital at the Trust saw a decrease in its >48hrs MRSA BSI rate to no cases from November 2007 until June 2008. The introduction of the new clerical post also coincided with a major decline in MRSA BSIs.

***C. difficile***

Following the introduction of steam cleaning at ALX, there was a decline in CDAD cases from 80 in the period April-June 07 to 23 in the period April-June 08. Building



**Figure 4. Cephalosporin use, surgical directorate, WRH January – December 2007**



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### The team received the first prize in 2007/08 OXOID award

on this success, the hospital plans to establish an isolation ward for CDAD cases at both hospitals.

#### **Compliance**

Compliance with MRSA screening protocols on chosen wards has increased from about 50% to usually over 90%.

#### **Screening requests**

There was a dramatic increase in MRSA screening requests at both the Worcester and Alexandra laboratories at the hospital.

#### **Antibiotic usage**

The combined effect of the antibiotic stewardship strategies has led to a decline of cephalosporin and

quinolone usage across the hospital. Figures 3 and 4 show tonnage data for representative directorates.

#### **Conclusion**

The hospital successfully removed itself from the surveillance of the Department of Health. More important is the slow and hopefully sustained improvement being made in a number of areas of infection control practice. Like all large tasks, there will be times when things are out of control. For example, there was a flurry of CDAD cases on one of the hospital's surgical wards that was alarming. However the directorate moved immediately to check audit results, explain poor performance and investigate individual cases. The difference is that all this was left to the infection control department in the past. Now, clinical staff have acknowledged that their role is just as important.