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Saving Lives – an epic quest to promote an evidence-based approach for preventing healthcare-associated infections in the National Health Service in England

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Since its inception more than half a century ago, the National Health Service has continued to transform and improve the health and wellbeing of the Nation. Now treating a million people every 36 hours, the NHS provides an unprecedented range of clinical interventions that can mend accidental damage, prevent, identify and manage or cure disease, and prolong quality life. However, hospital care and healthcare interventions are always associated with potential hazards, including the risk of acquiring an infection during care. Those patients most at risk are often the most vulnerable and chronically ill in our society and they and their families suffer needlessly because healthcare-associated infections are largely preventable. During the last decade, the Richard Wells Research Centre (RWR) in the Faculty of Health and Human Sciences at University of West London (formally Thames Valley University) has collaborated with the Department of Health and a variety of other governmental organisations and professional societies to develop an evidence-based approach to preventing healthcare-associated infections. This article describes the impact of our work and our journey in partnerships to support sustainable improvements in patient care, enhance patient safety and ultimately save lives.

Keywords | *Healthcare-associated infections; National Health Service; public health; infection prevention; patient safety*

Background

Acquiring new infections in hospitals and in primary and community care settings during episodes of healthcare are a real and constant threat to patient safety in all healthcare systems throughout the world. These infections are referred to as healthcare-associated infections (HCAI), and although there are no national aggregate data on the total number of HCAI in England, the Department of Health (DH [cited in this paper as GB.DH i.e Great Britain. Department of Health]) and successive National Audit Office (NAO) reports estimate that 300,000 patients receiving care and treatment in the NHS acquire a HCAI each year (House of Commons 2009; NAO, 2009). These infections often worsen the patient's underlying medical or surgical condition and for some result in serious disability or death. In 2007, meticillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections or *Clostridium difficile* infection was the underlying cause or a contributory factor in the deaths of 9,000 patients (Office for National Statistics, 2008; NAO, 2009). However, this figure is likely to underestimate the true mortality rate from HCAI due to the manner in which death certificates were completed at the time. In addition, the acquisition of HCAI will frequently prolong patients' recovery and delay their discharge from hospital, which in turn increases waiting times for new admissions. These infections are estimated to cost the NHS over £1 billion each year (Plowman et al.1999) and incur massive reputational damage as the public becomes frightened and loses confidence in the ability of those who work in the NHS to care for them safely.

Almost from the beginning of the modern antibiotic era in the1950s, pathogenic microorganisms responded to the increasing use of antibiotics by continuously and inexorably developing resistance to the therapeutic effects of an ever-expanding range of newly developed antimicrobial drugs, limiting their clinical effectiveness and rendering many ultimately useless. Antimicrobial resistance is not a phenomenon restricted to just MRSA but also frequently occurs in many other bacterial pathogens that are increasingly involved in causing HCAI, especially multi-resistant Gram-negative bacteria. Multiple drug-resistant infections are often more difficult and expensive to treat and are more frequently associated with serious complications and poor clinical outcomes.

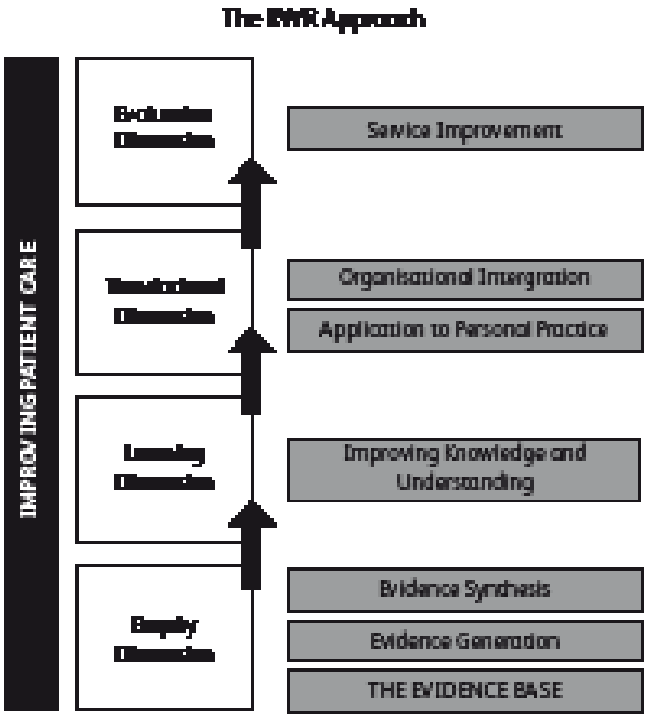
As intense media pressure escalated in tandem with a seemingly ever increasing rate of HCAI in NHS hospitals from the mid-1990s onwards, it became clear that this situation was untenable. If the NHS could not protect patients from infection, one of the most fundamental elements of safe care, its very future would be in doubt. Worse still, the public became even more anxious as reports of dirty hospitals and equally unhygienic practices by healthcare employees, including doctors and nurses, began to regularly feature in newspapers and on radio and television. It was quickly apparent that the threat to patients was real, it was serious, and it was ever-present in all healthcare settings and it was having a detrimental impact on public health and the delivery of safe healthcare. Soon, there was a sustained public outcry declaring that this situation was not acceptable; and the political reaction was equally intense – 'do something, anything but do it now.' It was then clear to all that after the first 50 years of its existence, the NHS was now facing a particularly threatening and perhaps the most defining challenge yet to its survival.

As public, political, and professional concern increased, the DH in each country in the UK responded with a variety of strategic policies, collectively aimed at significantly reducing the risk of HCAI throughout the NHS. The journey towards enhanced patient safety taken during the next dozen years would prove remarkably dynamic and transformational, producing a mind-shift in attitudes and in clinical practice within the NHS that incrementally began to reduce significantly the threat of infection to patients and to NHS staff (Health Protection Agency, 2009). In achieving this, the RWR Centre made a significant and far-reaching contribution and throughout this period, was and remains today at the heart of initiatives to:

- identify, critically appraise and then translate best evidence of clinical effectiveness into infection prevention and control guidelines in the NHS;
- educate and support NHS staff to implement the guideline recommendations into clinical practice;
- provide relevant evidence to support the ongoing development of strategic DH policy;
- and generate new evidence relevant to the prevention and control of HCAI.

The RWR approach incorporated a range of initiatives that included evaluative, translational, learning and enquiry dimensions (Figure 1).

Figure 1



This article is an abbreviated account of our decade-long support and contribution to the overall aims of the DH and the NHS to reduce the threat of infection and associated disability to both patients and healthcare staff, make life safer for people during periods of health-related vulnerability, and to save lives.

Healthcare associated infection – an emerging policy imperative

The need for a government response to the emerging threat of HCAI and antimicrobial resistance was first highlighted in reports from the House of Lords Science and Technology Committee (1998), *Resistance to antibiotics and other antimicrobial agents (known as the 'Soulsby Report')* and the DH Standing Medical Advisory Committee (SMAC) (GB.DH, 1998), *The path of least resistance*. The evidence presented to these committees indicated that the prevention of microbial transmission between patients through the consistent use of effective infection control measures was an essential element in the fight against MRSA and other antimicrobial-resistant organisms. After responding to these two reports, the DH published an initial action plan based on three key elements: infection control, prudent antimicrobial use and infection surveillance (GB.DH, 1999). It was becoming increasingly clear that the policy response to preventing and reducing HCAI required an iterative and multi-modal approach that harnessed existing evidence, promoted scientific discovery and made use of system and change management strategies to translate what was known into clinical action to protect patients.

During the following decade the work of the RWR Centre through the DH commissioned nurse-led epic project (evidence-based practice in infection control) would make a highly significant contribution to the generation and synthesis of the evidence base for preventing infections and the effective translation of that evidence into clinical practice throughout the NHS.

Developing national evidence-based guidelines for preventing HCAI

The Soulsby and SMAC reports in 1998 triggered the DH to commission a review of infection prevention guidance and the production of national evidence-based guidelines for the prevention of HCAI in NHS hospitals (epic1). The RWR team entered a competitive tender in 1999 to undertake this work and, having won the contract, brought together a collaborative group of clinicians and researchers to design the guideline development process and undertake a series of complex systematic reviews. An Expert Project Advisory Group was used to engage a wide range of stakeholders, provide peer review and facilitate the adoption of the guidelines within the NHS.

The epic1 guidelines were first published in 2001 (Pratt et al., 2001), the underpinning evidence was reviewed and updated in 2004 (Pellowe et al., 2004) and the guidelines were revised and republished in 2007 (Pratt et al., 2007). During this period there was considerable debate about whether or not HCAI were a threat to patients within primary and community care settings and how this impacted on acute care. The emergence of community strains of MRSA and *C. difficile* led to the epic guideline initiative being extended to include national evidence-based infection prevention and control guidelines for these settings, commissioned by the National Institute for Health and Clinical Excellence (NICE) in 2003 (Pellowe et al., 2003). These are now being updated under the direction of RWR staff. The process of developing these guidelines was complex and exhaustive, using systematic review methods (Figure 2) and consensus approaches in order to arrive at recommendations that were relevant, unambiguous and based upon the best available evidence of effectiveness.

Figure 2

and practice

So how did these guidelines impact on the world of policy development and implementing best practice in infection prevention and control? The epic1 guidelines (Pratt et al., 2001) were the first national evidence-based guidelines to be published in an international peer-reviewed journal, i.e., the Journal of Hospital Infection, making them accessible to experts and generalists alike. Both the NICE community and primary care guidelines (Pellowe et al., 2003) and the epic2 guidelines (Pratt et al., 2007) were also published in the same journal, becoming in 2008 among the ten most cited articles in the journal during that year.

The epic series of guidelines have been adopted by infection control teams across England and Wales and are extensively used to develop local protocols. They were also used in Scotland as the basis for their own guidance and influenced guideline development groups in other countries, e.g., the Republic of Ireland.

The guidelines were written in a user-friendly style that were easily understandable, answered important clinical and practice questions, and clearly described the underpinning evidence that supported each of the guideline recommendations. These recommendations consisted of a number of actions which, if carried out consistently, would prevent infections. They were focused on standard principles for infection prevention and control and actions related to preventing infections associated with the use of medical devices, such as indwelling urinary catheters and vascular access devices, such as central venous catheters. These actions formed the basis of a care bundle approach that would be used in later initiatives to minimise the risk of catheter-associated urinary tract infections and catheter-related bloodstream infections.

Supporting implementation of guidelines into clinical practice

As even the best evidence-based guidelines published in the most prestigious peer-reviewed journals cannot implement themselves, they will fail to influence clinical practice unless they are backed up by imaginative and effective publication, dissemination and implementation strategies.

Strategies for publication and dissemination need to ensure that the guidelines will reach key practitioners and that support will be available to help NHS Trusts and healthcare practitioners incorporate national guideline recommendations into their more detailed local guidelines and clinical protocols. This is how we did that.

To coincide with the publication of each set of guidelines, RWR actively engaged in dissemination. Negotiations took place with NICE and the DH for permission to publish the guidelines as a supplement in the Journal of Hospital Infection, a key publication in the UK for infection prevention practitioners. In addition, the DH circulated copies of the supplement to every NHS Trust Chief Executive. Nurses were targeted through a series of articles in key nursing journals, and the Nursing Times produced a ward wall chart of standard principles. Over the next 12 months, RWR staff conducted a series of guideline implementation workshops throughout the UK and Ireland (Pellowe and Pratt, 2004) and addressed a variety of national and international conferences to publicise and highlight the importance of the new guidelines.

Publishing the guidelines in a high quality peer-reviewed international journal was intended to overcome the well-recognised difficulty experienced by previous DH-issued guidelines, which quickly became lost within the maelstrom of DH circulars, directives and advisory notices, gathering dust on the shelves

of NHS Trusts throughout the country and ultimately being ignored. The epic guidelines also led the way in ensuring that policy and guidance in the field of infection prevention was informed by systematic appraisal and synthesis of the best available evidence.

When DH consensus guidance for preventing and managing MRSA infections was updated in 2006, the RWR Centre was commissioned to undertake the systematic review that established the evidence base for these guidelines (Loveday et al., 2006). In response to public perception that staff uniforms may contribute to HCAI, the DH again commissioned RWR to undertake an evidence review of the microbiological and social significance of uniforms in relation to the prevention and control of HCAI in order to inform the development of uniform and work wear guidance to NHS Trusts (Wilson et al., 2007; Loveday et al., 2007; GB.DH, 2007).

The clinical governance agenda

In 2002, the DH Chief Medical Officer (CMO) produced a report, *Getting ahead of the curve* that highlighted that the control of HCAI required the commitment of all healthcare professionals and not just the NHS Trust infection control teams (GB.DH, 2002a). In the same year, the DH established a series of controls assurance standards for infection prevention and control as part of their modernisation and quality improvement agenda (GB.DH, 2002b). These standards sought to ensure that NHS Trusts had proper arrangements in place for the management and control of infections. The controls assurance standards and the elaboration of these within the Health Act (GB.DH, 2006) that replaced them formed the basis of measures used by the Commission for Healthcare Improvement (and its successors, the Health Care Commission and the current Care Quality Commission) for assessing the quality of care provided by NHS Trusts.

In the following year another CMO report, *Winning ways,* highlighted that progress on reducing HCAI has been small and that a national strategy to address gaps in scientific and clinical knowledge on HCAI reduction was needed (GB.DH, 2003). This report also identifies key action in areas such as hand washing, clean hospitals and device use, including indwelling urinary catheters, central venous lines and respiratory support. Three of these action areas were derived from the first set of epic guidelines (Pratt et al., 2001).

The report also included the requirement for the Chief Executives of NHS Trusts to ensure that infection control was part of clinical governance and patient safety programmes and to appoint a Director of Infection Prevention and Control to be responsible for the management and implementation of infection control policy across the Trust. In order to address gaps in scientific knowledge the report proposed the establishment of a HCAI research network.

Translating evidence into action – the problem of implementation

Despite the clarity of guidance and the transparency of the evidence base, the challenge of changing practitioners' behaviour remained. Levels of adherence to guidelines in even the most basic of practices, such as hand hygiene, were poor. Practitioners knew what to do and knew why it was necessary, but some of the barriers to adherence identified in the literature remained to be overcome, while systematic reviews indicated that there was little robust evidence for what worked to change healthcare professionals' behaviour (Naikoba and Hayward, 2001; NHS CRD, 1999).

A previous study has suggested that the implementation of evidence-based practice is more likely to succeed in learning organisations where boundaries are clearly defined, values and beliefs are shared by all , and where staff and clients are valued (Rycroft-Malone et al., 2004). This study further identified that a range of factors that contribute to poor adherence to guidelines included organisational factors, such as the role and function of the infection control service and the proper use of surveillance data to guide practice, and workforce issues, such as knowledge and skill deficits and difficulty in translating knowledge into action. Overcoming these barriers requires a prolonged and sustainable combination of interventions that uses levers such as reporting and regulation, as discussed above, to facilitate opportunities for NHS Trusts and infection control teams to do things differently and focuses on the patient experience as a true measure of quality.

The work of the RWR following the publication and dissemination of the epic guidelines continued to focus on synthesising the evidence base for infection prevention and control through systematic review but also generating and supporting the implementation of evidence-based practice through the use of improvement science. In the following section

we highlight aspects of our work that have facilitated multidisciplinary teams to do things differently, informed the development of the role of infection control teams, promoted the use of surveillance data to underpin infection prevention interventions, and provided learning resources to ensure that all NHS employees are equipped with appropriate knowledge for practice.

Doing things differently – infection prevention as everyone's business

In an initiative aimed at shifting the responsibility for infection prevention and control and improving outcomes for patients, the RWR collaborated with the NHS Modernisation Agency (MA) to design and deliver a Clinical Governance Support Programme for the Prevention of HCAI. This programme directly addressed the challenge of translating evidence into practice and set the issue of infection prevention and control firmly within the clinical governance and quality agenda. The aims of the programme were to: promote a culture where all members of the healthcare team share responsibility for infection prevention; enable healthcare personnel to make a sustainable change to service delivery that facilitates a reduction in rates of HCAI; and develop networks of healthcare staff that can share best practice and support others in reducing the incidence of HCAI.

The programme used the Review Agree Implement Demonstrate (RAID) model of change management, an adaptation of the 'Deming' Plan, Do, Study, Act cycle (Deming, 1994) as a framework through which multidisciplinary delegate teams developed a programme of work to engage stakeholders, patients, and service users to improve patient safety through the reduction of HCAI. Multidisciplinary teams attended the programme, where the assumptions that infection prevention was the sole responsibility of infection prevention and control teams and that infection was an inevitable and acceptable consequence of complex clinical care were turned on their heads, and a systems approach to improving service was used to drive selected improvement projects. At the core of these projects were the principles of system change, such as involving a wide range of stakeholders, including service users; identifying where improvement was needed; challenging the status quo; measuring the outcomes of project activity; and sharing knowledge and learning. Learning from the work of the MA was later used in the Clean Safe Care Programme (GB. DH, 2008) and will be discussed later in this article.

Informing the future role of infection control teams

The infection control team play a pivotal role in the management and control of infections in both hospital and community care. The emergence of community strains of MRSA and *C. difficile* led the DH to commission a study that examined how community infection control nurses (CICN) were prepared for practice and the extent of their current roles and responsibilities as part of a wider reconfiguration of Health Protection services (GB.DH, 2001; GB.DH, 2002a). The RWR team were awarded an 18-month grant to undertake a multiple methods study of how practitioners were prepared for their roles, the extent of their role and how teams were configured to deliver community infection control services (Loveday et al., 2002, Loveday et al., 2003).

Why was this piece of work important in the greater scheme of things? While highlighting the scope of the CICN role in terms of both healthcare settings and the management of HCAI and communicable diseases, this study suggested that there needed to be a major shift in the focus of activity that these highly skilled practitioners were involved in. It brought into sharp focus that infection control teams (in both community and acute care) spent the majority of their time 'fire fighting.' Preventing infection was effectively a 'Cinderella' activity with teams having little or no time for creative initiatives or preventative work in terms of either HCAI or other infections. The review concluded that the profession and government should: focus the role of those working in infection control roles identify on infection prevention to shift the emphasis from reactive to proactive interventions; consider the removal of traditional professional boundaries to modernise service delivery; and develop clinical career pathways to make best use of these expert practitioners in the evolving modernisation agenda.

Surveillance – using data to guide practice

Surveillance data is the life blood of infection prevention and control, yet nationally what was known about rates of HACI in the late 1990s was limited to irregular prevalence studies and voluntary reporting schemes for surgical site infections and MRSA bloodstream infections. National prevalence studies indicated that nine patients in every hundred developed an infection as a result of receiving healthcare and that many of these infections were related to the use of invasive devices (Emmerson et al., 1996).

The NAO report in 2000 identified that the lack of surveillance data hindered the ability of the NHS to target prevention activity in a coordinated and focused way (NAO, 2000). Consequently, in 2002 the government established a mandatory reporting system for MRSA bloodstream infections. By 2004, the Health Protection Agency (HPA) reported that MRSA bloodstream infections had increased to over 7000 cases per annum and began collecting baseline data from the mandatory surveillance and reporting of MRSA bloodstream infections (HPA, 2006).

In 2003, the NAO commissioned the RWR Centre to compare the rates, infection prevention systems and policy initiatives being undertaken to reduce HCAI in the USA, Australia and selected European countries with those in the UK as part of their progress report to the Public Accounts Committee (NAO, 2004). The progress report highlighted that there was little improvement in the data available to indicate the nature and extent of HCAI in the UK and little evaluation of the impact of recent interventions. It also drew attention to the lack of progress in making use of surveillance data to guide infection prevention interventions and suggested that wider factors, such as waiting times and accident and emergency targets, impeded good infection prevention and control practice.

During our systematic review of the evidence base for preventing HCAI, it became clear that the standard of the evidence available was of variable quality for many infection prevention interventions. The systematic review process helped identify where new research was needed and also sparked debate about whether the 'gold standard' of research evidence used for other guidelines, i.e., the randomised controlled trial (RCT), was achievable for this area of clinical practice. The multi-factorial nature of infection prevention interventions makes it difficult to control variables and assign causality to one specific intervention. In 2001, the DH Policy Research Programme (PRP) launched a call for research projects focused on the issues raised by the 1998 Soulsby and SMAC reports, making available £2.5 million in research funding.

One of the interventions that had some support in the literature and in the work of the MA and the Institute for Healthcare Improvement in the USA was that feeding back surveillance or measurement data to clinical staff had a positive impact on reducing infection (Haley et al., 1985). RWR collaborated with the Infection Prevention Society and successfully submitted a nurse-led RCT known as CHART to investigate the use of local MRSA surveillance data fed back to staff on statistical process control (SPC) charts to drive reductions in MRSA bloodstream infections (Curran et al., 2008). Seventy-five wards in 24 hospitals in the UK took part in the study, and these were divided into three groups in order to test two variants of the SPC feedback system against a control group. When compared to two years of baseline data, both of the experimental groups showed a very significant decrease in the number of ward-acquired MRSA cases. However, because the control group also showed significant improvement, it was not possible to say precisely what part the SPC feedback system had played in the reduction. As indicated above, other national interventions may have contributed to the observed outcomes, as this study took place during a time of intense activity focussed on the reduction of MRSA, e.g., the national roll out of the DH CleanYourHands campaign and the introduction of mandatory surveillance of MRSA bloodstream infections in 2005. The CHART study also had a qualitative component that explored the dynamics of surveillance feedback in the participating wards. Findings showed wide variation in infection control processes, as well as differences in leadership, teamwork, communication and personal engagement with infection control practice. The long standing anecdotal observation that many individuals abdicate responsibility for preventing infection in hospital environments to the infection control team was confirmed through this study. The RCT element of the study was important, in that no other research documented ward-acquired MRSA during this four-year period. Importantly, it equipped infection prevention teams with essential skills in using local surveillance data and established quality improvement tools to guide infection prevention interventions.

Learning to prevent infection – a universal responsibility

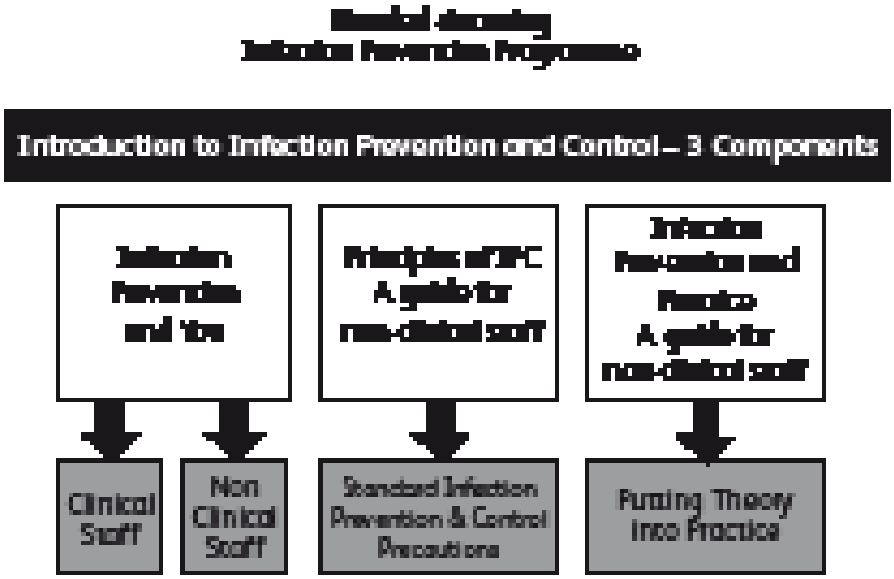
Knowledge of new guidelines is the first step in implementation, but a more proactive approach is required to encourage adoption. The Infection Control Nurses' Association (now the Infection Prevention Society), who were involved in the guidelines' development, worked with RWR to develop a series of educational workshops in which teams of practitioners could consider implications of the new guidance and develop action plans. BARD™ provided an educational grant for the series, which took place throughout the UK and Eire over the course of a year. An evaluation of the changes made post-workshop identified considerable progress in plans focussed on continuing education or audit (Pellowe and Pratt, 2004). Key factors in successful action plan implementation were time and the support of managers.

The introduction of the DH Clean Safe Care programme and the Saving Lives high impact interventions (GB.DH 2005), along with draconian centrally developed improvement targets forced Trusts to prioritise reducing HCAI and provided them with the tools to examine their performance. Many of the high impact interventions are based on the epic guidelines devised here at UWL, and the reliability tools encourage wards to monitor adherence. Use of these tools also enables Trusts to demonstrate compliance with the duties of the Code of Practice (GB.DH, 2006).

No matter how effective road-shows, publications and conference presentations may be, they will never reach all of the 1.3 million NHS employees who need to be aware of their role in preventing HCAI. In 2004, the NHS Core Learning Unit commissioned RWR and Intuition Publishing Ltd in Dublin to design an e-learning programme that would cater for all staff in the NHS (Fig. 3). The benefit of an e-learning programme is that it can be accessed at any time from any location, its use and success in the assessment can be monitored and the programme can be easily updated (Pratt and O'Malley, 2007).

The initial programme launched in 2005 covered Standard Principles and was designed for two distinct audiences: clinical and non-clinical staff, namely porters, cleaners and housekeepers. Part A, the core course was developed as a review course for clinical staff that can be incorporated into either an orientation programme for new staff or annual update. The rest of the programme provides an in-depth explanation of non-clinical staff members' role in preventing HCAI, an area sadly neglected prior to the programme's development.

Figure 3



The success of this highly interactive, award winning programme can be measured by the tens of thousands of NHS staff registering on the programme. In 2008 RWR were commissioned to develop additional modules for clinical staff. These included high impact interventions (GB.DH, 2005) and the guidance provided in the epic and NICE guidelines for short- and long-term indwelling urinary catheters and vascular access devices (Pratt et al., 2007; Pellowe et al., 2003).

Although the programmes were designed for NHS staff, there is potential for the programme to be used in the pre-registration nursing curriculum. At TVU, now UWL, aspects of the programme have been used in conjunction with work in the simulation centres prior to students beginning their clinical placement. A recent evaluation demonstrated the value of e-learning and this programme for students (Pellowe et al., 2010).

In response to user evaluation data, the programme was adjusted on a regular basis and in February 2011, the RWR Centre in collaboration with Intuition Publishing Ltd. began updating all aspects of this programme to ensure the sustainability of its quality and relevance to both clinical and nonclinical practice throughout the NHS.

Informing the policy research agenda

The CMO report Winning Ways (GB.DH, 2003) identified that a national Healthcare Associated Infection Research Network (HCAI RN) was needed to coordinate and assist in the formulation of a national research strategy to address gaps in current scientific and clinical knowledge about how to reduce the rates of HCAI. In 2006, the DH established the HCAI RN at the RWR Centre to manage and support the PRP in a period of continued policy emphasis on the prevention, management and control of HCAI and a range of initiatives to develop basic science and translational and operational research (Tingle, 2007).

The HCAI RN has an agreed programme of work that entails establishing a strategic focus for HCAI research across government initiatives and funding bodies; commissioning and managing PRP-funded research; establishing a priority-setting process and an infrastructure to provide advice to PRP and other independent advisory groups on research priorities in the fields of HCAI prevention and control; and developing public engagement in HCAI research. Achieving a coherent programme of funded research that reflects often competing priorities of policy makers, researchers, practitioners and a range of agencies, associations and interest groups, notably patient and public, is desirable but also has difficulties.

In order to overcome some of these difficulties, a National Research Priorities Advisory Group (NRPAG) was established in the HCAI RN in March 2008 to extend the debate around priorities for HCAI research and to avoid repetition and strengthen the cumulative power of policy research in this field. The Group is drawn from a range of disciplines, including clinical microbiology, infection prevention practice, organisational behaviour, health economics and epidemiology. NRPAG also supports the research and development subgroup of the government's independent advisory group on Antimicrobial Resistance and Healthcare-Associated Infection (ARHAI).

HCAI RN and NRPAG have developed a methodology for the identification of short- to medium-term research priorities and those that are longer term, which is both transparent and robust. The processes used for short- to medium-term priorities involve preliminary identification of priority areas using consensus methodology; intelligence gathering to map

contemporary research and key publications; analysis of these to scope gaps; and policy requirements and prioritisation using a range of justification, feasibility and risk criteria. Identifying longer-term priorities takes into account changes in society, expansion of knowledge and technological advances and requires an iterative approach with investment in horizon scanning and foresight exercises that are outward looking and not restricted by immediate policy pressures. These processes facilitate the development of a research programme that will result in evidence-based policy that drives and responds to the challenge of reducing HCAI throughout the National Health Service (Loveday, 2009).

Involving Service Users in Research

Partnership between service users and researchers is a cornerstone of the current research and development strategy for the NHS in England. Unlike other fields of care, such as cancer and mental health, researchers in antimicrobial resistance and healthcare-associated infection and microbiology have little experience of working with patients and the public to prioritise, design and conduct research and no access to service users able to contribute in an authoritative way to the research enterprise.

While researchers and practitioners think they know what patient and public concerns are, we do not know our service user audience well, and assumptions are often confined to a narrow, media-focused agenda and assume that the lay public have little part to pay in scientific research. In 2007, the HCAI RN established a Service User Research Forum (SURF) to bridge the gap between researchers and the public in this field. A coordinator was appointed and stakeholders identified via an advertising campaign undertaken through the INVOLVE networks, the UK Clinical Research Collaboration and existing patient/public groups, such as MRSA Action and National Concern for Healthcare Infections. A stakeholder conference was held and a core membership of ten established. The aims of SURF are to ensure that the views and perspectives of patients, carers and the public are fully taken into account within the field of ARHAI research; to act as a resource for the research and policy community; to lead in the identification of patient and public concerns and priorities for research; to advise on how best to involve patients, carers and the public in research; to contribute to all stages of research commissioning, design, conduct and dissemination; to develop, design and conduct patient and public involvement research projects; and to train other users to make a positive contribution to the field of ARHAI research. Following some initial training, members of the group are confidently engaging in the ARHAI research arena, sitting on commissioning boards and reviewing national competitive grant proposals and offering researchers a lay perspective on the value of completed research.

SURF provides a forum for identifying public and user concerns in a systematic way, creating an interface for service users and researchers in the field of infection and microbiology and develops the knowledge and skills of service users and professionals to work together in the prioritisation, design and conduct of research (Jones et. al., 2008).

Making infection prevention everyone's responsibility – evaluating what worked?

In 2004 the Secretary of State for Health announced a national target to reduce MRSA bloodstream infections by 50% over a three-year period from 2005 to 2008 in the face of continued public concern and media focus on HCAI and dirty hospitals. In the same year a focus on improved hospital environmental hygiene was highlighted in the Matrons Charter (GB.DH 2004a). In 2005, the complementary HCAI work streams being undertaken by the CMO and Chief Nursing Officer (CNO) were brought together under the direction of the CNO and the Cleaner Hospitals Lowering Rates of Infection Programme (GB.DH, 2004b). The programme aimed to realise the target for halving MRSA bloodstream infections, improving hospital cleanliness and increasing public confidence in the NHS as clean and safe. In addition to the national target the programme used a combination of system levers and improvement methods to facilitate adoption, spread and sustainable change in organisational, team and individual behaviour. These included regulation and performance management, provision of tools and techniques for evidence based care, targeted improvement support and a knowledge transfer network.

The RWR was invited to develop a proposal for the retrospective evaluation of this programme to assess its impact in promoting and embedding the prevention of HAI as 'everybody's responsibility' and identifying the contexts and mechanisms that were critical to improvement. The research team for this piece of work brought together colleagues from across the University in a multiple methods project that used quantitative methods to assess existing and prospective mandatory surveillance data and qualitative case study design to explore the experiences and perceptions of stakeholders within nine NHS acute Trusts of varying sizes and complexity and facing different levels of challenge in reducing their MRSA bloodstream infections.

Our findings indicate that setting a national target was crucial to raising the profile of preventing HCAI generally and MRSA bloodstream infections in particular. National mandatory surveillance data shows that the 50% national reduction in MRSA BSI was achieved in September 2008 but we were unable to establish robust variables from retrospective data and identify statistically significant relationships between the multiple interventions that formed the programme and the reduction in cases. Our cross-case analysis characterised NHS Trusts on a spectrum of improvement resistant to improvement responsive. Both, the programme and targeted support team were catalysts in moving Trusts from 'resistance to responsiveness' and creating the conditions for transformational change by: supporting and cultivating leaders and champions; challenging denial and complacency; driving a shared understanding of where the Trusts problems lay through better data, information systems and feedback; changing the mindset of practitioners through the use of root cause analysis and increasing the reliability of evidence based care practices. Crucially we found that there has been a perceived cultural shift in the responsibility for preventing infection and a recognition by all staff that infection prevention and control is everyone's responsibility and that all practitioners and healthcare workers have a significant role to play in preventing harm to patients (Loveday et. al., 2010)

Conclusion

The past two decades have seen the rise of antimicrobial resistance and infections associated with healthcare interventions that are ever more complex. The ability of microorganisms to seek out and expose the frailties of human physiology and behaviour pose a huge challenge for policymakers, healthcare professionals and technologists. The work of the RWR over the past twelve years has had a major impact on the field of infection prevention and made a significant contribution to ensuring the safety and well being of patients through primary and secondary research and its translation into action that ensures the judicious and consistent application of evidence based practice in the care of patients.

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