

REDUCING HEALTHCARE ACQUIRED INFECTIONS – GOOD PRACTICE OUTSIDE NORTHERN IRELAND

Introduction

It is believed that changes in the hospital environment have led to the spread of MRSA and other healthcare acquired infections in the UK. These changes include a reduction in the number of beds, decreased length of stay so patients leave before MRSA is detected, increased staff workload, and high rates of bed occupancy, sometimes more than 100%. Although specifically MRSA rates may differ between European countries, overall, according to the Health Protection Agency, healthcare acquired infections are not significantly different¹.

Current recommendations that MRSA-colonised patients admitted to healthcare facilities should be identified by active surveillance cultures and placed in contact isolation are based on good evidence of cost-effectiveness. This has been substantiated by a systematic review of the literature. There is ample observational evidence for the effectiveness of this approach in low-prevalence countries such as the Netherlands, which have been able to reduce MRSA prevalence to below 1% by an aggressive strategy of 'search and destroy'. There is also mounting evidence that the spread of MRSA can be contained by similar strategies in endemic settings².

This briefing paper outlines specific examples of good practice found outside Northern Ireland, including the countries of the UK, Republic of Ireland, European countries and the US. Much of the work focuses on MRSA. The paper should be seen as a work in progress as some information is still outstanding and the Committee may well be aware of other good practice.

1. England

Saving Lives delivery programme: Dept. of Health – Policy and Guidance

The programme is designed to support organisations and individuals in reducing healthcare associated infections like MRSA.

The following examples of good practice are taken from the *Clean Safe Care* website which is a hub of information, tools and news about reducing healthcare associated infections and providing clean, safe and reliable healthcare.

www.clean-safe-care.nhs.uk

¹ Leifer, D (2005), Why do rates of healthcare-associated infection vary so widely across the continent?, *Nursing Standard*, vol 19(52) pg 20

² Struelens, M.J. and Denis, O. (2006), Can we control the spread of antibiotic-resistant nosocomial pathogens? *Current Opinion in Infectious Diseases*, 19: 321-322

Bolton Hospitals NHS Trust

Bolton Hospitals NHS Trust has made significant reductions to its MRSA bacteraemias and has signed up to the NHS Saving Lives delivery programme as part of a five-year strategy for quality improvement with the following key outcomes:

- The impact of HCAI on Trust business has been recognised by the board;
- Quality is at the centre of Trust plans; and
- There is senior ownership and leadership for the infection control agenda.

Guys' and St. Thomas' NHS Foundation Trust, London

This is one of England's largest NHS Foundation Trusts. It is a major tertiary referral centre, therefore admitting many sick patients from other hospitals, some of whom already have MRSA infection when they arrive. It has introduced a series of high-impact interventions for infection control including:

- Education and communication programmes for all staff;
- Hand hygiene campaigns aimed at staff and visitors;
- An MRSA care pathway, including screening of patients in high-risk areas for MRSA;
- An enhanced programme of intravascular device management based on national guidelines (the Trust found that 50% of its bacteraemias were associated with such lines); and
- A programme of environmental cleaning and refurbishment.

Its interventions were successful in reducing the number of patients acquiring MRSA at the Trust from 192 to 79 per year since 2003, despite the fact that the number of patients admitted to the hospital with MRSA has risen from around 40% in 2003 to around 70% in 2005. The success is also attributed to a clear Trust-wide priority for infection control, strong leadership and support at a senior level and support from staff at all levels.

Leeds Teaching Hospitals NHS Trust

From 2005 onwards a total of 12 infection control objectives for the Trust Executive Directors were agreed. At the same time, each Trust clinical directorate was required to commit to a plan to address infection control issues. Specific projects included the cleanyourhands campaign, hand hygiene signs (in the most common languages) at the entrances to all hospitals and wards, peri-operative mupirocin-based prophylaxis against MRSA and MRSA risk factor analysis in targeted clinical areas with high incidences of MRSA bacteraemia.

The key outcomes looked for were:

- Targeted decolonisation of high-risk patients;
- 20% reduction in MRSA bacteraemia in one year and reductions in other HCAs e.g. *Clostridium difficile*; and
- Trust-wide ownership of infection control clinical and managerial engagement.

As a result MRSA bacteraemia cases have fallen by 20% by 2005/06 compared to 2003/04 and reports of *Clostridium difficile* and ward closures due to viral gastroenteritis have also decreased.

Royal Wolverhampton Hospitals NHS Trust

This Trust has been awarded the International 2006/07 Oxoid Infection Control Team of the Year Award. It established its Infection Control Board as a new sub-group of the Trust Board and therefore gained involvement from the top down. They identified

sensible performance indicators and targets and also leads and champions to provide more effective routes of communication and share best practice in infection control.

The MRSA bacteraemia rates fell, multi-faceted initiatives to reduce *Clostridium difficile* associated diarrhoea were put in place (including a root cause of every case) and practice improvements throughout the Trust have reduced to zero cases of *Acinetobacter baumannii* colonisation and infection since August 2006.

Leicester University Hospitals (UHL) NHS Trust

Leicester hospitals reduced the number of MRSA blood stream infections by 25% (from 132 to 99 cases) from 2003/04 to 2005/06. The targets were to reduce by 40% by 2006/07 and 60% by end of 2008. The hospitals have been identified by the Dept. of Health as leading the way in the fight against MRSA.

UHL were given one of five international awards at the 2005 Oxoid Infection Control Team Awards Ceremony.

The systems and processes introduced at the Leicester University Hospitals NHS Trust include:

- Increased profile of the importance of hospital cleanliness and infection prevention in all staff training;
- Constant programme of inspection of wards and other clinical areas by senior members of the cleaning teams, Matrons and the Infection Prevention and Control Service;
- Hand hygiene campaigns, including alcohol gel at every bedside;
- Infection control service offering advice and support for all Trust staff;
- Patient information leaflets;
- Surveillance of infection rates; and
- Infection Control Teams from UHL, the community hospitals, nursing and residential homes regularly meet to share evidence of good practice.

The Queen Elizabeth Hospital NHS Trust, King's Lynn

To decrease the incidence of infections caused by MRSA, an educational intervention study was initiated in 2005. The study focused on appropriate antibiotic prescribing in which the use of agents associated with subsequent infections caused by MRSA and *Clostridium difficile* was discouraged. In conjunction with the usual infection control practices at the Trust, the intervention resulted in a reduction in the use of certain antibiotics and a significant decrease in episodes of MRSA bloodstream infections and infections caused by *C. difficile*. The intervention involved:

- Designing new antibiotic guidelines, which were ratified by the Antibiotic Stewardship Committee;
- Lectures delivered throughout the Trust;
- Microbiologist routinely attending ward rounds in haematology and the critical care unit; and
- Microbiologist performing general infectious diseases consultations.

2. Scotland

Golden Jubilee National Hospital, Clydebank

This hospital is one of those in Scotland currently piloting an MRSA screening programme which is to be rolled out across Scotland in 2009. The screening programme involves patients entering hospital being screened for MRSA as part of a package of measures. The Health Secretary stated *“the Golden Jubilee National Hospital in Clydebank, where the system is in place has not had a single MRSA infection for two years”*³.

The senior infection control manager at the Golden Jubilee outlined other attributes contributing to their success including a strict cleaning culture *“Hygiene is everyone’s job, not just all those who work at the hospital but also patients and visitors...we have single rooms for patients and simple things such as the fact that staff have to pass a basin on the way into the room and again on the way out help to reinforce the right culture of hygiene”*⁴

University of Abertay, Dundee with TPLD (UK developer of game-based learning)

*“By combining a computer games environment and a mathematical algorithm used to simulate the spreads of MRSA in a hospital, TPLD one of the UK’s leading developers of game-based learning solutions and technology, in conjunction with the University of Abertay, Dundee, has created an MRSA awareness and Training Tool with which doctors, nurses and patients can learn together and understand correct healthcare acquired infection policy and procedure and the consequences of not following these properly”*⁵.

3. Wales

Gwent Healthcare NHS Trust

Gwent Healthcare Trust has lowered the rate of MRSA infections on an orthopaedic ward⁶ at Neville Hall Hospital for patients about to undergo joint replacement through a ‘search and destroy’ screening approach. A strict protocol, established in 2002, is in place to ensure patients are screened before they are admitted. Only patients who are confirmed not to be colonised with MRSA are admitted and patients who test positive are decolonised before being admitted. High risk patients (during their stay) and staff are also regularly screened for MRSA. If a patient is found to be MRSA positive after admission they are removed to another ward, surgery is halted until there has been a thorough clean of the ward and all patients are confirmed free of MRSA. Surgeons also try not to carry out elective procedures after an emergency admission to the ward as such patients will not have been screened prior to admission.

³ Hospitals to screen patients on arrival for MRSA (The Herald, Nov. 26, 2007)
www.theherald.co.uk/politics/news/display.var.1858342.0.0.php

⁴ Is this the only hospital in Scotland beating MRSA? (Evening Times, Oct. 31, 2005)
http://tahilla.typepad.com/mrsawatch/2005/10/is_this_the_onl.html

⁵ Preventing MRSA is ‘Name of Game’ The Clinical Services Journal, May 2007
www.clinicalservicesjournal.com/Story.aspx?Story=2221

⁶ www.wao.gov.uk/1748.asp

There was only one hospital acquired MRSA infection in the ward between 2002 and 2004 and none in 2005 or 2006.

Cardiff and Vale NHS Trust

The Cardiff and Vale NHS Trust, which runs 9 hospitals, has decreased its MRSA rates by more than 60% in the five years up to 2006. The Trust's campaign⁷ includes encouraging regular hand hygiene and improved standards of cleanliness by all staff. The director of infection, prevention and control at the Trust noted that it was the first Trust in the UK to recognise the benefits of using alcohol gel to combat the spread of infections and to create the post of director of infection control and prevention.

The Trust was recognised as a centre of good practice by the Irish lobby group MRSA and Families. The Group visited the Trust in 2006.

Morrison Hospital, Swansea

Patients for elective hip and knee joint operations at Morrison Hospital are routinely screened so that they can be decolonised before admission and go ahead with the surgery when they receive the all clear⁸.

4. Republic of Ireland

Rotunda Hospital, Dublin

In 2005 the Rotunda Maternity Hospital became the first maternity hospital in the Republic of Ireland to be accredited by the Irish Health Services Accreditation Board. To achieve this every aspect of the hospital's service was examined and evaluated by a panel of international experts. One of the areas in which it was judged was its stringent infection control practices. At the time of the award MRSA infection did not represent a problem for the Hospital due in part to the stringent infection control practices that the Hospital has in place.

5. Channel Islands – Jersey

Due to an aggressive 'search and destroy' Jersey is at the top of the best performing health services in Britain against MRSA and there were no cases of blood infection recorded in Jersey in 2006⁹.

6. The Netherlands

Erasmus University Medical Centre, Rotterdam, The Netherlands

The Netherlands has had major success in keeping MRSA out of its hospitals. One of the leading places for developing effective strategies to achieve this is the

⁷ MRSA control skills shown to families, Greg Tindall, South Wales Echo, Sept. 2, 2006

<http://icwales.icnetwork.co.uk/news/health-news>

⁸ Screening gives MRSA a beating, Colin Hughes, The Western Mail, Sept. 21, 2004

<http://icwales.icnetwork.co.uk/news/wales-news>

⁹ Hospital winning war on MRSA, Andy Sibcy, Jersey Evening Post, 26/05/2007

Erasmus University Medical Centre in Rotterdam¹⁰. In 2002, at a neighbouring hospital, there was a sudden increase in the cases of MRSA, rising from an average of 400 to 1,200 cases.

At the 1,200-bed Erasmus Medical Centre University Hospital, there were about 20 positive cases of MRSA per year. In 2002 this rose to 70. By 2004 there was no MRSA in the outbreak hospital and other incidents are quickly eradicated using 'search and destroy'.

One of the main reasons for success was 'search and destroy' which involves the early detection, early identification and early containment of infection and encompasses patients, healthcare workers and the healthcare environment. The critical success factors in the Netherlands were:

- A national policy on infection prevention and control benchmarked by the Healthcare Inspectorate;
- National laboratory guidelines on detection and the transportation of patients from abroad;
- Local infection control committees implement policy; infection control facilities exist such as isolation rooms and there are trained healthcare workers;
- All new healthcare workers are educated about healthcare-associated infections;
- There is risk classification of patients and healthcare workers (Class A - proven, Class B -high risk, Class C - increased risk Class D - no risk)
 - Class A and B - strict isolation on admission, pending culture test results
 - Staff that come into contact with those patients wear gloves, a gown, mask and cap
 - Class C are screened and limited contact made until proven negative
 - Class A staff are removed from the hospital immediately and stay at home until proven negative
 - Class B are restricted in their movement at work until proven negative;
- In the event of an outbreak the ward closes and only reopens after all patients and healthcare workers are negative, the ward is disinfected and non-disinfected material, such as paper, is destroyed.

Another backbone in the prevention of resistant bacteria in The Netherlands is the implementation of a strict antibiotic policy in Dutch hospitals. This is steered by local committees and many hospitals produce their own formularies with lists of 'first choice' compound and their indications for use. Rates of resistance of clinically important bacteria are low and older antibiotics continue to be first line drugs in the treatment of serious infections, including those on intensive care units¹¹.

¹⁰

http://www.dh.gov.uk/en/Policyandguidance/Healthandsocialcaretopics/Healthcareacquiredinfection/Healthcareacquiredgeneralinformation/TheeliveryprogrammetoreducehealthcareassociatedinfectionsHCAincludingMRSA/DH_4102049

¹¹ www.eurosurveillance.org/em/v05n03/0503-222.asp

7. Norway

Rikshospitalet, Oslo

The following description of infection control in this hospital was made by the Head of Infection Control for the Norwegian Nurses' Association¹²:

- Very restrictive antibiotic policy;
- National guidelines in handling patients with MRSA in all settings:
 - Patients who have been in healthcare facilities in any country outside Scandinavia and the Netherlands in the previous six months are put in single rooms, contact isolated and screened; and
 - If an employee tests positive, the person will be taken off duty, put on sick leave on full sickness benefit until three negative results are shown;
- System is well organised but requiring a lot of resources and is time consuming for all personnel involved.

8. Slovenia

University Clinic of Respiratory and Allergic Diseases, Golnik, Slovenia

In October 2001 a nationwide prevalence study in 19 Slovene hospitals revealed a 62% prevalence rate of MRSA among all *S. aureus* isolates responsible for nosocomial infections. Two other investigations in Slovene ICUs in 1997 and 2001 showed prevalence rates between 60% and 75%. Hospitals with high endemic MRSA carrier rates often have concerns about high costs and limited benefits of aggressive infection control.

This study in the University Clinic of Respiratory and Allergic Diseases¹³ evaluated the effectiveness and feasibility of an aggressive infection control strategy to reduce nosocomial transmission of MRSA during 5 years from 1998 to 2002. The strategy was based on 'search and destroy' and included:

- Promotion of hand hygiene;
- Active surveillance cultures at admission to identify MRSA carriers;
- Barrier precautions for patients with MRSA;
- Eradication of MRSA carriage (decolonisation); and
- Continuous education of healthcare workers on hygiene procedures.

Overall the study indicated that an active infection control program is effective in preventing nosocomial spread of MRSA in highly endemic settings. The active surveillance cultures at admission indicated that prior to this strategy about half of MRSA cases were being missed. Although the annual incidence of MRSA did not decline significantly, overall the acquisition of MRSA at the hospital was reduced from 50% to 6.1% of all MRSA cases and most patients with MRSA were transferred from other hospitals or nursing homes.

¹² Wipe it Out, RCN Campaign on MRSA, *Nursing Standard* (2005), vol 19 (52), September 7

¹³ Tomic, V. et. al., (2004) Comprehensive Strategy to Prevent Nosocomial Spread of MRSA in a Highly Endemic Setting, *Arch. Intern. Med.*, vol 164, pgs 2038-2043

9. France

Rouen University Hospital, Normandy

Overall hospitals in France have reduced MRSA by 8% in four years, in part due to nurses being made responsible for cleanliness and strict isolation of infected patients. At Rouen University Hospital in Normandy¹⁴ a nurse spokesperson said that the reason French hospitals were so clean was that simply that cleaning never stopped and they were scrubbed from top to bottom. In addition the hospital enforces strict infection control and staff are not permitted to wear their uniforms outside of the hospital.

10. Finland

Hospital District of Helsinki and Uusimaa

Health Officials in Finland are hoping to prevent a situation in which MRSA becomes as prevalent in Finland as it is in a number of other countries, including the UK and the USA¹⁵. An increase in infections saw the government grant EUR 2.2 million extra in 2005 for fighting MRSA. The money has been mainly spent in opening new MRSA wards to isolate patients and in hiring new employees e.g. in the Hospital District of Helsinki and Uusimaa (HUS) more than 60 new positions were set up last year to fight MRSA and the efforts appear to be paying off as the head physician at the Clinic of Infectious Diseases at the HUS stated that the epidemic in the hospitals of the Helsinki region had been brought under control and infection rates are only one third of that of previous years.

11. Israel

Meir Medical Centre (Kfar Saba, Israel)

Israel is a country where MRSA is endemic; the annual prevalence of methicillin resistance among *S. aureus* isolates recovered from hospitalised patients ranges from 40% to 60%.

This hospital in Israel is a 700-bed community hospital which evaluated the effect that the implementation of SHEA¹⁶ guidelines for active surveillance would have on its MRSA levels. The guidelines recommend that patients with a high risk of carrying MRSA should undergo active surveillance for MRSA upon admission to hospital. This active surveillance forms the basis of the 'search and destroy' policies of Scandinavian countries and The Netherlands, where the prevalence of MRSA is low.

The study undertook active surveillance culture upon admission for high risk patients and patients carrying or infected with MRSA were placed in contact isolation in single rooms or if none available the patient was put in a room with other patients with a distance of 1 bed between them and other patients. MRSA carriers who remained in the hospital received a specified eradication treatment comprising a nasal ointment and showering with chlorohexidine.

¹⁴ *We Can Learn From French*, Nicola Stow, The News of the World, 21 Oct. 2007

¹⁵ www.hs.fi/english/print/1101981437194

¹⁶ SHEA – Society for Healthcare Epidemiology of America

Providing research and information services to the Northern Ireland Assembly

The results showed that dealing with MRSA is possible in an area where the pathogen is endemic as the measures led to the mean number of MRSA bacteraemia cases per month decreasing from 3.6 before the interventions to 1.8 afterwards.

12. USA

Hospital of St. Raphael, New Haven, Connecticut

This hospital took a successful staged approach to active surveillance cultures¹⁷. Initially a surgical intensive care unit (SICU) and the haematology/oncology ward were selected to start active surveillance cultures. The unit and ward had ongoing transmission of MRSA with infections, despite implementing precaution policies and alcohol-based hand rub. All patients admitted to the two units were screened on admission and weekly thereafter. Colonised or infected patients were isolated.

Results for nine months showed more than 800 patients were admitted - 89 per cent had an admission culture tested as recommended. Out of those, 4.5 per cent had MRSA (and a history of it) and the same number of patients was positive for MRSA (without history). So in taking the cultures the hospital detected 50 per cent of all the patients admitted to the ward and unit with MRSA. A comparison of a baseline six-month period before the culture surveillance revealed there was a significant drop in MRSA infections in the unit and ward.

The hospital also screened stool specimens for MRSA as patients with loose or liquid stools that contain MRSA are likely to be sources of transmission. In 2003 more than 1,500 patients had one or more specimens submitted, about 10 per cent had MRSA - 62 per cent of those had no history of MRSA. Of them 75 were inpatients - with only 15 in isolation. This policy detected people with unknown MRSA colonisation and were isolated sooner than if this initial test had not been performed.

Pittsburgh Regional Health Initiative (central line – intravenous catheter – infections)

The US Centre for Disease Control estimates that bloodstream infections arising from the insertion of a central line (an intravenous catheter) affect up to 250,000 patients a year in the US, killing 15% or more of this number¹⁸. Thirty-two hospitals in 10 southwestern Pennsylvania counties participated in the intervention, including 28 of the 39 acute care hospitals that provided intensive care services in the six-county Pittsburgh metropolitan statistical area¹⁹.

The participating hospitals of the Pittsburgh Regional Health Initiative²⁰ began a strict enforcement of safety guidelines in 2001 and the strict implementation of a set of practices (a bundle) known to reduce the risk of infections during catheter insertion. The intervention was designed collaboratively and led by infection control staff from

¹⁷ http://www.dh.gov.uk/en/Policyandguidance/Healthandsocialcaretopics/Healthcareacquiredinfection/Healthcareacquiredgeneralinformation/TheDeliveryProgrammetoreducehealthcareassociatedinfectionsHCAIincludingMRSA/DH_4102049

¹⁸ Spear, S. (2008), Fixing Healthcare from the Inside, Today, Harvard Business Review, 24/01/2008

¹⁹ Reduction in Central Line-Associated Bloodstream Infections Among Patients in ICUs – Pennsylvania, April 2001-2005, CDC MMWR, Oct 14, 2005/54(40); 1013-1016

²⁰ A regional collaboration built on clinical working groups to share best practice throughout the region
Providing research and information services to the Northern Ireland Assembly

participating hospitals. The bundle included the use of large sterile barriers, gowns, gloves, masks and head coverings; application of skin antiseptics; insertion of the catheter in the neck rather than the groin area; and completion of a check list verifying that all procedures were followed. All were used correctly with the empowerment of nurses to intervene when protocols were not followed²¹.

Overall, the pooled mean rate of central line-associated bloodstream infections decreased in participating ICUs by 68% from 4.31 to 1.36 per 1000 central line days²²

John Hopkins Medicine, Baltimore

As with the Pittsburgh initiative a set or 'bundle' of specific evidence-based practices is being used to reduce catheter-related bloodstream infections. The work began in 1998 in an ICU and resulted in the near elimination of such infections by 2002²³

Michigan Keystone ICU Project and the new HCI Project

In 2005, this Michigan Keystone ICU project was believed to be the largest patient safety collaborative of its kind in the world with 127 Michigan ICUs and 70 Michigan hospitals participating.

Hospitals participating have reduced central line infections by nearly 50% and of the participating ICUs, in 2005, 68 ICUs had reported zero bloodstream infections and zero ventilator associated pneumonias for at least six months.

The toolkit used consisted of a series of recommendations based on current research and best practices developed by a nine-member volunteer working group of health professionals²⁴.

January 2009

²¹ www.premierinc.com/all/safety/topics/bundling/region-state.jsp

²² Reduction in Central Line-Associated Bloodstream Infections Among Patients in ICUs – Pennsylvania, April 2001-2005, CDC MMWR, Oct 14, 2005/54(40); 1013-1016

²³ www.premierinc.com/all/safety/topics/bundling/region-state.jsp

²⁴ www.premierinc.com/all/safety/topics/bundling/region-state.jsp