UNIVERSITY HOSPITALS BIRMINGHAM NHS FOUNDATION TRUST
BOARD OF DIRECTORS
THURSDAY 24 July 2014

Title:	**ANNUAL INFECTION PREVENTION AND CONTROL REPORT APRIL 2013 – MARCH 2014**
Responsible Director:	Philip Norman, Executive Chief Nurse and Executive Director for Infection Prevention and Control
Contact:	Dr Beryl Oppenheim, Director of Infection Prevention and Control. Ext 16523

Purpose:	To provide the Board of Directors with an Annual Report which summarises the Infection Prevention and Control activity from April 2013 – March 2014	
Confidentiality Level & Reason:	Not applicable	
Annual Plan Ref:	Strategic Aim 4 : Quality of Services	
Key Issues Summary:	• To indicate any implications, e.g. Clinical, Financial, Human Resources • To report any benefits, risks or costs associated with the decision	
Recommendations:	The Board of Directors is asked to accept the Annual Report on Infection Prevention and Control	
Approved by:	Philip Norman	Date: 14 July 2014

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ANNUAL INFECTION PREVENTION AND CONTROL REPORT APRIL 2013 – MARCH 2014

PRESENTED BY EXECUTIVE CHIEF NURSE

1. Introduction

This report provides a summary of the progress with Infection Prevention and Control from April 2013-March 2014.

2013/14 was a challenging year for Infection Prevention, with national objectives regarding bloodstream, for example, meticillin resistant Staphylococcus Aureus (MRSA) and *Clostridium difficile* Infections (CDI) aimed at delivering a zero tolerance approach to avoidable infections, and a number of new national guidelines and directives requiring urgent attention. There were also a number of staff changes in the team; however a range of new and planned appointments in early 2014/15 will facilitate the building of a strong team moving forward into this year.

The NHS continues to face the threat of multiply antibiotic resistant organisms which could potentially limit our ability to undertake healthcare of the sort we have become accustomed to such as complex surgery, bone marrow and solid organ transplantation or maintaining patients in intensive care settings, and this concern has recently been highlighted by both the Prime Minister and the Chief Medical Officer for England.

A number of guidance documents developed at a national level addressing issues such as the problems of carbapenemase producing Enterobacteriaceae (CPE) and *Pseudomonas aeruginosa* transmitted via water supplies are proving particularly challenging to implement in a large and complex tertiary referral hospital.

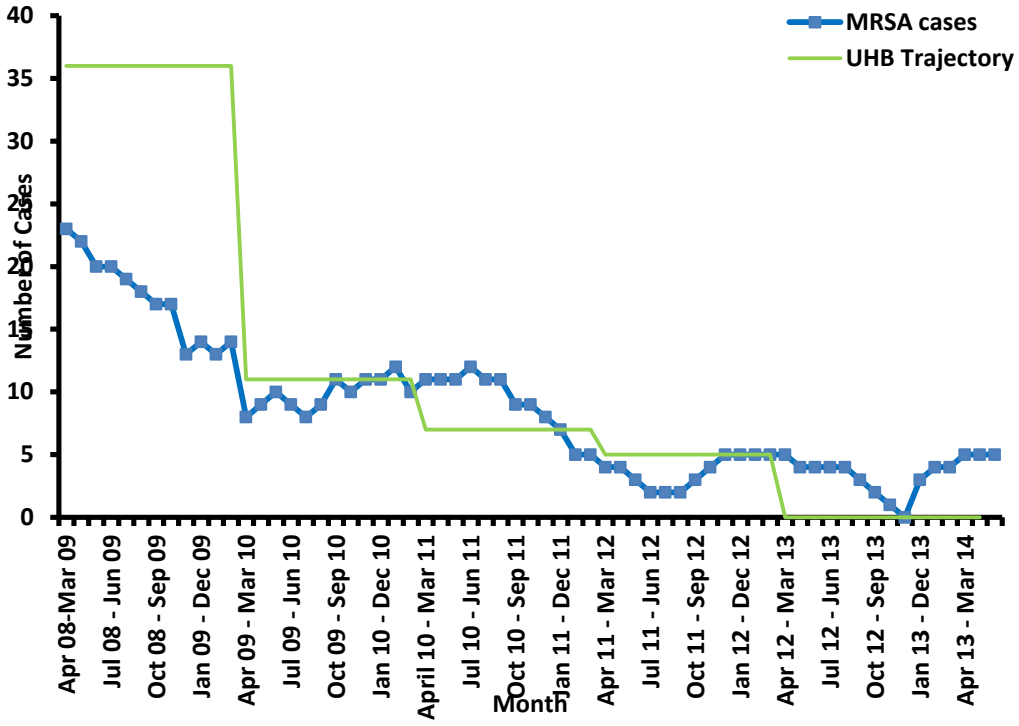
Finally the changing picture of commissioning groups and their support services locally require a new understanding of the landscape and how we relate to the various organisations charged with responsibility for different aspects of control of healthcare associated infections (HCAIs).

2. Key Target Organisms

2.1 *MRSA bacteraemia*

During 2013/14 the objective for Trust apportioned MRSA bloodstream infections was 0, and the outturn for the year was 5 cases of which one was assessed as unavoidable, ie 4 cases were deemed to be avoidable. All cases were reviewed through the post infection review process, with cases assessed as having potentially avoidable factors also being taken for Chief Executive Root Cause Review and action plans to address learning points have been developed and are being monitored to ensure implementation. Figure 1 shows numbers of bacteraemias against the objective over the period 2008 to 2013.

Figure 1. Annual rolling total of *MRSA bacteraemias* against annual objective (2008-2014).



As for 2013/14 the national approach to MRSA bacteraemias will be the same for 2014/15. There is a zero tolerance approach and all cases will need an urgent post-infection review across the relevant health economy to assess to which organisation the case will be apportioned. The process requires a transparent, thorough and timely response, not only to the investigation, but also to the follow up of any learning and action points.

2.2 *Clostridium difficile infection (CDI)*

The objective for Trust apportioned cases of *Clostridium difficile infection* (CDI) for 2013/14 was 56. As for 2012/13 all samples in 2013/14 were screened using the GDH test (GDH is the abbreviation for Glutamate dehydrogenase, which is a chemical found in *Clostridium difficile*) and those that were positive were tested by PCR (Polymerase Chain Reaction) for toxin producing strains of *Clostridium difficile* and these results were immediately reported for action. Positive tests were also tested for pre-formed toxin and these results were reported in accordance with national guidance. Table 1 shows the monthly numbers of CDI cases at UHBFT for the financial year 2013/14 and Figure 2 shows Trust apportioned cases compared to trajectory since 2008.

In 2013/14 with agreement from Commissioners all Trust apportioned cases of CDI were reviewed against avoidability criteria, using a similar process to that described for MRSA bloodstream infections, and those deemed unavoidable were excluded from consideration of local penalties. Of the 80 Trust apportioned cases, 16 (20%) were deemed to have some potentially avoidable factors, most commonly related to deviations from best practice in antimicrobial prescribing.

This approach was widely communicated across the wider healthcare community and partly as a result of our own and other Trust's concerns with the national system, a national working group was set up to develop arrangements for this financial year and beyond. For 2014/15 a similar system to the one developed at UHB has been recommended for use across England with our tool for post infection reviews commended as an example of good practice. The group continues to meet to discuss the approach for subsequent years and we are pleased to remain committed to working with the group.

Figure 2. Annual rolling total of CDI cases at UHBFT against annual objective (2008-14)

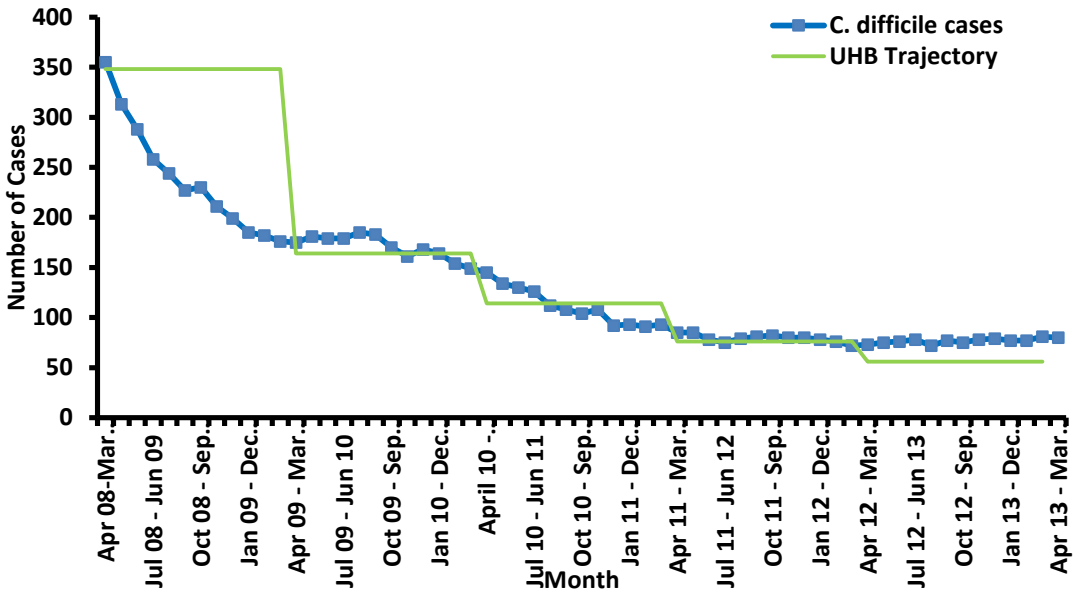


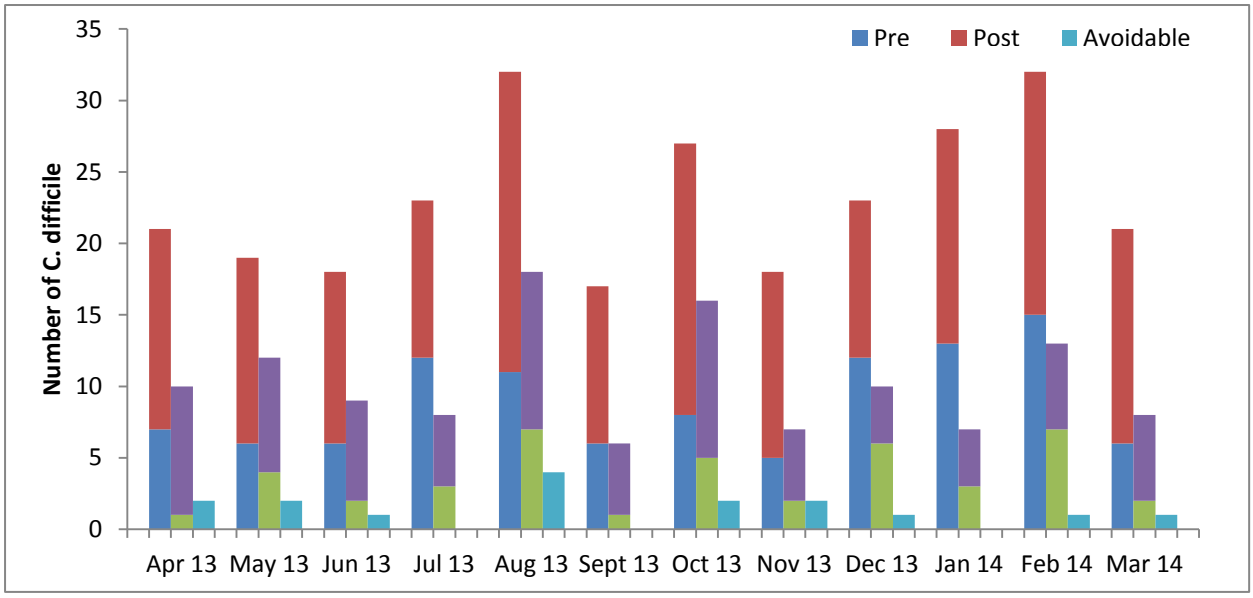
Table 1: Monthly number of CDI cases at UHBFT from April 13 to March 14.

Month	Total number of CDI	Objective (Trust apportioned) Monthly/ (annual)	Time of CDI acquisition		Commissioners reviewed unavoidable cases	Commissioners reviewed avoidable cases
			Pre	Post 48 hours (Trust apportioned)		
Apr 2013	10	4.6	1	9	7	2
May 2013	12	4.6	4	8	6	2
Jun 2013	9	4.6	2	7	6	1
Jul 2013	8	4.6	3	5	5	0
Aug 2013	18	4.6	7	11	7	4
Sep 2013	6	4.6	1	5	5	0
Oct 2013	16	4.6	5	11	9	2
Nov 2013	7	4.6	2	5	3	2
Dec 2013	10	4.6	6	4	3	1
Jan 2014	7	4.6	3	4	4	0
Feb 2014	14	4.6	8	6	5	1
Mar 2014	7	4.6	2	5	4	1
Total	**124**	**56 (56)**	**44**	**80**	**64**	**16**

Note: Following the introduction of a new review tool with local commissioners, unavoidable cases were discounted for the purposes of locally agreed penalties. The final two columns of the above table provide details of the commissioners reviewed figures for all Trust apportioned cases of CDI.

The optimal testing regimen for clinical purposes remains controversial. Figure 3 shows the proportion of PCR positive cases which were also positive for preformed toxin production. This has averaged out at approximately 50% which is in line with what has been found in the literature. We feel that the Trust system provides an excellent means of gaining highly sensitive and timely results for clinical purposes as well as meeting national reporting requirements.

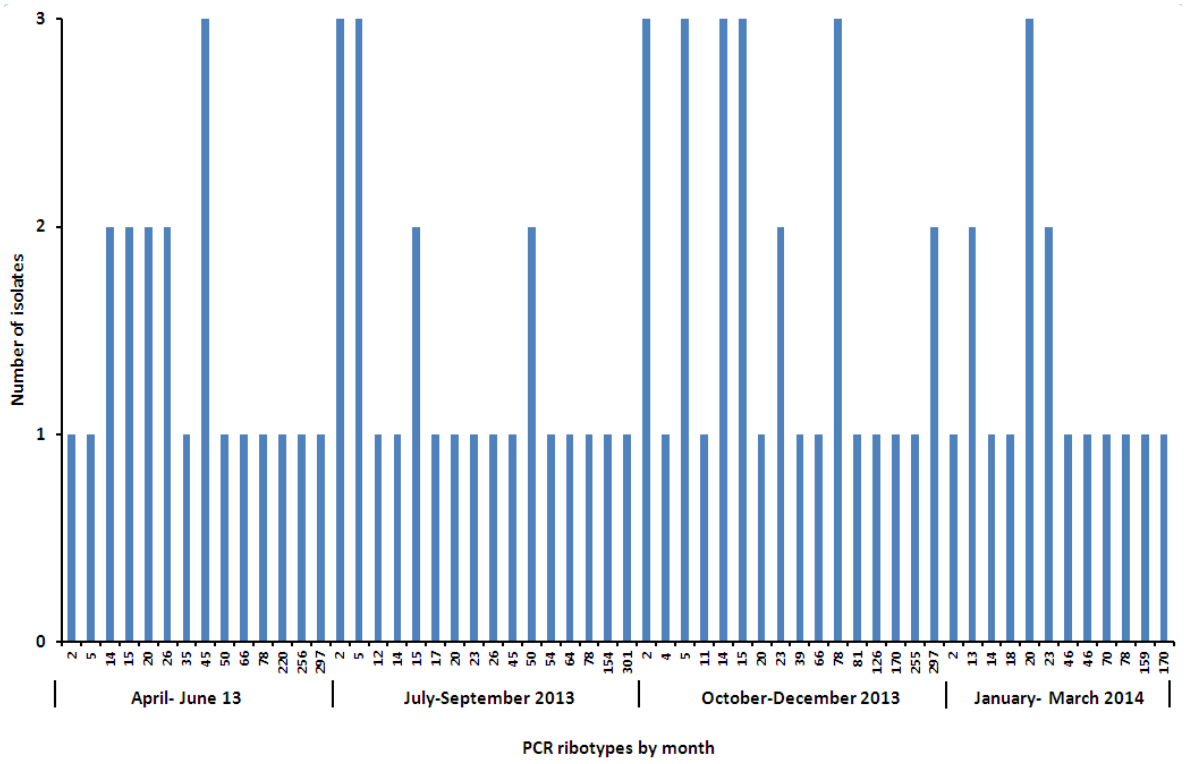
Figure 3. PCR and EIA positive specimens for 2013/14.



Note: For each month first column represents PCR results, second column represents EIA (Enzyme immunoassay) results; third column represents the number of avoidable cases of *C. difficile* after review by commissioners.

Although numbers of cases remain low there is always concern around possible transmission of *Clostridium difficile* in hospital. In order to investigate this, strains have been sent for typing in cases where there were possible clusters on wards, generally increased numbers in particular areas, or severe or fatal cases. Figure 4 shows the ribotype results for UHB in each quarter for 2013/14. This financial year the picture was one of extremely diverse ribotypes with very little evidence of possible transmission and no particular endemic strains to the organisation. This is in line with the national picture in many organisations where the overall impression is that hospitals are now mainly seeing "community" strains of *C difficile* with limited, if any, in-hospital transmission. The sources of these isolates remains largely unknown but it is felt that perhaps they are widespread in the environment and acquired in the same way as much of the rest of our intestinal flora. Whilst this is again a reassuring picture, it does imply, however, that further options for reductions in cases may be limited, as the remaining risk factors other than antimicrobial treatment are not easily amenable to modification.

Figure 4. *C. difficile* PCR ribotypes by quarter during 2013/14.



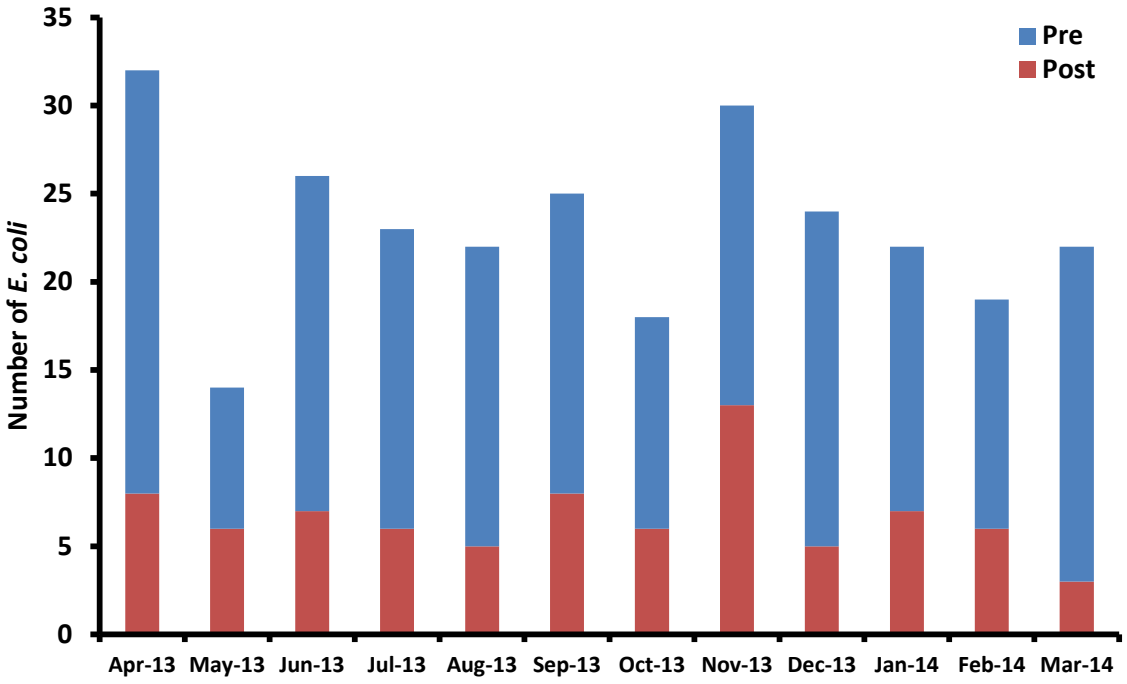
2.3 *Escherichia coli* (*E coli*) bactereamias

Monthly reporting of *E. coli* bacteraemias continues to be mandatory. During 2013/14 there were 80 Trust apportioned and 197 non-Trust apportioned

cases of *E. coli* bloodstream infections. Figure 5 shows the total number of *E. coli* bacteraemias over the year.

The continuing relevance of this surveillance system is unclear as it is well known that many of these infections arise from the patient's own normal flora and that there is little that can be done to prevent the majority of these. However, during 2014/15 we intend to pilot a system of post infection reviews for those considered to be possibly related to urinary catheter infections, to assist with auditing our processes for managing these.

Figure 5. Total number of *E. coli* bacteraemias and the number of Trust apportioned 2013/14.

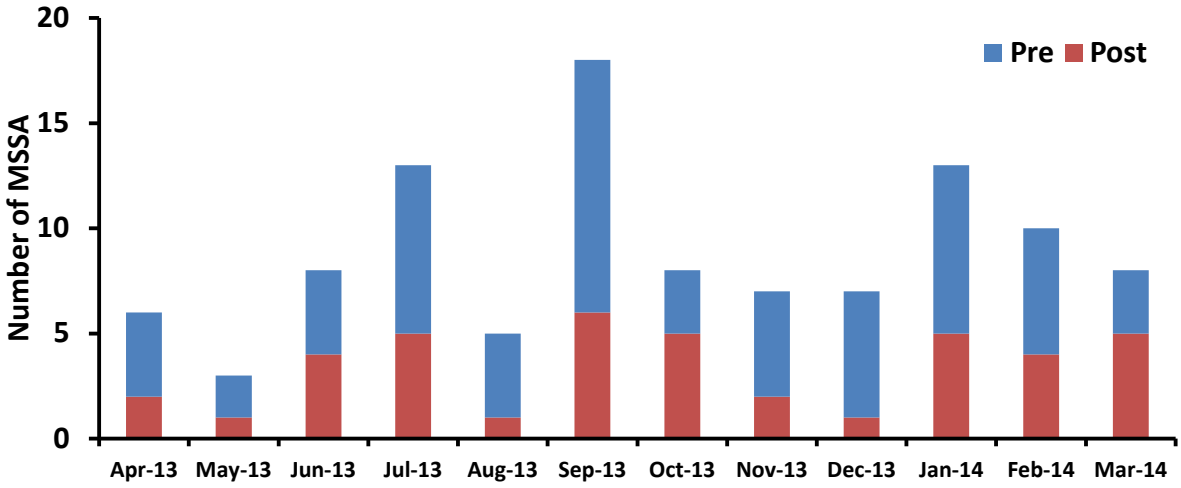


2.4 Methicillin-sensitive Staphylococcus aureus *(MSSA) bacteraemias*

Monthly reporting of meticillin susceptible *S. aureus* bloodstream infections continues to be mandatory. During 2013/14 there were 41 Trust apportioned and 65 non-Trust apportioned cases. Figure 6 shows the variation in numbers over the year.

Similarly to *E coli* bacteraemias, many of these represent infections that cannot be predicted or prevented, however we are reviewing all cases to assess whether they were related to a the presence of a medical device such as a peripheral or central venous access device of urinary catheter, and looking in more detail at those where there may be a preventable factor.

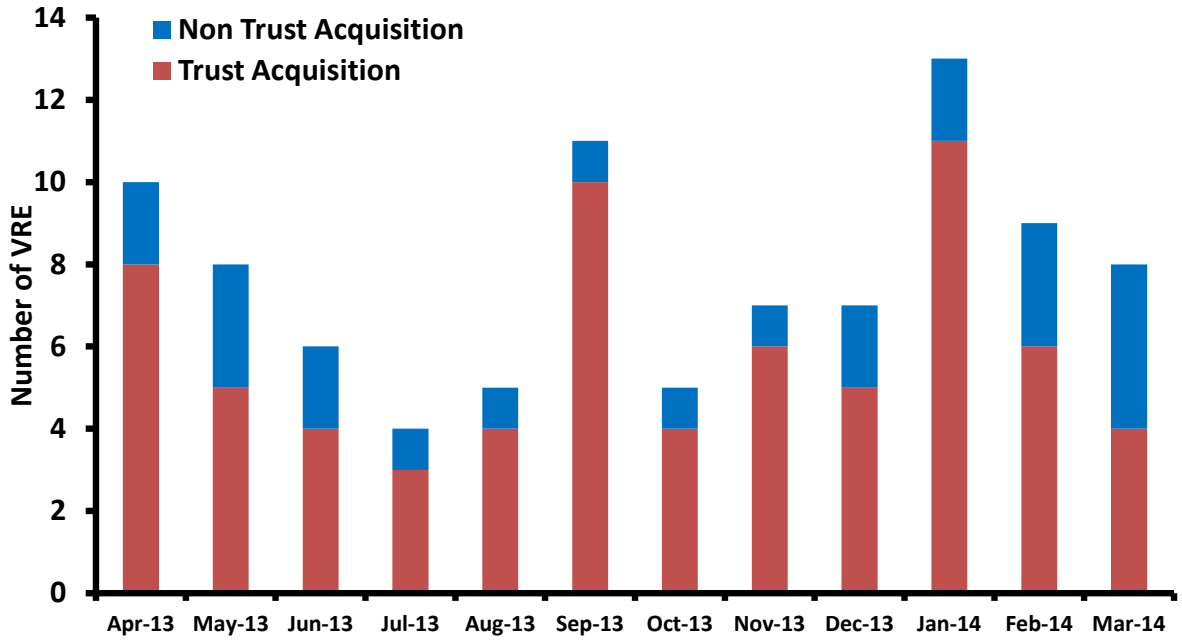
Figure 6 Total number of *MSSA bacteraemia's* and the number of Trust apportioned 2013/14.



2.5 *Glycopeptide resistant enterococcal (GRE) bacteraemias*

During 2013/14 there were 25 Trust apportioned and 8 non-Trust apportioned cases, the majority occurring in patients who were either inpatients or had recently been inpatients. This shows improvement compared to 2012/13 where we had 43 *GRE bacteraemias* in total. Although numbers of cases remain low there is always concern around possible transmission of *GRE* in hospital. In order to investigate this, strains have been sent for typing in cases where there were possible clusters on wards, generally increased numbers in particular areas. This financial year the picture was one of diverse *PFGE* types with very little evidence of possible transmission.

Figure 7. Total number of newly identified *VRE* and the number of Trust apportioned 2013/14.



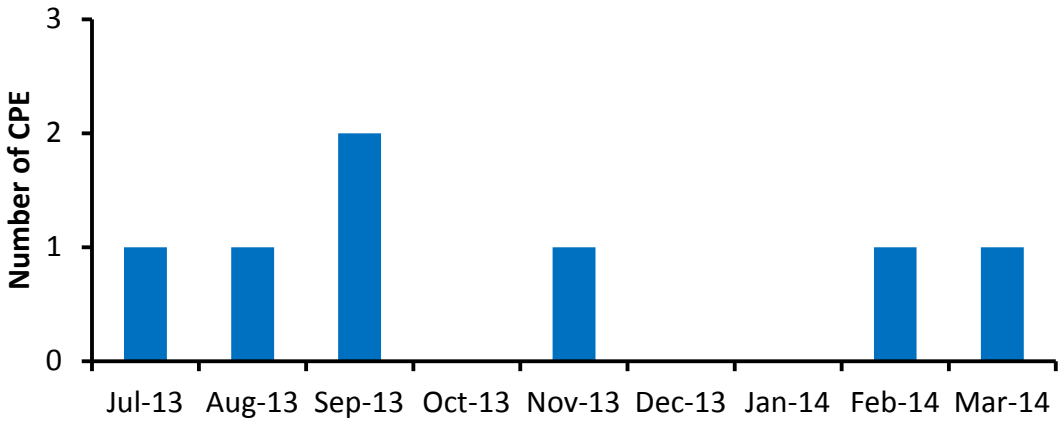
2.6 *Multi-drug resistant Acinetobacter (MDR-AB)*

MDR-AB has been a significant problem at UHB for a number of years, and controlling the spread of this highly resistant pathogen is a global problem. Cases are often imported by patients who have received medical treatment abroad, and UHB has seen importation of strains by military patients who have suffered combat related trauma. In July 2011 a particularly problematic strain, designated *QUEE13AC-27* was introduced to the Trust and transmission persisted, particularly among trauma, burns and plastics patients and those being treated in critical care, over a prolonged period. However with good Infection Prevention practice assisted by the close collaboration with Theme 2 of the NIHR Surgical Reconstruction and Microbiology Research Centre the last reported case of this strain was in January 2013. During 2013/14 there were 11 cases of *MDR-AB* reported. The need for basic infection control measures including strict attention to decontamination of the environment remains vitally important in the control of this pathogen.

2.7 *Multidrug resistant Enterobacteriaceae*

The transmission of multi drug resistant Gram negative bacteria especially carbapenemase producing Enterobacteriaceae, is a current and ongoing threat to patients nationally. During 2013/14 7 cases of carbapenemase producing Enterobacteriaceae were identified in patients treated at UHB. These strains were associated with individuals who had received healthcare abroad, particularly in Eastern Europe, the Middle East and the Indian subcontinent. Evidence from other countries including the UK has shown the spread of these organisms within hospitals affecting local populations. In many cases these strains may have only one, or sometimes no, antibiotics which can be usefully employed for treatment, making this a serious concern to patient management and treatment. Efforts are needed to prevent transmission with emphasis on the importance of identifying those patients at risk of carrying these strains and screening them for carriage, with colonised cases requiring strict isolation for the duration of their hospital stay. National guidance including the national “toolkit” became available during the year and we have developed an action plan to ensure that all aspects of this guidance are being addressed within UHB.

Figure 8. Cases of *CPE* per month for 2013/14.

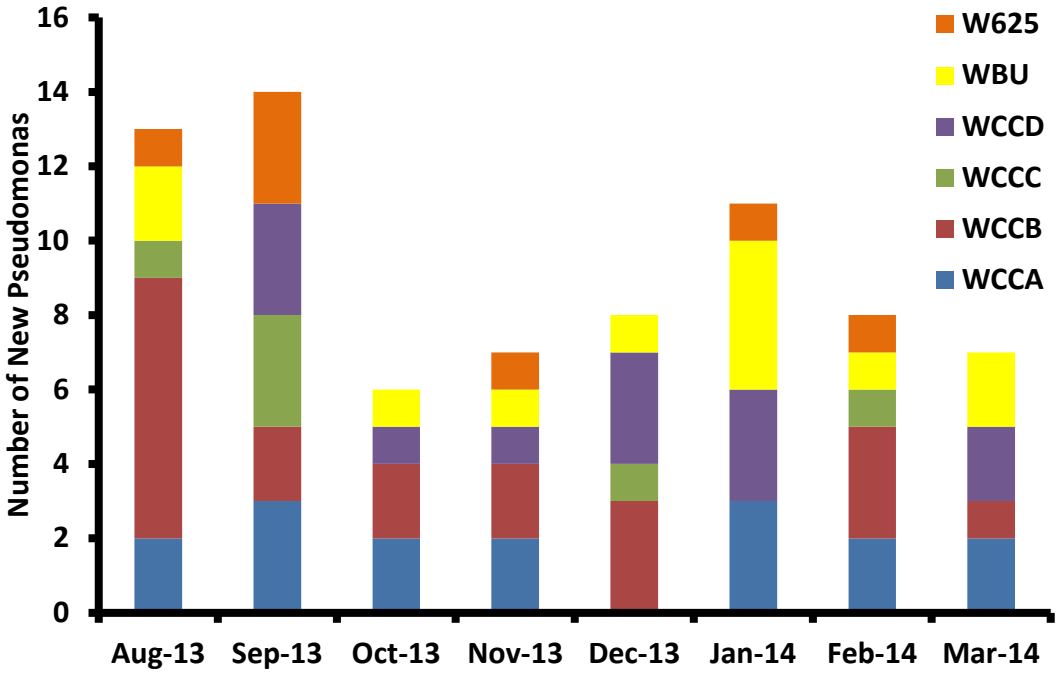


2.8 *Pseudomonas aeruginosa* in water

Investigations into a number of high profile outbreaks of *Pseudomonas aeruginosa* infection on neonatal units revealed that these infections can be transmitted via water, especially in augmented care units or where highly immunosuppressed patients are being treated, although it remains somewhat unclear as to whether the risks are as high in adults as in neonates. This information led to definitive guidance regarding water sampling, acceptable levels of *P. aeruginosa* in water, care of water outlets, and surveillance of cases of *Ps aeruginosa* infection and colonisation. There was a requirement for organisations to set up Water Safety Groups, undertake risk assessments, monitor water sampling and clinical surveillance data, and take action where any concerns are noted.

A Water Safety Group under the chairmanship of the DIPC has been set up and reports quarterly to the Infection Prevention and Control Group. A clinical surveillance system for *P. aeruginos*a acquisitions has been set up for relevant augmented care units and Figure 9 shows the results of new cases each month.

Figure 9. Cases of *Pseudomonas aeruginosa* per month from August 13 – March 14.



P. aeruginosa has long been known to cause problems in burns wounds, but the source of the organisms has not always been clear. Our collaborations with the NIHR SRMRC have again proved valuable in allowing a clinical study looking into the epidemiology of *P. aeruginosa* in the Burns Centre. Results show that approximately 30% of major burns cases acquire *P. aeruginosa* and

that in some of these cases, the strains acquired are similar to those found in water supplies especially showers. Our work with whole genome sequencing of *Ps aeruginosa* in patient and water isolates has attracted national interest and we have been delighted to receive further funding via NIHR to undertake a snapshot survey across four hospitals in England to assess the presence and scale of transmission of this organism from water and the likely impact of the national guidance.

3. Outbreaks and incidents

3.1 *Norovirus*

The winter of 2013/14 saw ongoing and prolonged periods of norovirus in the community and outbreaks in both community and hospital settings. At UHB 3 wards were closed between October 2013 and March 2014, all due to laboratory confirmed norovirus.

3.2 *Coronavirus (nCoV)*

Human coronaviruses were first identified in the mid 1960s causing respiratory infections of varying severity in humans and animals. *MERS-CoV (Middle East Respiratory Syndrome coronavirus virus)*, previously known as *novel coronavirus*, is a new subtype/strain of coronavirus, first identified by the Netherlands in 2012. A genetically very similar strain was identified in a patient from the Middle East at QEHB in February 2013. At this stage, only a relatively small number of cases have been reported. During 2013/14 there have been no cases of coronavirus reported. An action plan is in place at QEHB for any patients presenting with *MERS-CoV* following the PHE guidance/ recommendations for the management of confirmed cases in strict respiratory isolation.

4. Surgical Site Infections

The Trust now has an active surgical site surveillance sub-group meeting under the chairmanship of Mr Mike Hallissey. In addition to the mandatory surveillance of infections following orthopaedic implant surgery there is now a programme to deliver snapshot surveillance of infections following other types of surgery with the long term aim of making each specialty able to continuously monitor their own infection rates.

In addition to these activities the group has audited skin preparation for surgery with a view to developing standardised procedures and is also looking in detail at the appropriateness of and adherence to antibiotic prophylaxis guidance.

5. Antimicrobial Stewardship

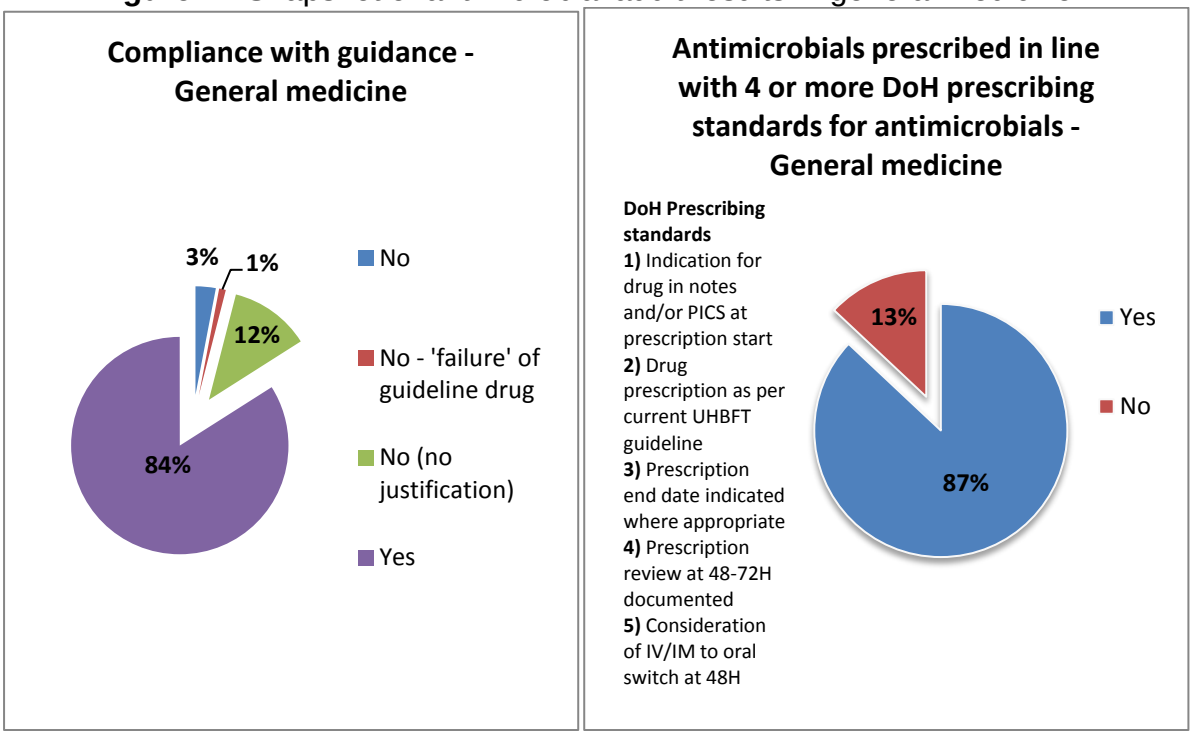
The DIPC and the Chair of the Antimicrobial Steering Group, Dr Martin Gill, have been working closely together to strengthen the role of the Group and develop a clear programme of work encompassing all aspects of antimicrobial

stewardship. In April 2014 a whole time Band 8b Principal Antimicrobial Pharmacist, Dr Harpal Dhillon, took up post, and supported by a part-time Band 8a post we are confident that this will further enhance the work of the group.

The development of an electronic audit tool based on the major audit criteria in the Department of Health Start Smart Then Focus strategy has allowed consistent auditing of antimicrobial prescribing, and in 2013/14 the infection prevention contract with local commissioners was expanded to include a key performance indicator around prescribing according to guidelines in general medicine, with a target of 70% compliance to be achieved in the final quarter. Over 1000 audits were undertaken during the year and we were delighted to be able to achieve the KPI from the first quarter. Figure 14 shows a snapshot of the type of report we are able to generate from this sytem, with final year end results of the audits in medicine.

For 2014/15 the contract requirement has been expanded, based on learning from the CDI reviews, to include audits of prescribing in the surgical specialties, with agreed improvements over baseline findings to be made through the year.

Figure 14 Snapshot of antimicrobial audit results in general medicine



6. Training and Education

In 2013/14 the Infection Prevention and Control team (IPCT) have continued to deliver a wide variety of education.

It is mandatory for every member of staff to attend an annual infection

prevention update. 7359 staff were trained resulting in a compliance rate of 93.2%. This has been achieved through Trust Induction and both Trust and local mandatory training sessions.

In addition, the IPCT have delivered informal sessions on a variety of subjects including the introduction of CPE screening and the post infection review process and continue to deliver sessions in Infection Prevention Week and Doctors Induction.

7. Research and Development

Research and development is a key component of an infection prevention programme, particularly in a high profile teaching Trust such as UHB. Close links with the NIHR SRMRC (the DIPC is also joint theme lead for Theme 2) are already reaping benefits in terms of improving our understanding of the transmission of key pathogens such as MDR Acinetobacter and *Pseudomonas aeruginosa*. Other microbes which are being studied as part of the programme include *Staph aureus* and *Candida spp* and it is hoped that the results of this research will also further our understanding of the transmission of these important microbes.

8. General Planning for Next Year

We have developed an ambitious but flexible and achievable programme for work over 2014/15 which we hope will place the Trust in a position where we can improve patient safety and meet national standards and guidance. This plan is provided as part of the regular Board of Directors paper, and quarterly updates are reported.

The Board of Directors is asked to accept the Annual Report on Infection Prevention and Control.

Beryl Oppenheim, Director of Infection Prevention and Control
Philip Norman, Executive Chief Nurse

July 2014