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Forward

This Journal of Infection Prevention supplement contains the abstracts published at the Infection Prevention 2014 Conference in Glasgow, Scotland. The submitted abstracts represent an important part of the Conference, and we would like to congratulate all those who have had their abstracts accepted and extend our gratitude to all who submitted an abstract. Each abstract undergoes a blinded peer review process and is assigned a score. Those abstracts with a sufficiently high score are accepted for publication at the conference and a small proportion of those have been selected as oral presentations, the remainder as posters. We hope that you find this abstract supplement a useful resource.

The Infection Prevention Society Scientific Programme Committee (Jonathan Otter, Christina Bradley, Michael Nevill, Karen Wares, Elaine Ross, Philip Pugh and Pat Cattini)

Oral Presentations

Abstract ID: 2906

Peri-anal screening for *Clostridium difficile*- is it the way forward?

Marietta Niala, Rohinton Mulla, Anne George
Luton and Dunstable University Hospital

Introduction

Clostridium difficile is a gram positive bacterium that can live harmlessly in the gut of some people. However, if the balance of the normal flora becomes disturbed *C. difficile* can proliferate and cause infection such as diarrhoea, abdominal pain, loss of appetite etc. In 2006, the Trust had a total of 351 *C. difficile* cases (community and hospital acquired).The Trust is aiming to achieve zero *C. difficile* infections. In December of 2013, active *C. difficile* screening of adult patients on admission (emergency and elective) was implemented.

Methods

A peri-anal swab was used to determine how many of the patients on admission were *C. difficile* carriers. Swabs were plated on to a Biomerieux Chrom ID *C. difficile* agar plate and suspected colonies were confirmed using the Alere Techlab *C. difficile* Quik Chek Complete test.

Results

A total of 1888 peri-anal samples were tested and 43 (2.3%) were found to be *C. difficile* positive. This includes all elective and emergency admissions in all adult specialties. 24 (56%) out of the 43 positive samples were found to be toxigenic. Four out of the 43 peri-anal *C. difficile* positive patients turned out to be *C. difficile* toxin positive following a stool sample.

Discussion

Peri-anal swabs can be used to successfully screen *C. difficile* carriers. These patients may be at risk of getting *C. difficile* infections following courses of antibiotics and are likely to spread infections in susceptible contacts. Currently, *C. difficile* carriers identified during the study are not isolated. Alternatively, it may be postulated that asymptomatic carriage may reflect immunity to *C.* difficile infections. We also plan to study the effect of isolating asymptomatic carriers in the spread of *C. difficile* disease. All positive isolates will be sent for typing to determine any relevance.

Abstract ID: 2988

Time from first exposure to detection for carbapenemase-producing Enterobacteriaceae (CPE)

Andrea Ledgerton, David Harvey
Wirral University Teaching Hospital NHS Foundation Trust

Introduction

Our hospital experienced two CPE outbreaks between 2011 and 2013. A clonal *Klebsiella pneumoniae* VIM-4 outbreak was followed by an OXA-48 outbreak. To inform our strategy on duration of screening, conversion time was assessed during two outbreaks of CPE.

Methods

Rectal screening of contacts was undertaken weekly until 4 weeks after the last patient was discharged. Timelines of all cases were constructed. For cases with clear epidemiological links to a known case, likely time from first exposure to CPE detection was calculated.

Results

25 patients were identified (14 VIM-4, 11 OXA-48). The mean conversion time was 26 days, with a range of 4 to 85 days. Comparing VIM-4 with OXA-48, the mean was 23 days vs 31 days. Overall, 70% of cases were identified by 4 weeks, 90% by 6 weeks and 100% by 13 weeks.

Discussion

In order to detect CPE transmission, four weeks screening from first exposure should be considered the minimum necessary. Extending this to six weeks would capture most cases. Three months screening would detect primary contacts requiring longer to convert and potentially would cover two standard incubation periods, so uncovering secondary contacts. As part of a multifaceted approach of early detection and containment, prolonged active surveillance should be considered as a standard measure. Screening should continue for a sufficient time period after the last known patient is discharged. Based on these data, six weeks would be pragmatic, and three months optimal.

10.1177/1757177414547832

Abstract ID: 2881

Assessing the burden of carbapenemase-producing organisms from inter-hospital patient transfers and from patients receiving healthcare abroad

Janice Scott, Damien Mack
Royal Free London NHS Foundation Trust

Carbapenem resistance is emerging within UK healthcare facilities, predominantly from healthcare facilities abroad. There is debate about admission screening for carbapenemase-producing organisms (CPOs) as a detection tool, to aid early containment and plan preventative measures. The trust became a pilot site for the proposed national Public Health England (PHE) CPO Toolkit, later published December 2013.

Aims and methods
A point prevalence survey (PPS) was undertaken across all Trust wards. Patient inclusion and exclusion criteria were adopted as per PHE. The case definition was designed for clarity and generalizability. All inpatients were asked if they had healthcare abroad or healthcare in a UK hospital in the past 12 months, or contact with a CPO. This information was then used to assess the burden.

Results
Of 551 patients surveyed, 2% (11) had received healthcare abroad and 20.3% (112) within the UK, within the last 12 months, and 17.4% (96) had healthcare in a London hospital, subsequently identified as a high-risk group.

Of the high-risk group, 3.4% (19) of patients in high-risk areas such as critical care were screened on admission before the survey, none within general wards.

The high-risk areas with more than 20% of suspected cases are the stroke unit, renal unit, private patient unit, hepatobiliary and transplant wards, intensive care unit, oncology ward and infectious diseases ward.

The gold standard approach outlined in the toolkit indicated that all patients who were high risk and being admitted through the Trust should be screened and isolated. On balance, patient safety considerations indicate the need for a pragmatic approach, which is to predominantly screen and isolate only the patients in the highest risk categories on admission.

Discussion
We are sharing the PPS survey tool with other London trusts, to identify trends regionally and to compare teaching trusts to district general trusts.

Abstract ID: 2884

Where's all the VRE gone? - A successful VRE bundle at a Singapore hospital

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Introduction
Vancomycin-resistant enterococci (VRE) emerged at our hospital in the mid-2000s. Despite implementing targeted active surveillance in 2006, the prevalence of VRE continued to rise. Further interventions were introduced in late-2012 / early-2013.

Methods
Our VRE bundle comprised: monthly cleaning audit of 10% of general discharge using fluorescent markers, enhanced precautions signage, a minor expansion of active surveillance, implementation of hydrogen peroxide vapour (HPV) for terminal disinfection following the discharge of VRE patients, a change in the bleach cleaning solution, and an automated electronic alert system to identify known VRE carriers at the time of admission. In addition, education and feedback to staff of MDRO rates were provided regularly in various hospital forums. Monthly cases of VRE infection and colonization from January 2008 to January 2014 were extracted from hospital records. A 'breakpoint' regression model was fitted to the monthly number of VRE cases. The model evaluates potentially differing trends before and after a breakpoint, which is estimated by the model instead of being specified a priori, resulting in less potential for bias.

Results
A total of 341 cases were reported over this 73 month period. The best estimate for the breakpoint corresponds to early February 2013 (95% confidence interval, CI: August 2012—June 2013), when the bundle was implemented. The peak incidence was 9.2 cases per month (95% CI: 6.0—13.2) in March 2013 and reduced to 2.4 cases per month (95% CI: 1.1—4.7) by January 2014.

Discussion
The bundle of interventions was associated with a significant change in the incidence of VRE at our hospital. Confidence intervals around the breakpoint suggested that all elements of the bundle (apart from the change in bleach cleaning solution) could have played a role in the reduction of VRE.

Abstract ID: 2826

'Don't Go Breaking My Heart'! Benchmarking practice in response to elevated cardiac surgery infection rates

Martin Still, Nichola Baker
Brighton & Sussex University Hospitals NHS Trust

Improvement Issue and Context
The Trust submits cardiothoracic surgical site infection (SSI) data to Public Health England that is also fed back to the surgeons. In the first quarter of 2013 the infection rate was 12.9 % (95% CI 6.1 – 19.7) compared to a national average of 5.2% (95% CI 4.9 – 5.5, p=<0.001). This prompted an immediate investigation into aspects of pre, peri and post-operative practices benchmarking against the NICE SSI Clinical Guideline and networking with other organisations that undertook cardiothoracic surgery.

Methods and Measurement
Infection Control (IC) practices come as a 'bundle' so it can be difficult to isolate the actual cause and effect of any one intervention. The IC team focused on standards stated in the NICE SSI Guideline that included hand hygiene and personal protective equipment practices across the unit. The Royal Brompton & Harefield Trust hosted a networking meeting where best practices were shared. Engagement with the surgical team was initially a challenge. All information was shared at the time it was gathered that prompted discussion. Observations of practice were fed back immediately in order to effect maximum change. Work started to change types of dressings used and what information was given to patients. Work also started on improving the patient hygiene process. There was resistance to change, probably because some of the practice changes were imposed and sustaining change required leadership.

Evidence of Improvement
The SSI rate for April to September 2013 dropped to 6.7% (95% CI 3.3 – 10.1 p= 0.37) against a national average of 5.3% (CI 5-5.6%) and compliance with hand hygiene and personal protective use increased.

Future Steps
At the networking meeting it was agreed that a national cardiac surgery networking group would be set up and meet around the country to discuss and continue to share best practices.

Abstract ID: 2905

Antimicrobial Prescribing: What do we do badly and how can we improve?

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[1]Watford Hospital, [2]Watford General Hospital, [3]North Middlesex Hospital, [4]Barnet Hospital, [5]Royal Free Hospital, [6]Basildon Hospital

Improvement Issue and Context

The aim of the audit was to evaluate antimicrobial prescribing on the wards of a large teaching hospital, to highlight areas of poor compliance and to devise a targeted, sustainable and realistic intervention to improve practice.

Antimicrobials are very commonly prescribed medications in hospitals. Standardising the approach to prescribing has been successful in reducing cost associated with antimicrobial use and reducing the prevalence of resistance phenotypes associated with increased mortality.

Methods and Measurement

A group of seven foundation year doctors designed a proforma to collect data on different aspects of antibiotic prescribing within the hospital to see how well local protocol was adhered to. Adult inpatients were audited and the initial data was collected over a one month period gaining a sample size of 75.

Evidence of Improvement

Initial results highlighted that the areas of poor compliance when prescribing antimicrobials were: stating duration of antimicrobial course in the notes (36% compliance), and documentation on the drug chart recommending stop date for antimicrobials (26%).

A targeted intervention of a specific sticker to place on the drug chart when antimicrobials are prescribed was introduced and trialled on two wards. When re-audited one month post-intervention it was found that use of the sticker improved prescribing practice. For example post-intervention, 76% of prescriptions stated a stop date for antimicrobials.

Future Steps

The implementation of a specific sticker on the drug chart for antimicrobial prescribing has been shown to improve antimicrobial prescribing within this hospital. From this, an assumption can be made that it reduced unnecessary antimicrobial doses, in particular from the stopping of antimicrobials on the correct stop date. It is therefore recommended that the sticker be rolled out onto other wards with the aim in the future of incorporation into the drug chart.

Abstract ID: 2958

Reducing the number of missed isolation days in the Alder Hey High Dependency Unit using the Bioquell Pod

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Introduction

Single rooms are in short supply in many NHS hospitals. Our 15 bed high dependency unit (HDU) has four side rooms and a frequent need to isolate bacterial (MRSA, ESBL and CRE) and respiratory (RSV and influenza) pathogens. Side rooms are often occupied by patients with infectious and non-infectious needs, meaning that 'isolation' is attempted in the bays. Bioquell Pods are semi-permanent structures that are used to convert multi-occupancy bays into single-occupancy pods.

Methods

Three Pods were implemented in February 2013. Bed usage was recorded each day. The number of missed isolation days was compared for the year prior to the Pods (Feb 2012 – Jan 2013) vs. the first year of Pod use (Feb 2013 – Jan 2014). Patient isolation priorities were as follows: airborne (e.g. measles) > droplet (e.g. respiratory virus) > contact (e.g. MRSA, rotavirus). The percentage of 'missed isolations' was calculated for each pathogen (when a patient requiring a side room was placed in a bay), and compared using the Chi squared test.

Results

Data were recorded for 203 days pre-Pod and 211 days in the first year of pod usage. Missed isolation days fell from 58% (662/1138) pre-Pod to 15% (205/1382) during the first year of pod use (p<0.001) (Table). The impact was most marked for MRSA (51% to 8%. P<0.001) and respiratory viruses (60% to 16%, p<0.001).

Table. Missed isolation in the first year of Bioquell Pod use compared with the previous year

Pathogen	Pre-Pod use (%)	During Pod use (%)	p value
MRSA	51.3	8.0	<0.001
ESBL / CRE	26.4	15.7	<0.001
Respiratory viruses	60.3	16.3	<0.001
Rotavirus	49.3	60.8	0.109
Overall	58.2	14.8	<0.001

Discussion

Introducing Pods to our 15 bed HDU significantly reduced missed isolation, and thus transmission risk. The effect was especially marked for MRSA and respiratory viruses.

Conflict of Interest

Jon Otter works part-time for Bioquell.

Abstract ID: 2912

Enhanced surveillance of *E. coli* bacteraemia in Scotland - A pilot study

Donald Bunyan, Julie Wilson, Samantha Fleming, David Henderson, Camilla Wiuff, Alistair Leanord
Health Protection Scotland

Introduction

The number of *E. coli* bacteraemia reported in Scotland has increased continuously since 2009. The recent Scottish Point Prevalence Survey (PPS) identified that among the HAIs, the proportion of cases attributed to *E. coli* was higher in 2011 (12.1%) than in 2005/6 (3.1%).

This pilot study aimed at measuring the burden of disease and identifying ways to describe the epidemiology and primary causes of *E. coli* bacteraemia in Scotland.

Methods

An enhanced *E. coli* dataset was collected by eight participating NHS boards within a 3-month data collection period (October to December 2013).

Results

Of the 532 cases obtained, nearly 60% of cases were classed as inpatients. When assessing previous hospital admissions, 30% were admitted to hospital in the month prior to developing a bacteraemia. More than 50% of cases had a urinary tract infection as the primary cause of infection (i.e. the infection that is thought to have caused the bacteraemia). Nearly 50% had developed bacteraemia following a primary infection acquired in the community. When asked as to whether the potential primary cause of the bacteraemia was medical procedure related / device related or if there was another cause, less than 10% of the bacteraemia were found to be device related, although for the majority this information was unknown.

Discussion

This pilot study has highlighted population characteristics that are associated with patients in NHS Scotland who have bacteraemia caused by *E. coli*. It has provided a basis with which to start to generate hypotheses for targeting interventions in healthcare settings, with the addition of other linked datasets to elucidate more complex population characteristics including health outcome. Future work will be required to demonstrate and quantify the effectiveness of these interventions in different care settings.

Abstract ID: 2968

First UK trial of Xenex PX-UV room decontamination device

Angela Beal, Karren Staniforth, Nik Mahida, Natalie Vaughan, Mitch Clarke, Tim Boswell
Nottingham University Hospitals NHS Trust

Introduction
There is increasing recognition of the role of the healthcare environment as a reservoir for key pathogens, such as vancomycin-resistant enterococci (VRE). New automated environmental decontamination technologies utilising hydrogen peroxide and ultraviolet-C light (UVC) have been developed, which may have improved efficacy compared with manual disinfection.

The purpose of this study was to evaluate the efficacy of a pulsed xenon UV room disinfection device (PX-UV) in a centre for clinical haematology, which is at high risk for VRE.

Method
Two sampling methods were used to evaluate the device. i) Tryptone soya agar (TSA) contact plates for total surface aerobic colony count pre clean, post clean and post exposure to PX-UV. ii) Sponge recovery with broth enrichment to provide a sensitive presence/absence test for VRE post clean and post exposure to PX-UV. Ten rooms were sampled with contact plates and eight additional rooms sampled with sponge recovery. The total colonies on the TSA plates were enumerated after 48 hours incubation. Identification of VRE was established by standard laboratory methods.

Results
Median total aerobic counts pre-clean, post manual cleaning and post PX-UV were 35.5, 4 and 2 CFU respectively. Of the 160 samples taken post manual cleaning, 26 (16%) were positive for VRE. However after deployment of PX-UV, VRE was still recovered from 16 of 160 matched samples (10%).

Conclusion
The Xenex PX-UV system produced a greater reduction in total surface contamination compared to standard manual cleaning alone. However, it did not completely eradicate VRE from the environment. User feedback was positive and the increase in time taken to complete a room was 20 minutes meaning this technology could be used as an adjunct to a manual cleaning process with minimal increase in overall time taken.

Conflict of Interest

Xenex provided a free loan of the PX-UV device for the duration of the study and provided funding for a member of the research team to attend conference last year.

Abstract ID: 2865

Hepatitis A and E virus seropositivity amongst healthy young adults in India: Implications for immunisation & public health policy

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Introduction
Various serosurveys and studies provide ample evidence of differing perspectives regarding epidemiology of hepatitis A virus (HAV) and hepatitis E virus (HEV) in India and other developing countries. This study was conducted to assess seroprevalence of HAV and HEV and its associated factors with an aim to provide inputs to planners regarding the requirement for the HAV vaccine. The proportion of new HAV and HEV positives among patients admitted to tertiary healthcare facilities was also assessed.

Methods
A multi-centre cross sectional survey amongst 4175 healthy young adults was carried out in training centres, selected by multistage random sampling, giving equal representation to all regions of India. Sample size was calculated by taking prevalence of HAV seropositivity amongst adults as 60% and alpha 5%. A total of 695 patients were also evaluated in four selected hospitals.

Results
Seroprevalence for HAV and HEV was 92.68% (95% CI, 91.82, 93.47) and 17.05% (15.90, 18.26), respectively. Bivariate analysis found statistically significant association ($p<0.05$) between HAV and HEV seropositivity with various factors. Logistic regression showed that hand washing without soap, regular close contact with domestic animals, consumption of unpasteurized milk and regular consumption of food outside home were risk factors for HAV ($p<0.05$). For HEV, irregular hand washing, consumption of unpasteurized milk and irregular consumption of freshly prepared food were risk factors ($p < 0.05$). Among patients, the distribution of HAV, HEV, hepatitis B surface antigen (HBsAg) and HCV was 10.22%, 21.87%, 16.98% and 3.74%, respectively.

Discussion
A high natural immunity against HAV among the healthy young adults clearly demonstrates that vaccination against HAV is not required at present. The large proportion being susceptible to HEV points towards the requirement of preventive strategies in the form of safe drinking water supply and sanitation, increasing awareness through information, education and counselling, and behaviour change with respect to personal hygiene especially hand and food hygiene.

Abstract ID: 2913

Improvements in pain, odour, sleep and social activities for patients with chronic wounds using novel aqueous oxygen peroxide (AOP) technology

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Introduction
Chronic venous leg ulcers (VLUs) are a common cause of morbidity in community settings. Patients with VLUs often experience pain, odour, sleep interruption and reduced participation in social activities. We evaluated the impact of applying aqueous oxygen peroxide (AOP) on the quality of life for patients with VLUs.

Methods
We performed a primary care based, double-blind, randomised, placebo-controlled trial (RCT) and a small follow-on evaluation. 61 patients suffering with chronic, static, venous leg ulceration were included in the RCT, and randomised to two weeks of treatment with 20 parts per million AOP or sterile water placebo. Four patients were enrolled in the follow-on evaluation designed to explore the impact on patients' quality of life in more detail; all patients in this evaluation were treated with AOP. RCT patients scored pain before and after each treatment using a 0-100 point Likert scale. Patients in the follow-on evaluation scored pain, impact on sleep pattern, social activities and odour pre and post treatment, or at 6 weeks, whichever came first.

Results
Patients treated with AOP experienced greater reductions in ulcer pain after treatment compared with placebo treatment (mean reduction 28.4 vs. 9.6, $p=0.001$). In the follow-on evaluation, average pain (6.0 vs. 3.5), odour (5.0 vs. 0), impact on sleep (4.3 vs. 0.8), and impact on social activities (5.8 vs. 3.3) were all reduced (composite quality of life average 5.2 vs. 1.9, $p=0.001$).

Discussion
The use of AOP in general practice produced reductions in ulcer pain and wound odour, which is likely to be linked to the antimicrobial properties of AOP. We also recorded improvements in sleep and participation in social activities for patients treated using AOP. Treatment of chronic VLUs in general practice using AOP confers substantial benefits to a patient's quality of life.

Conflict of Interest

Jon Otter works part-time for Bioquell; Nick Adams and John Chewins are employed by Bioquell.

Abstract ID: 2983

Service user involvement: How well are we doing?

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Introduction

The Service User Research Forum (SURF) was set up by the HCAI Research Network in 2007 to establish patient and public involvement (PPI) in HCAI and Antimicrobial Resistance (AMR) research. SURF members work alongside research teams to provide lay input into research priorities, design data collection tools, comment on funding applications, and in some cases become co-applicants. The HCAI Research Network investigated how PPI is integrated into HCAI and AMR research; the challenges and benefits perceived by researchers and how researchers can be further supported to integrate PPI.

Methods

An online survey using a mix of multiple choice and open-ended questions was sent to 500 researchers who had published in the Journal of Infection Prevention and Journal of Hospital Infection or who had worked with SURF in the past. Multiple choice data was analysed in SPSS. Open-ended responses were analysed thematically.

Results

Eighty responses were received. Of those who had carried out research between 2011-2013, 51% (n=34) had included PPI and 87% (n=46) believed PPI could benefit research. Methods of involving the public varied considerably, the most common contribution of lay individuals being to review research priorities, data collection tools and documents for research participants. Examples of the benefits of involvement were a greater understanding of the patient perspective and more accessible patient materials. For those not involving the public (n=33) the main barriers were lack of time and access to lay individuals.

Discussion

Public involvement is not as widely integrated into HCAI and AMR research as some other health disciplines. However, there are examples of where it is adding value to research in the field. To maximise the benefits of PPI, the research community should include lay individuals as partners in research as opposed to a sounding board for researcher generated ideas and materials.

Abstract ID: 2878

What's happened to a belief about 'duty of care' in hand hygiene?

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Introduction

It is accepted by hospital clinical governance and infection control experts that every clinician's duty of care includes hand hygiene yet healthcare workers globally continue to struggle with compliance. To explore whether hand hygiene is viewed by clinicians as their duty of care we conducted focus groups discussions with clinician staff in Vietnam.

Methods

We conducted 10 focus group discussions with nursing and medical staff from five large public hospitals across Hanoi, Vietnam. A locally trained researcher facilitated all discussions. Tape recordings were transcribed verbatim and then translated into English. Thematic analysis was conducted by two investigators.

Results

Expressed frustration with high workload, limited access to hand hygiene solutions, and hand hygiene guidelines being too difficult to recall were accepted as bona fide reasons for non-compliance. No participants acknowledged or expressed hand hygiene as being a 'duty of care' to their patients. A dominant justification for non-compliance was the lack of hand hygiene among visitors and family members who provide daily basic care to patients. Although 'duty of care' for patients was absent there was a strong duty of care to ones-self about when hand hygiene was a benefit to their own health regardless of patient load or environmental challenges.

Discussion

Vietnam has unique barriers to compliance that includes limited access to alcohol based hand rub, clean running water, soap and hand towels. These barriers are amplified by overcrowded conditions and dual bed occupancy. Clinicians require assistance with the interpretation and importance of the 'My 5 Moments for Hand Hygiene' – commencing with an emphasis on a 'duty of care' to their patient regardless of compliance by visitors and family. Remodelling training to focus on 'duty of care' commencing with before and after patient contact (Moments 1& 4) may assist with improving hand hygiene compliance.

Posters

Antimicrobial prescribing and stewardship

Abstract ID: 2814

Doripenem may be an alternative antibiotic to treat imipenem and meropenem-resitant *Enterobacter cloacae* infections

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Introduction
The therapeutic options for imipenem and meropenem-resistant *Enterobacter cloacae* infections are usually limited due to co-resistance to other classes of antibiotics. In this study, we attempted to explore whether doripenem, a newer carbapenem, can be prescribed to treat these infections.

Methods
At a regional hospital in southern Taiwan, since 2010, 16 isolates of *E. cloacae* showing simultaneous resistance to both imipenem and meropenem were collected and analyzed. E-test strips were used to detect the minimum inhibitory concentrations (MICs). The tested carbapenems were imipenem, meropenem, and doripenem. Interpretation was according to the Clinical and Laboratory Standards Institute guideline published in 2014.

Results
All isolates were non-susceptible to imipenem and meropenem with MICs ≧ 2 mg/L. By contrast, various doripenem MICs were observed: 1 mg/L, 5, 31.3%; 2 mg/L, 9, 56.3%; 4 mg/L, 1, 6.3%; and > 32 mg/L, 1, 6.3%.

Discussion
In this study, 31.3% (5 of 16) of imipenem/meropenem-resistant *E. cloacae* isolates were susceptible to doripenem, indicating that doripenem may serve as an alternative choice to treat such infections. Previous pharmacodynamic studies suggested that infections caused by organisms with doripenem MICs 4 mg/L may be cured by the recommended dose of doripenem (500 mg administered over four hours every eight hours). Accordingly, up to 93.7% (15 of 16) of the isolates may be sufficiently treated with doripenem. Therefore, when imipenem/meropenem-resistant *E. cloacae* infections are encountered, doripenem susceptibility is worthy of being tested. If the etiologic agent remains susceptible to doripenem, or even with MICs up to 4 mg/L, the antibiotic may be feasible to treat the infections.

Abstract ID: 2820

Flomoxef may be prescribed as the first-line antibiotic to treat acute pyelonephritis caused by extended-spectrum beta-lactamase-producing organisms

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Introduction
Carbapenems are usually recommended to treat infections caused by extended-spectrum beta-lactamase (ESBL)-producing organisms. However, frequent use of carbapenems may predispose to the increase of carbapenem-resistant organisms, which are growing worldwide. The present study was conducted to explore whether flomoxef, a cephamycin with activity against ESBL-producing organisms, can be substituted for carbapenems to treat acute pyelonephritis (APN) caused by ESBL-producing organisms in order to reduce carbapenem use.

Methods
From May 2012 to April 2014, patients with APN caused by ESBL-producing organisms and treated with flomoxef were enrolled as cases. Patients with similar infections but treated with doripenem were enrolled as controls for comparison. Treatment success was defined as fever and other systemic signs or symptoms gradually subsided within three days of antibiotic administration. Otherwise, it was defined as a treatment failure.

Results
A total of 20 cases and 30 controls were retrospectively identified during the two-year study period. *Escherichia coli* was found in 46 patients, and the remaining 4 were caused by *Klebsiella pneumoniae*. Treatment success was found in 18 of the 20 cases with flomoxef therapy; the two failure cases were subsequently treated successfully with doripenem. All the 30 controls with doripenem therapy achieved successful treatment results. The rates of treatment success were not statistically significant between the two groups.

Discussion
In this study, flomoxef was found to achieve a high rate (18 of 20, 90%) of treatment success for APN caused by ESBL-producing organisms; hence, we recommend that flomoxef may be prescribed as the first-line antibiotic to treat such infections, especially mild to moderate infections. If treatment failure by flomoxef occurs, the subsequent use of carbapenems as the salvage antibiotic is still adequate. Consequently, if this measure become a part of the antimicrobial stewardship programs, the reduction of carbapenem-resistant organisms may be anticipated by reducing carbapenem use.

Abstract ID: 2833

An increasing incidence of extended-spectrum beta-lactamase-producing strains in *Escherichia coli* bacteremia

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Introduction
Extended-spectrum beta-lactamase (ESBL)-producing organisms are increasing worldwide, which most frequently occurs in *Escherichia coli* now. This study was to explore an increased extent of the incidence of ESBL-producing strains in *E. coli* isolated from blood at a regional hospital, which provides important information for empiric antibiotic therapy.

Methods
This was a retrospective study at a regional hospital in southern Taiwan. From 2009 to 2013, all *E. coli* isolates obtained from blood cultures were enrolled in this study. If multiple isolates were identified from the same patient during the same hospitalization period, only the first isolate was enrolled. ESBL-producing strains were confirmed by double disk diffusion test.

Results
A total of 2083 *E. coli* isolates were enrolled. The ESBL-producing strains accounted for 7.5 % (31 of 381), 8.3% (33 of 363), 8.2% (34 of 381), 15.9% (68 of 360), and 18.8 % (81 of 351) of *E. coli* isolates in 2009, 2010, 2011, 2012, and 2013, respectively. The incidence of ESBL-producing *E. coli* was significantly different between 2011 and 2012 ($P < 0.05$).

Discussion
In this study, we observed an increased incidence of ESBL-producing strains in *E. coli* isolated from blood in this hospital during the five-year period, especially a rapid and statistically significant increase from 2011 to 2012 (8.2% vs. 15.9%). Overuse of third-generation cephalosporins might be a possible reason because the use of third-generation cephalosporins has increased in this hospital since 2012. However,

further investigations are still necessary to explore other possible reasons. This phenomenon is concerning and should be observed closely. Until the incidence of ESBL-producing *E. coli* has declined, carbapenems may be the most reliable empiric therapy for infections probably caused by *E. coli*, especially severe infections

Abstract ID: 2872

The influences on antimicrobial prescribing behaviour in nurse prescribers: a systematic review

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Introduction
Antimicrobial resistance (AMR) is an urgent public health concern and threatens to reduce the effectiveness of antimicrobials. High consumption, increased frequency and imprudent use of antimicrobials are believed to accelerate resistance and research suggests that inappropriate prescribing is apparent in practice. With a growing number of nurses prescribing antimicrobials, generating an understanding of their practice is essential to inform future strategies designed to combat AMR. Therefore the objective of this review was to systematically identify, appraise and synthesise the evidence in relation to the influences on independent nurse prescribers' (NPs) antimicrobial prescribing behaviour.

Methods
A comprehensive search strategy was undertaken; databases (AMED, CINAHL, MEDLINE, Health Source: Nursing/Academic Edition), conference proceedings and reference lists were searched for English language studies from January 1st 2002 to 31st December 2013. Records identified were screened for relevance. Two independent reviewers assessed the methodological quality of the papers using critical appraisal tools and data was extracted.

Results
Five studies were found which explored influences on NPs' antimicrobial prescribing behaviour and two which explored both NPs and doctors/physician assistants. Methodologically, survey design was most common with only one study adopting a qualitative approach. Guidelines, safety, tolerability and efficacy of the antibiotic and diagnostic uncertainty were the most common influencing factors. Other factors such as the clinical condition of the patient and patient/parent pressure, training/experience, peer support, cost, race and payment factors were also mentioned within the studies.

Discussion
These studies were limited by relatively poor response rates, small sample sizes, designs with no agreed theory and often failure to explore the underlying reasons. A methodology which allows for a more thorough exploration of all influencing factors on prescribing behaviour may be more useful to inform future behavioural strategies designed to be inclusive and relevant to this ever increasing group of prescribers.

Abstract ID: 2890

To evaluate the role of biochip for identifying non-tuberculous mycobacteria

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Introduction
In the last two decades, the trend of pulmonary disease caused by non-tuberculous mycobacteria (NTM) seems to be increasing globally. Because the species of NTM causing diseases and consequences vary by geographical distribution, the therapeutic options are different. However, the traditional culture method (TCM) is complicated and time-consuming. Hence, it is very important to adopt a fast method to identify different NTM, resulting in the optimal treatment. The aim of this study was to evaluate the role of identifying NTM by a biochip (DR.Chip Biotech, Inc., Taiwan) method, a rapid diagnostic molecular method.

Methods
This was a retrospective study at Chi-Mei medical center in southern Taiwan. From January to December 2013, all clinical samples sent for identifying NTM were enrolled in this study. The methods for identifying NTM included both biochip and TCM.

Results
A total of 6819 samples, mostly obtained from sputum, were enrolled in this study. The detectable rate of NTM was 7.5 % (n =510) and 6.9 % (n = 473) by biochip and TCM, respectively. Moreover, biochip can further distinguish 15 of the most common species of NTM in Taiwan with an accuracy rate of >99% among all NTM-positive species. Of the 510 NTM isolates, the first five NTM species were *Mycobacterium intracellulare* (n = 197, 38.6%), *Mycobacterium kansasii* (n =113, 22.2%), *Mycobacterium abscessus* (n = 107, 21%), *Mycobacterium gordonae* (n = 45, 8.8%), and *Mycobacterium fortuitum* (n = 31, 6.1%).

Discussion
As a result of this study, the application of biochip can not only quickly identify NTM but also distinguish different NTM species. Hence, we consider that biochip may help physicians to prescribe the optimal antibiotics for treating infections caused by NTM.

Abstract ID: 2987

Reducing the use of antibiotics in multi-resistant organisms in urine specimens

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Cheshire and Wirral Partnership NHS Foundation Trust

Improvement Issue and Context
The Infection Prevention & Control (IPC) Community Team reviews, and communicates to relevant others, every positive microbiology urine result. From this response, it is possible to determine that antibiotic therapy reflects the microbiology result and follows the agreed antibiotic formulary. This initiative enabled us to identify ways to support a community-wide reduction in the use of antibiotics for multi-resistant organisms in urine specimens, and develop a pathway for safe catheterisation, which prevents infections associated with urethral and suprapubic catheters.

Methods and measurement
The IPC team produced guidance for community staff in the assessment, diagnosis and treatment of Urinary Tract Infections (UTIs), emphasising issues such as dehydration, inaccurate urine sample collection, inaccurate diagnosis and management of recurrent UTIs.

The IPC team introduced a community catheter pathway for staff, which supports screening and decolonisation for MRSA; reason for catheterisation and considerations for prompt removal. A successful business case enabled a bladder scanner to be purchased for out of hours care to support a trial without catheters in the community setting. Patients were educated regarding self-care of their catheter, when to seek help or advice, and given a leaflet for reference. Patients were scheduled for review at 10 weeks; this allowed the nurse to assess patients within the manufacturers' licence, considering contingencies, and allowed action if the patient was found to be symptomatic of a systemic Catheter Associated Urinary Tract Infection

Evidence of Improvement
Feedback from staff for the pathway has been positive; the numbers of inappropriate specimens of urine and antibiotic prescribing have reduced. A collaborative approach to urine specimens has proven successful, promoting communication with all key stakeholders.

Future Steps
This work is ongoing in terms of communications with colleagues across the health and social care community. Education and guidance will be extended to domiciliary services, and care homes.

Abstract ID: 2789

Integrating a diverse infection prevention team and driving organisational improvement using the John Adair Leadership Model

Tracey Cooper
Betsi Cadwaladr University Health Board

Improvement Issue and Context

An experienced senior Infection Prevention Nurse took up post 1 year ago in a large NHS organisation, which has major challenges with infection rates. Three legacy organisations with very different cultures were merged to form this organisation. Each had its own infection prevention service, with different profiles, priorities and working practices. At merger these three services combined from a financial perspective, but never merged to become a single service.

The challenge has been to bring these very different services and historic cultures together in order to achieve an effective organisation-wide infection prevention service that facilitates high standards of effective infection prevention practice.

Methods and Measurement

Leadership and change theories have been utilised by the newly-appointed senior nurse. The John Adair Leadership Model was selected as a useful approach for working with individuals and legacy teams, with the aim of effecting change within the Infection Prevention Team, and across the wider organisation. This approach combined with use of the John Kotter Change Model to drive improvement across the whole organisation is described, along with the leadership challenges this presents.

Evidence of Improvement

Measuring the effectiveness of the leadership approach to achieve this type of cultural and individual behavioural change is not easy. There are however, numerous examples of 'before and after' behaviours which demonstrate how the approach taken is resulting in different thinking and working practices.

Future Steps

Work with individuals within the team continues, including developing their leadership skills and encouraging their use of the John Adair Leadership Model. The key elements of the leadership model also continue to be used as part of wider work across the organisation. The aim is to engage staff, and deliver the scale of change needed to protect patients from avoidable infection.

Abstract ID: 2841

Improving standards of infection prevention and control practice in St john Ambulance (SJA) through our communications strategy

Stevie Slade, Marsha Farquhar
St John Ambulance

Improvement issue and Context

St John Ambulance underwent a restructure in 2013 from 42 Counties, to a model of 8 regional teams. This was partly to bring greater consistency to operations across the organisation and provided an opportunity to simplify policy implementation; furthermore, the new structure includes an IPC lead in each region to be responsible for overseeing IPC activities and cascading information

Methods and Measurement

Numerous communications relating to IPC practice have been produced and implemented following the restructure:

TAKE5 campaign

A monthly campaign is based on the concept of taking five minutes to carry out checks on areas such as waste management and hand washing. The campaign consists of posters and briefing sheets that line managers use to discuss with their teams .

IPC 'nibbles'

These are short sections of news articles, complete with new branding which have been published on the SJA intranet and a national news e-letter.

National activities

Following a building refurbishment, a hand washing awareness day was planned to raise awareness and standards at National Headquarters.

IPC National Advisory Group activities

Materials produced, such as the development of a sharps injury management poster.

Evidence of improvement

Increased awareness can be seen in several areas: IPC posters and other materials have been displayed regionally; audits have showed raised standards and increased compliance. The IPC National Advisory Group members have also provided positive feedback on IPC campaigns.

Future steps

Examples of planned work include launching a monthly clinical e-newsletter to include IPC articles and to plan more national activities like the hand washing day and reporting of these on the intranet. We also aim to increase the national provision of IPC resources, such as cleaning chemicals and clinical waste collection, to be communicated via the IPC National Advisory Group and news stories.

Abstract ID: 2879

Gaming theory, social media and human factors - catalysing an epidemic of evidence uptake

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Improvement issue and context

The use of game theory and social media as a mechanism for generating interest in research findings is a groundbreaking approach to engaging healthcare professionals. Being able to excite busy professionals to apply evidence based research findings into practice is subject to multiple barriers.

Method

Using a hybrid of a well established game, Top Trumps® and social media (Twitter), we developed a novel 'TopTrumpitter' visualisation to enhance understanding, and enable access and practical translation of key articles on human factors and infection prevention and control (IPC). Twitter was used to provide a description of articles in 140 characters.

A five-part TopTrumpitter grading criteria was developed, with scores ranging from 0 to 10: 1) Relevance - method employed, impact on prevention. 2) Wow factor - reader wants to keep reading after the first seven words. 3) Immediate change to practice - unambiguous, implementation-focused. 4) Must read - engaging language and references stimulating further reading. 5) Bonus point - reader motivated to tell someone else to read/tweet about it

Findings

From 3000 titles, 129 abstracts and 52 full text papers were reviewed and 33 retained. Visualisations were created on the top 6 articles using a TopTrumps-like

format. The Twitter-approach enabled articles to be summarized succinctly. The final component of the visualisation scored each paper using the TopTrumpitter criteria.

Discussion

This approach builds on the call to action recommended by Storr et al[1] and allows for an engaging presentation of article reviews to reach out to a wider audience. In the 21st century, where the use of mobile technology and social media is expanding and the cognitive capacity of frontline practitioners is compromised by information overload, new approaches to visualising research findings have great potential to stimulate debate and influence practice.

Reference

[1]Storr J et al (2013) Integrating human factors with infection prevention and control. Health Foundation Thought Paper.

Abstract ID: 2929

TeamGreen A pilot study exploring the potential of ATP (Adenosine Triphosphate) screening to increase healthcare professional engagement with environmental cleaning

Carolyn Dawson, Fiona Reakes
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Introduction

Lack of engagement can make implementation and sustainability of infection prevention interventions difficult. A pilot study within an NHS acute setting explored the potential of ATP (Adenosine Triphosphate) screening to increase healthcare professional engagement with environmental cleaning (EC). ATP screening within infection prevention has been widely discussed. However, application to engagement appears novel.

Methods

Semi-structured interviews with senior nursing staff (N=2) were conducted pre and post interactive sessions to establish: perceived level of EC data ownership, and perceived level of EC "engagement". 13 interactive sessions occurred over five weeks, involving healthcare professionals from a range of clinical grades (N=8). Sessions utilised the 3M Clean-Trace Hygiene Management System. An IPC nurse aided participants conduct ATP screening of: Cardiac Arrest Trolley, Drip Stand, Dynamap Base, Notes Trolley Draws, and SATS Probe. Participants recorded Relative Light Unit (RLU) counts for each surface. Easy to understand data was generated: Red >2000; Amber 1000-2000; Green <1000 RLU. Green was the target status.

Results and Discussion

Data collection occurred July-August 2013. Interviews revealed low data ownership. Participants reported difficulties engaging staff in EC discussions, not everyone saw it as "their job". Interactive sessions generated high engagement, determined by the emergence of a "want to clean" culture (Table 1).

Encouragingly, RLU counts fell across all five areas. Post-interactive session interviews (N=2) confirmed increased perceived levels of data ownership and engagement. Instead of interviews, future work will develop a survey to establish data ownership and engagement levels pre and post interactive sessions. Surveys will be validated (summer 2014), with additional wards involved with interactive sessions (autumn 2014).

Table 1. Sample of indicative quotes collected during interactive sessions

"...feel like I'm in CSI!"
"We were talking about SATS probes in break"
"That's the difference between getting an infection and not" (looking at SATS probe)
"We're in the green!!!"

Abstract ID: 2946

Admission Screening for gram negative resistance

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Improvement issue and context

A new resistant organism, carbapenem resistant Enterobacteriaceae (CRE), has emerged, which is problematic due to resistance and ease of spread. Patients who are colonised with CRE must be identified, so that the appropriate control measures may be implemented. In a busy acute Trust, the Microbiologist requested a short pilot study to establish if screening for CRE was feasible for emergency admissions. This pilot was to highlight any problems with a CRE screening programme

Methods and measurement

The pilot was to be run for a week, with CRE risk assessment paper tool (as below) to be done on admission:

Risk assessment	Yes / No
1. History of CRE colonisation or infection anytime in the past?	
2. Healthcare admission abroad in last 12 months?	
If yes, record the name of the country	
3. Healthcare admission in Manchester, London (within M25) or Northwest England in the last 12 months?	
If yes, record the name of the hospital	

If there was a "yes" to any of the questions, then the patient was nursed with contact precautions, and GNR screen taken (rectal swab) on admission, and then every 48 hours until three samples had been obtained. Patients who were found to be CRE positive were to be nursed in a side room, and contacts "followed up". An information letter and screening tool was sent prior to the study to staff. Intensive educational programmes were run on the ward for all staff with emphasis on practicalities.

Evidence of Improvement

Day one, just over 40% of new admissions were risk assessed which rose to nearly 90% by day 8.

Future Steps

For an implementation of CRE screening programme, a formal educational process should be devised. There should a mechanism in place so that Senior Clinical Staff and Medical Teams may be able to raise any issues which be may dealt with. The screening tool should be stored electronically, with the rest of the patient's records, which may also serve as a checking mechanism for screening programmes.

Abstract ID: 2969

Developing the infection prevention and control Health Care Assistant role

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Improvement issue and context

The Infection Prevention and Control Team (IPC) had changed their ethos from highlighting poor practice to a support and knowledge resource as historically we were seen as the 'police force'. Therefore, the role of the IPC healthcare assistant (HCA) needed to develop in line with this change. Staff now required someone to work closely with them to assist and lead with their ward based IPC education.

We needed consistent education on topics such as hand hygiene and environmental cleanliness to be delivered to all levels of staff in a meaningful way.

Methods and Measurement

Regular ward visits from the HCA were commenced to highlight specific ward needs and therefore be able to provide education that is applicable to them. Walkarounds with the executive management team have become commonplace to reinforce key messages to all staff. Hand hygiene and environmental audits are undertaken routinely and discussed at monthly operational meetings where Modern Matrons attend. This was designed to create an environment where all staff feel confident to be able to check and challenge colleagues and ensure IPC is regarded as part of creating a safe environment for patients.

Evidence of Improvement

We now see more motivated and enthusiastic staff who state 'IPC is an integral part of patient care rather than seen as an add on'. We have noted that commitment from the executive team encourages and motivates staff resulting in a fantastic positive attitude towards IPC. Hand hygiene compliance has increased and sustained a level of greater 90% and environmental audits for example have increased from 68% to 89% since the role developed.

Future steps

Currently in the process of creating a user friendly poster on how to clean commodes. Also, looking to develop peripheral cannulation education using existing gaming technology.

Abstract ID: 2816

Antimicrobial activity of *Eucalyptus globulus* oil, xylitol and papain

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Introduction
Germicides have been used indiscriminately in health care environments, often at much higher concentrations than recommended minimum inhibitory concentration, which has encouraged the development of microbial resistance to these agents. The goal of this study was to evaluate the antimicrobial activity *in vitro* of *Eucalyptus globulus* essential oil, 10% xylitol, 20% xylitol, 10% papain and 20% papain against the following microorganisms: *Pseudomonas aeruginosa; Salmonella spp; Staphylococus aureus; Proteus vulgaris; Escherichia coli* and *Candida albicans*.

Methods
Therefore, *in vitro* antimicrobial activity was tested through agar disk-diffusion test and evaluation of the diameters of inhibition halo of the substances tested. Chlorhexidine 0.5% was used for control.

Results
It was observed that the inhibitory activity of *Eucalyptus globulus* was superior to that of chlorhexidine when applied to the microorganism *Staphylococus aureus* and identical to *Escherichia coli, Proteus vulgaris* and *Candida albicans*. The 10% papain showed an antimicrobial effect inferior to that of chlorhexidine when applied to *Candida albicans*. The substances, 10% xylitol and 20% xylitol, showed no inhibition of the tested microorganisms.

Discussion
The antimicrobial activity of *Eucalyptus globulus* essential oil is superior to that of chlorhexidine when applied to the gram-positive bacteria tested. Thus, it can be inferred that the essential oil of *Eucalyptus globulus* has antimicrobial activity against the strains of microorganisms tested and can be a viable alternative as an antiseptic agent. It reinforces the need for new investigations, seeking evidence of its pharmacological and germicidal properties.

Abstract ID: 2867

Disinfection of hospital environmental surfaces with sodium hypochlorite: a systematic review

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Introduction
Sodium hypochlorite is one of the most used disinfectants for environmental surfaces, although new products and technologies for disinfection procedures are emerging.

Objective
To review the evidence for the efficacy of disinfection with sodium hypochlorite of environmental surfaces to prevent contamination and healthcare-associated infection.

Methods
This study used the Cochrane Handbook for Systematic Reviews. The search was performed from December 2013 to February 2014 using COCHRANE, LILACS, PUBMED/MEDLINE, SCIELO, CINHAL databases.

Results
We analysed 16 controlled experimental studies, one of which was randomized, one cross-over and two were before and after comparisons. They were published between 1989 and 2013. Almost all studies showed favourable results in terms of microbial growth or inhibition by hypochlorite action (10), reduction of infection (5), microbial resistance (1) and colonization (2). Two studies showed loss of efficacy, one in the presence of heavy soiling with blood and another when tested for rehydrated dried virus. Hypochlorite showed higher antimicrobial efficacy, including spores, and broad antimicrobial activity, longer exposure time and higher concentration allowing longer action compared with other disinfectants.

Discussion
Hypochlorite is an effective disinfectant for environmental surfaces. However, the studies that have sought the relationship between its use and infection reduction didn't control important confounding variables. Despite many studies with similar design, meta-analysis was not possible because of the diversity of strategies used to conduct and measure the effect of the interventions, relating to: the origins and types of microorganisms, sampling and laboratory testing, culture media, types of surfaces, product concentration and contact time. The CONSORT and TREND protocols for evaluation of internal validity were inappropriate to the nature of these studies, so is urgent the development of specific protocols for evaluation of laboratory and microbiological studies.

Abstract ID: 2873

Improving compliance with hydrogen peroxide vapour automated room disinfection at National University Hospital, Singapore

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Improvement issue and context
Since 2006 NUH has been implementing robust active surveillance, isolation, cohorting and improving hand hygiene compliance for health care workers. However recently we have detected incremental increases in MRSA bacteraemias. Further, MRSA hospital acquisitions have now reached a plateau with rates difficult to reduce below 2.5%. Importantly, we are also experiencing increases in other hospital acquired infections caused by multi-drug resistant organisms (MDROs). We recognized a need to escalate our efforts in environmental decontamination. NUH introduced hydrogen peroxide vapour (HPV) technology to decontaminate each room following the discharge of a patient known or suspected of being infected or colonised with a MDRO.

Methods and measurement
To achieve this goal we engaged in a pilot trial using HPV (Bioquell Q10) to understand the feasibility of introducing and integrating new technology into our existing workflows. Subsequently, NUH purchased five Q10 suites to integrate into our environmental decontamination approach for high risk areas.

Evidence of improvement
The pilot trial demonstrated operational feasibility. Since then, 1733 deployments using five Q10 suites have been completed (August 2013 – May 2014), comprising 98% single rooms and 2% shared equipment. Each Q10 is used on average once per day (1.0 – 1.3). Deployments are based on patients known to be infected or colonized with pathogens based on a priority list of organisms of significance for NUH. Usage has been extended to include other inpatient areas experiencing increases in MDRO acquisitions or for outbreak control including cleaning of common shared equipment.

Future steps

HPV service has become integrated into hospital operations. We plan to further optimize the service by extending services to be available 24hours/7days per week, and tracking and reporting HPV utilization based on priority organism.

Abstract ID: 2874

Incidents related to failed decontamination of endoscopes and surgical instruments

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Health Protection Scotland

Introduction

Reusable surgical instruments and flexible endoscopes provide potential routes for transmission of pathogenic agents between patients in healthcare facilities. As such, the decontamination process between uses is a vital component in the prevention of healthcare associated infections. Furthermore, advances in technology and expansion of screening programs have led to a great increase in endoscopic procedures in recent years. The aim of this review was to provide an overview of outbreaks, infections and incidents associated with inappropriate, inadequate or unsuccessful decontamination of endoscopes and surgical instruments, providing useful context to national guidelines.

Methods

Databases of medical literature, Medline and Embase, were searched systematically. Articles detailing incidents associated with unsuccessful decontamination of surgical instruments were identified.

Results

147 articles were identified reporting incidents associated with unsuccessful decontamination of endoscopes, while 21 articles were found for surgical instruments. Breaches in each stage of the process of endoscope decontamination were associated with incidents, with bronchoscopy (54% of articles), endosopic retrograde cholangiopancreatography (ERCP, 19%) and upper-gastrointestinal endoscopy (16%) most commonly reported. Organisms most commonly identified in endoscope breaches include *Pseudomonas aeruginosa* (29% of relevant articles) and *Mycobacterium* spp. (23%). However, recent years have seen carbapenemase-producing *Klebsiella pneumoniae* become the most commonly reported organism.

Discussion

Decontamination incidents associated with endoscopes continue to be extensively reported in the medical literature. Changes in the pathogens seen, as well as the emergence of incidents where no breach can be found in the decontamination process merit urgent investigation and further research. In contrast, the small number of articles identified detailing surgical instrument decontamination failures underlines the low risk of cross-infection and highlights the robust nature of instrument sterilisation practices. The diverse nature of reported surgical instrument incidents also suggests that failures are not systemic. However, the possibility of reluctance to publish failures must be considered, with incidents going unreported.

Abstract ID: 2888

Phase 3 testing of an ultra-high level sporicidal disinfectant: The missing link between laboratory based efficacy and clinical performance

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Introduction

Common variables between laboratory suspension tests and real world disinfectant use include; Delivery method - are suspension tests relevant for disinfectants which are delivered via cloths, wipes, spray mists, etc.? Contact time - are 60 minute wet contact times clinically relevant? Controlled field testing or 'phase 3 testing' bridges the gap between in-vitro efficacy and clinical effectiveness. Testing takes place in clinical settings where a known bioburden of a specific organism is exposed to a disinfectant delivered in its normal way. This work used phase 3 testing to determine the effectiveness of an ultra-high level disinfectant against validated *Clostridium difficile* spores.

Methods

A 32m^3 unfurnished isolation room was used. Prior to disinfection 10 plates were placed on horizontal and vertical surfaces, including the ceiling. Plates contained 9 slides. Each slide was inoculated with up to $1x10^6$ *C. difficile* spores dried onto its surface. An ultra-high level sporicidal disinfectant was dispensed throughout the room via a centrally located, specialist, mains powered misting system over a 7 minute period. After 43 minutes dwell-time, plates were collected and processed in the laboratory by neutralisation and then for *C. difficile* viability. After neutralising, plating onto Columbia agar and incubating anaerobically at 37° C for 3 days, microbial growth was reported.

Results

$5.6x10^5$ cfu were recovered from the control with no exposure to the *disinfectant*. $<1.4x10^1$ cfu were recovered at the 10 test locations.

Discussion

The test disinfectant proved highly effective against C. difficile spores in a clinical setting. Both delivery method and contact time are clinically appropriate for this specific disinfectant. Phase 3 testing offers manufacturers and customers significant insight into disinfectant performance in the clinical setting and may assist decision makers when adopting new disinfectants into clinical practice.

Abstract ID: 2889

Using a new low temperature, non-corrosive laundry system to improve the cleanliness of high performance mattresses and reduce energy costs associated with the laundry process

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Improvement issue and context

To reduce the risk of cross-infection, high-performance mattresses must be effectively cleaned and decontaminated prior to re-use. This is achieved either via heat (75°C) or chemical exposure i.e. chlorine releasing agents. Regular exposure to either of these factors can damage mattresses which can be an important cross-infection issue. The laundry process itself and replacing damaged or worn mattress covers / components represent significant costs for mattress providers, Trusts, loan stores etc. managing fleets of specialist air mattresses. The improvement issue was to identify a more energy efficient laundry process which could deliver equivalent or improved mattress cleanliness without exposing products to excessive heat or corrosive chemicals.

Methods and measurements

A 4-week evaluation at a commercial laundry compared the standard laundry process (75°C) with a new system combining a specialist detergent with a non-corrosive, high level disinfectant rinse at 35°C. Primary outcome was mattress cleanliness. Swabs were used to quantify microbial bioburden (total viable count (TVC)) pre and post-laundry for 20 mattresses going through the laundry. Secondary outcomes included process efficiency (water usage and energy expenditure).

Evidence of improvement

Outcomes		Standard process (75°C)	New process (35°C)
Mean TVC on mattresses	Before laundry	10^5	10^5
	After laundry	10^2	<10
Wash cycle duration		64 minutes	42 minutes
Total water usage		276 litres	165 litres

The new system creates cleaner mattresses, which reduces the risk of cross-contamination prior to re-use of the products. In addition the new process reduces the wash temperature by 40°C and saves 22 minutes (34%) of time and 111 litres of water (40%) per wash cycle.

Future steps

The commercial laundry has adopted the new laundry wash system where it has now been successfully used for 18 months. In addition to improving mattress cleanliness the laundry has increased mattress throughput and recorded a 53% energy saving as a direct result of employing the new system.

Abstract ID: 2898

Establishing a national protected bedspace discharge cleaning time

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Health Protection Scotland

Improvement Issue and Context

With increasing demand for hospital beds, pressure is often applied to nursing and housekeeping staff to supply free beds ASAP after patient discharge. Rushing discharge cleaning or giving insufficient time to clean has the potential to result in inadequately decontaminated patient environments and cross-transmission of pathogenic agents. We sought to establish a protected timeframe for nurses/cleaning staff to complete bedspace discharge cleaning before the following patient can be admitted. This time is to be applicable for different ward-types (e.g. ICU, psychiatry etc.) and bedspace-types (e.g. single room, four-bed bay etc.). A methodology was developed and a study undertaken to establish how long such cleaning takes and if this time differs within and between specialties.

Methods and Measurement

A basic methodology including a cleaning checklist and measurement tool were piloted in one NHS Scotland Health Board. The checklist and tool were assessed according to their usefulness and usability by staff responsible for hospital cleaning and were subsequently altered according to feedback received during this pilot. The adjusted tools were then used in six NHS Scotland Health Boards to measure time taken to clean in a variety of contexts.

Evidence of Improvement

National protected cleaning times were established as a result of this study, giving further support to housekeeping services and nursing staff involved in discharge cleaning. The checklist and measurement tools were well received and considered self-explanatory by those undertaking the study and staff welcomed the opportunity to help establish a protected time. Details on similarities and differences in cleaning times between different areas have also provided useful information as to differences in cleaning strategies.

Future Steps

We are now seeking to progress the protected cleaning time to a national policy. Consultation with key stakeholders including nursing and housekeeping staff will continue to assess the usefulness of this time.

Abstract ID: 2902

Improving process efficiency and medical device cleanliness at a Foundation Trust by adopting a new combined cleaner/disinfector into routine use in a busy Medical Device Library

Gary Embleton
Lancashire Teaching Hospitals NHS Foundation Trust

Improvement issue and context

Effective cleaning of equipment is essential prior to devices being loaned from the Medical Device Library (MDL). Inadequately cleaned devices pose a potential infection risk to patients, MDL staff and Medical Engineers. Historically routine MDL device cleaning involved two-stages; Step 1. Washing with neutral detergent solution and or wipes. Step 2. Drying with paper towels. The improvement aim was to identify a new method of device cleaning which would maintain device cleanliness whilst simultaneously improving process efficiency and reducing waste from the cleaning process.

Methods and measurement

A new combined cleaner/disinfector, permitting a single stage cleaning process, was identified and evaluated within a busy MDL at a Foundation Trust. Medical device cleanliness was determined using adenosine triphosphate (ATP) swab testing of ten devices before and after standard (detergent-based) cleaning and when using the new cleaner/disinfector. Process efficiency was assessed by performing formal time-and-motion assessments when processing ten devices with both the standard and the new cleaning process.

Evidence of improvement

The time-and-motion studies demonstrated clear improvements with a >50% efficiency saving when using the new product. ATP scores demonstrate medical device cleanliness was on average 50% cleaner when using the new cleaner/disinfector compared to the standard process, thereby reducing further any potential infection risk to patients, MDL staff and Medical Engineers. The new process eliminated the use of paper towels. This significantly reduced the waste produced when cleaning devices.

Future steps

The MDL have adopted the new cleaner/disinfector into routine use for all device cleaning. The new product has improved departmental efficiency, reduced waste associated with product cleaning and resulted in cleaner equipment.

Abstract ID: 2919

A pilot study of the use of pulsed-xenon ultraviolet disinfection in a UK hospital

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Introduction

No touch disinfection methods have attracted interest as methods of reducing environmental contamination with pathogens. Pulsed-Xenon Ultraviolet (PX-UV) is a means of producing ultraviolet light that yields ultraviolet C throughout the germicidal spectrum. The purpose of this pilot study was to evaluate the efficacy of PX-UV in reducing the level of environmental contamination in patient areas in a UK hospital.

Methods

During a period of increased norovirus activity, high touch frequency sites were identified in an affected bay, five single rooms and their toilets. Contact plates were taken from sites after terminal cleaning (post clean). The area was treated with PX-UV and repeat samples taken from adjacent areas at the same site (post PX-UV). One operating theatre was also sampled. Total aerobic colony counts were performed after 48 hours incubation. The worker reading the plates was blind to the sample site and timing in relation to PX-UV treatment.

Results

The number of surfaces with no growth (CFU=0) after sampling in the post-cleaning group was 3 (4.0%) while in the post PX-UV group the number of no growth surfaces was 31 (41.3%). The number of surfaces with less than 5 CFU were 17 (22.6%) and 52 (69.3%) for the post clean and post PX-UV groups, respectively. The total CFU in the post clean group was 5959 while in the post PX-UV group, the total CFU was 1089; this led to a mean CFU of 79.4 and 14.5 for the post clean and post PX-UV groups respectively, representing an 81.7% reduction $p<0.0001$ (Wilcoxon rank-sum test).

Discussion

The PX-UV device reduced bacterial contamination after terminal cleaning. This additional disinfection was accomplished in a relatively short time on multiple

high-touch frequency surfaces. Additional research into the impact of PX-UV disinfection on nosocomial transmission rates would be of interest.

Conflict of Interest

Three of the co-authors on this abstract are employees of Xenex Healthcare Services who manufacture the device used in the study.

Abstract ID: 2921

Undertaking hydrogen peroxide vapour room decontamination in 'hard to do' clinical areas

Matthew Reid, Tina Tipton
Royal Wolverhampton NHS Trust

Improvement Issue and Context

The Trust has identified the environment as a potential vector for the transmission of infection, and has utilised hydrogen peroxide vapour (HPV) for reactive room decontamination since 2008, and as part of the Trust's proactive annual deep clean programme since 2011. It is also deployed as required in response to outbreaks. Despite the application of the HPV process in numerous clinical areas across the Trust, it had never been undertaken in areas such as Emergency Department (ED) and the 30 bedded Integrated Critical Care Unit (ICCU) due mainly to the operational and spatial issues inherent with such departments; both departments are very busy and have large expansive areas which makes deployment of HPV very difficult.

Methods and Measurement

An HPV decontamination process typically takes at least 2 ½ hours. Patient admission and attendance in 2013/14 of 632 and 109,375 in ICCU and ED respectively, required the multi-disciplinary team to value the longer-term benefit of admitting patients to a decontaminated environment. To undertake the HPV process in these 'hard to do' areas required joint, co-operative working between multidisciplinary teams and departments in the Trust.

Evidence of the Improvement

The HPV process was deployed to both the ICCU and ED departments in July and September 2013 respectively. It is interesting to note that a reduction in cases of *C. difficile* attributed to ICCU has been observed since HPV room decontamination occurred .

Future Steps

It is important that such clinical areas are not left for a long time before they are planned for HPV room decontamination again. It is encouraging to see that such 'hard to do' areas can be decontaminated with HPV through a combination of multidisciplinary team work, planning, flexible and adaptive working, and effective risk assessment.

Abstract ID: 2931

Cause analysis of *Pseudomonas aeruginosa* infections in large area burn Patients

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Burns and plastic surgery department, First Affiliated Hospital of Chinese PLA General Hospital

Introduction

To explore the causes of *Pseudomonas aeruginosa* infections in large area burn patients in burn unit and propose preventive measures.

Methods

A total of 67 large area burn patients from 2012 to 2013 were enrolled in the study. In total, 350 samples were collected for bacterial culture including 134 samples from burn wounds, 216 samples from object surface in laminar flow clean room, hands of medical staff, object surface in treatment room, keyboards and door knobs.

Results

In the 350 samples, 41 samples were positive with *P. aeruginosa*, therefore the positive rate is 11.7%. The positive rate of the samples from burn wounds was 18.7%; the positive rate of the samples from object surface in laminar flow clean room was 10.4%; the positive rate of the samples from hands of medical staff was 12.5%; the positive rate of the samples from object surface in treatment room was 0%; the positive rate of the samples from door knobs and keyboards was 8.3%.

Conclusion

P. aeruginosa infections in large area burn patients may be from hands of medical staff, object surface in laminar flow clean room, and door knobs and keyboards. Strengthening the management of medical staff, strict disinfection and isolation should be implemented in burn unit to prevent *P. aeruginosa* infections in large area burn patients.

Abstract ID: 2942

Problems in connection with cleaning hospitals with Methicillin-resistant *Staphylococcus aureus* in Japan - Interviews with four Infection Control Nurses

Michiko Morimoto
University of Hyogo, Japan

Introduction

The cleaning of hospital rooms with MRSA infection in Japan is managed differently according to each institution. The purpose of this study is to specify the problems of cleaning hospitals with MRSA infection using interviews with the infection control nurses.

Method

We studied interviews with four infection control nurses at four hospitals in Hyogo prefecture of Japan, each hospital has 100 beds. Interviews were carried out for 30 minutes using a semi – structured data collection process and an interview guide. During the interview, questions were asked to those interviewees about cleaning up MRSA infections: focusing on cleaning methods, training and challenges. The interviews were recorded as a verbatim record. In order to highlight the problems of the cleaning (KH Coder Ver.2β31) analysis software was used. This was utilized in order to create an extractable data base using search words (noun, adjective verb, verb, etc)

Ethical considerations: Our method and design were accepted with the approval of the research ethics committee of the university.

Results

This project resulted in the establishment of an ICT, environment, cleaning, measures, outbreaks, committees, management (individuals), hearing, touching, wards, prevention, activities, carry-in, hand-washing observations, suppliers, auxiliaries, infection control nurse, and education items.

Discussion

This data has brought to our attention that the major causes of infection are not generally due to personal contact between medical process and patients, but are usually due to more broad environmental causes. Therefore, it is advisable that nurses take more notice of environmental conditions rather than delegating this to non-medical staff.

Abstract ID: 2954

ENCOMPASS Hygiene Intelligence System: Does it help to improve theatre cleaning between cases?

Sara Silver, Clive Stasin, Shazad Raja
Royal Brompton and Harefield NHS Trust

Introduction
It is vital for theatres to be cleaned thoroughly between cases. The operating theatres at our institution are cleaned between cases by theatre staff where each discipline is responsible for cleaning their specific equipment. The aim of this study was to determine the efficacy of cleaning between cases and whether this could be improved by actively monitoring prescribed areas.

Method
An invisible gel, easily removed upon regular wiping, was applied to 18 high touch objects in the theatre environment. This gel fluoresced under UV light which had to be removed without trace in order for the surface to attain a pass. Phase 1 was a blind approach to create a baseline, the results of which were shared with the team following 12 cardiac surgery cases. Areas for improvement were identified and discussed. Phase 2 was to assess whether discussions were successful in improving standards of cleanliness by applying gel to the same 18 high touch objects in 12 cardiac theatres.

Results
Phase 1: Of the 216 high touch objects that were gelled, 60 passed (28%) with a median of 3.5 per object and a mean of 6 per object. 1/18 passed 100% of the time and 8/18 failed 100% of the time.

Phase 2: Of the 216 high touch objects tested, 129 passed (60%) with a median of 7 per object and a mean of 6 per object. Phase 2 shows an increase in the pass rate of 32% in just one month of repeat testing where 3/18 passed 100% of the time and 0/18 failed.

Discussion
This UV light method has been successful in improving the degree of cleaning in our operating theatres. This is as a direct result of team discussions, knowledge of location of the gel, training as well as improvements in cleaning technique.

Abstract ID: 2960

In-Use sporicidal efficacy of Peracide peracetic acid (PAA) disinfectant solution: In-vitro efficacy and ward assessment

Shanom Ali, Monika Muzslay,Peter Wilson
University College London Hospitals NHS Trust

Introduction
Effective decontamination of the clinical environment remains a priority where affected patients may spread bacteria. Spores of C. difficile (CD) may persist on surfaces for months despite sporicidal disinfection. We assessed the efficacy of a peracetic acid (PAA) disinfectant (Peracide) under EN standards, in-vitro simulated-cleaning and ward evaluation.

Methods
EN testing: Sporicidal (modified EN13704) efficacy of PAA (1000ppm and 4000ppm concentrations) was assessed against CD (027 spores) in distilled water (DW) or synthetic faecal (SF) soiling.

Simulated-cleaning: A polypropylene surface (25cm^2) contaminated with 10^{6}cfu spores (no soiling; DW) was wiped-clean using a microfiber cloth (225cm^2) wetted with PAA (1000ppm), NaDCC (1000ppm) or tap water (control) and sampled after thirty or sixty minutes.

Ward evaluation: Randomised microbiological-sampling for aerobic-colony-counts (ACC) and CD was performed over two wards at a London teaching hospital over 3 phases: Pre-intervention (existing PAA disinfectant-use only; 1week), Intervention (Peracide use only; 2weeks) and Post-intervention (Peracide removed and original disinfectant re-instated; 1week). A questionnaire was distributed for user-feedback.

Results
PAA;1000ppm demonstrated >6log median (99.9999%) reductions of CD within 15min (without soiling) but within 30sec (with SF) using PAA:4000ppm.

Simulated cleaning identified surfaces remain contaminated (~3log CD) for up to 60 min if cleaned with tap water or NADCC but 2 log less contamination when Peracide was used.

The study period was too short to observe significant differences in ACCs (716 sites). Frequency of CD isolations on surfaces dropped from pre-intervention (13%) to 2.1% during Peracide use (n=96). Seventy-two percent of staff (21/29) found Peracide easy to prepare or use.

Discussion
Peracide disinfectant achieved sporicidal efficacies that exceeded the EN criteria (3log reduction within 60min) and demonstrated good potential to reduce/eliminate CD contamination from the hospital environment. User-feedback was positive (fragranced formula with colour activation-system improved usability) and deemed acceptable by hospital staff.

Abstract ID: 2975

Environmental assessment of a Critical Care Unit during increased incidence of *Clostridium difficile*

Rick Catlin, Eimear Donnelly
Aintree University Hospital Foundation Trust

Introduction
The Infection Prevention and Control (IPC) team wanted objective assurance of cleaning standards in addition to visual assessment due to the risk of cross-transmission of healthcare associated infections in a Critical Care Unit (CCU) The IPC team measured the effectiveness of cleaning across 39 different high touch objects (HTOs) during a 24 hour period.

Methods
Monitoring was performed using fluorescent DAZO Gel® as part of the Ecolab EnCompass Hygiene Intelligence program. The IPC team covertly tagged 120 HTOs prior to cleaning with the EnCompass DAZO Gel®. An HTO was deemed to be thoroughly cleaned if all the DAZO Gel® was removed.

Results
Of the 120 HTOs monitored, 4 were not accessible on review day. Of the remaining 116 HTOs, 9 (7.75%) had not been cleaned effectively as the DAZO Gel® was still clearly visible under UV light.

Discussion
The EnCompass monitoring illustrates the strong cleaning focus within the CCU during a period of increased CDI incidence. The 9 HTOs not effectively cleaned were shared equipment for multi-patient use, e.g hoist. The equipment is required to be thoroughly cleaned after patient use and is the responsibility of nursing staff. This study provides assurance to the IPC team that the cleaning standard was high during this snapshot assessment. However there is still improvement to be made, especially for nurse cleaned HTOs.

Following this study we plan to: Communicate and discuss findings with ward staff and identify barriers to effective cleaning. Senior ward staff should undertake regular visual assessment. Implement the EnCompass Hygiene Intelligence program across the hospital to gain assurance of cleaning effectiveness and cleaning standards for increased patient safety.

Conflict of Interest
This abstract has been completed with Ecolab using their product/system.

Abstract ID: 2977

Continually improving cleaning standards and performance in a large NHS Acute Trust

Gary Thirkell
Leeds Teaching Hospitals Trust

Improvement Issue and Context

The role environmental cleaning plays in the prevention of transmission of healthcare acquired infections is consistently recognised. [1] Infection Prevention and Facilities teams require assurance that cleaning is performed thoroughly and effectively, alongside the implementation of appropriate training tools to improve/sustain cleaning performance.

Methods and Measurement

The Trust implemented EnCompass Hygiene Intelligence program to improve cleaning performance across 2 large hospitals within Patient Wards, Intensive Care Units (ICU) and Theatres, measuring: Daily & discharge cleaning in ICU and Patient Wards, Discharge cleaning performed by Rapid Response and Theatre terminal cleaning.

High touch objects are marked prior to cleaning with the fluorescent gel. Using a UV blacklight after cleaning, the full removal of the gel is measured. Results are transmitted to the Trust's portal which provides realtime trend analysis. Three week baseline period followed by communication to staff, raising awareness of importance of cleaning. Post baseline period, a continuous improvement program was implemented including: Strong communications program, Weekly feedback, 1:1 feedback, Targeted education based on analysis from monitoring.

Evidence of Improvement

All areas significantly improved in comparison to the baseline period.

	Percentage improvement
Patient Room	39%
ICU Daily & Discharge cleaning	37%
Rapid Response team	40%
Operating Theatre	64%

Visual auditing scores, already very high, saw a 1-2% improvement with the Encompass interventions.

Future Steps

Continue EnCompass, increasing usage across the Trust and training programs to maintain cleaning effectiveness and efficiency, resulting in assurance for the Trust.

[1] Otter JA, Yezli S, French GL. The role played by contaminated surfaces in the transmission of nosocomial pathogens. Infect Control Hosp Epidemiol 2011;32:687-99.

Conflict of Interest

I worked with Ecolab in a workstream which focuses on the content of the poster.

Education of healthcare staff and the public

Abstract ID: 2795

Cross-sectional survey of compliance of doctors with infection control measures in the West Bank / Palestine Governmental Hospitals

Ahmed Abu Tayeh, Fadi Zaben, Anis Al Hajjeh, Colin Green, Malik Zaben
International Medical Education Trust 2000- Palestine (IMET2000-Pal)

Introduction
Hospital acquired infections, which can be transmitted from microorganisms on the hands of doctors to patients, remain an important cause of morbidity and mortality of hospitalized patients across the world. Doctors have different practices in adherence to infection control (IC) standards depending on their undergraduate training and possibly experience. This study aims to explore Palestinian doctors' knowledge of and compliance with IC standards in the governmental hospital. It is expected that this study will identify the IC training needs of this very important subgroup of healthcare workers.

Methods
A multi-centre, cross-sectional, descriptive study, using a self-administered questionnaire, was conducted in October-November 2013. Participants' knowledge and compliance regarding specific IC policies were examined using a scale of 0-9; 9 is the maximum score. Needs for training were also explored. SPSS was used for data analysis.

Results
90 doctors from 6 governmental hospitals in West Bank responded to our survey; 85.4% males, 27.8% juniors (internship), 61.1% residents and 11.1% consultants. While only 28.9% received training in their local hospitals, their knowledge and compliance scores were 7.5 and 4.7, respectively (maximum score is 9). Juniors had the lowest score of compliance (3.8). Factors including subspecialty, gender and place of work, had no effect on neither participants knowledge nor compliance scores. The vast majority (96.7%) of participants indicated that infection control training is needed or very much needed.

Discussion
While doctors' knowledge of IC standards is fairly acceptable, their compliance with these standards is unacceptably low. Their knowledge, behaviuor, attitudes, and beliefs toward infection control measures need to be improved by problem-based training and multimodal and multidisciplinary approach.

Abstract ID: 2800

Achieving hand hygiene at blood collection sessions: Scottish National Blood Transfusion Service

Ann Paterson[1], Kathryn Dick[2], Graeme Paterson[2], Louise Anderson[2]
[1]*Scottish National Blood Transfusion Service/ Health Protection Scotland*
[2]*Scottish National Blood Transfusion Service*

Improvement Issue and Context
Following the introduction of the 'WHO five moments for hand hygiene' in 2007, increased use of alcohol based hand rub (ABHR) led to an increase in the number of reportable skin irritation incidents from donor services staff. The complex multi processes involved in taking a blood donation meant that healthcare workers (HCWs) were performing hand hygiene up to ten times per donation, nursing approximately 30 donors per session. Donors are healthy individuals that carry normal skin flora. HCWs hand hygiene is primarily important to prevent contamination of the blood products collected. This project sought to address this without compromising donor care or the blood products collected.

Methods and Measurement
Two small studies were undertaken to compare the efficacy of hand hygiene when following the 'five moments for hand hygiene' against risk assessed stages of the blood collection procedure i.e. performing hand hygiene only immediately before haemoglobin testing, immediately prior to venepuncture and immediately before needle removal.

Whilst HCWs followed the standard protocol, hand hygiene practice was observed; finger dabs ascertained the level of bacteriological counts from HCWs. The results showed there was a marginal reduction in bacteriological counts when the study protocol was undertaken. SNBTS obtained agreement through Clinical Governance structures to implement the proposed change to use ABHR in line with the study protocol.

Evidence of Improvement
HCWs at donor sessions have been implementing the study protocol since February 2013; there has been a reduction in staff skin irritation reports from 7 in 2012-3 to 1 in 2013-14. Furthermore, the finger monitoring data has shown no change since the introduction of the hand hygiene protocol. There have been no reports of contaminated blood products.

Future Steps
Staff are encouraged to continue reporting any incidence of skin irritation and overall quality control of hand hygiene continues.

Abstract ID: 2827

Facilitating infection control education with an online and paper workbook

Martin Still
Brighton & Sussex University Hospitals NHS Trust

Improvement Issue and Context
It is recommended that all healthcare staff who work directly with patients (clinical staff) have an infection control (IC) update at least annually. In June 2013 only 37.6% of the 5000 clinical staff had attended an IC update in the previous year. The update was mainly delivered face to face at a study day utilising a power-point presentation. Acknowledging that people have different learning styles and more importantly the necessity to ensure education about infection prevention and control, an online/ paper workbook was developed.

Methods and Measurement
The Trust records and publishes quarterly reports of compliance with all statutory and mandatory training. Quarterly reports were reviewed prior to implementation of an IC yearly clinical update workbook. The workbook met the IC competencies defined by Skills for Health for all staff having direct patient contact. Following implementation of the workbook in August 2013, subsequent quarterly reports were reviewed. Comparative analysis was undertaken to show if there had been any significant increase in staff numbers completing a clinical IC update in the previous year.

Evidence of Improvement
Prior to implementation 37.6% had completed their update in the previous year. Following implementation 44.4% had completed an update representing a statistically significant increase ($p = <0.0001$). 13% of the staff had completed an update utilising the new workbook.

Future Steps
Although there has been a statistically significant increase in the number of clinical staff undertaking an IC update in the previous year, only 45% of the staff are now up to date. Future plans include identification of why this is, and implementation

of new novel ways of education. One method, soon to be trialled, is IC nurses working alongside healthcare professionals on a ward, providing senior nurse support and education at the very place it matters the most.

Abstract ID: 2863

Findings from a health education outreach intervention covering hygiene and the spread, treatment and prevention of infections

Authors: Beverley Hoekstra, Vicki Young, Cliodna McNulty
Public Health England Primary Care Unit

Improvement Issue and Context

Antibiotics are the most commonly prescribed childhood medicine, and in much of Europe, antibiotic prescribing rates are highest in children (Spyridis & Sharland, 2008). Within schools, infections are a major cause of childhood illness and absenteeism, with poor respiratory and hand hygiene contributing to increased spread. During the 2011/12 academic year "illness (not medical or dental appointments)" accounted for the majority of student absenteeism (Department for Education, 2013).

e-Bug educates young people about microbiology, hygiene and the spread, treatment and prevention of infection. The e-Bug resources comprise of educational packs for teachers and an interactive website. An outreach project is underway to determine how the e-Bug resources can be used by a broader audience, including school nurses and informal educators.

Methods and Measurement

To determine how e-Bug can assist other individuals, qualitative focus groups and interviews are being conducted with school nurses, school nurse assistants, teachers, and other stakeholders. Research is underway in Gloucestershire, Leicestershire, Shropshire and London. The health education role of informal educators is being explored, along with resource and training needs.

Evidence of Improvement

Preliminary data identifies that e-Bug should be targeted at various informal educators, and in some regions school nurses. Our research indicates the school nurse's role varies significantly across localities. The provision of health education by school nurses, including education on hygiene and infection related topics, also varies greatly. Findings from this research will be presented, along with plans for tailoring or designing new educational resources.

Future Steps

These findings come at a time when the Department of Health's UK Five Year Antimicrobial Resistance Strategy identifies a key area for future action as improving professional education, training and public engagement (Department of Health, 2013). This research has implications for all practitioners involved in educating the public about infection related topics.

Abstract ID: 2880

Leadership training for infection prevention practitioners

Sarah Freeman[1], Elaine Ross[2]
[1]NHS Education for Scotland, [2]NHS Dumfries and Galloway

Service Improvement

Infection Prevention and Control Practitioners (IPCPs) are challenged by the increasing demands on their expertise and skills as organisations combat healthcare associated infection. As Leaders, they have to focus on targets, managing tensions between innovation, governance and engaging and enabling others to succeed. This can be challenging and therefore requires a model of engaging leadership.

Methods and Measurement

In 2013, IPS (Scottish Branch) tendered for an individual or organisation to provide a leadership training programme for 10 IPCPs, utilising action learning and 360 degree appraisal. The IPCPs agreed the 5 success criteria at the start of the course and an evaluation questionnaire was completed.

Results

It was important for the group that they were comfortable in role and felt secure to discuss challenges facing them in the workplace and move forward. One IPCP described how the course helped her "prepare for a new senior position". Practitioners described how the course made confident and effective IPCP by exploring their attributes and the valuable contribution make in the workplace. As a result of the course the IPCPs became more assertive saying they would "network more" and have "the confidence to take different opportunities". Reflective practice is an important learning opportunity. IPCPs comments included that the course "taught me not to pre -judge and to be more open-minded" and to focus on "positive reflection". Impact of the service is important and IPCPs described how other members in their team could see the benefits.

Discussion

The Facilitator described the participants as "hungry to learn" and there was a high level of engagement. Since completing the course 3 of 10 IPCP have obtained promoted posts. Future developments are to build in a workshop 6 months after the end of the programme to capture impact of learning and sustain growth.

Abstract ID: 2894

A survey for competency of certified nurses in infection control in Japan: Differences among novice, competent, proficient, and expert

Hanako Misao[1], Kazumi Kawakami[2]
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Introduction

In Japan, as of July 2013, 1808 nurses are registered certified nurses in infection control (CNICs) through Japanese Nursing Association (JNA). The goal of career development and a systematic educational program for CNICs have not been developed in Japan. It is necessary to develop a competency model for Japanese CNICs. Therefore, the purpose of this study was to identify CNICs' competency status.

Methods

We conducted a cross-sectional study of CNICs' competency in infection prevention practice using a self-administrated questionnaire of 5-point Likert scales based on a competency self-assessment tool developed by Association for Professionals in Infection Control and Epidemiology. The questionnaires were mailed to 1711 CNICs listed from JNA's website. This study was approved by the IRB of Juntendo University.

Results

975 CICN returned the questionnaire (57% response rate), of which the responses from 969 (99.3%) were used in the analysis. Based on the years of experiences as CICN and working status, respondents were divided into 648 novice (66.9%), 201 competent (20.7%), 110 proficient (11.4%), and 10 experts (1.0%). The mean scores of core components of the questionnaire were as follows: identification of infectious disease process 17.1±6.9; surveillance and epidemiologic investigation 6.9±3.1; preventing/controlling the transmission of infectious agents 34.1±13.2; management and communication 26.4±11.1; education and research 26.4±11.1; and employee/occupational health 6.3±3.2. The percentages of scoring mean of each core components were from 44% to 48.9%. The percentages of four other components, which were "future-oriented domains", were from 39.3% to 46.6%.

Conclusion
Because the majority of the respondents were novice and competent CICNs, the percentages of scoring mean of each components of competency were under 50%. Further, we have to identify the differences of each components of competency among novice, competent, proficient, and experts, in order to examine the career development and continuing educational system.

Abstract ID: 2896

Present conditions and issues surrounding certified nurse in infection control (CNIC) in Japan

Chie Umakoshi, Mr. Satoshi Fujinaga, Mr. Kakuei Oosaki, Yumiko Mizukami, Tomoko Sakihama, Sachiko Morishita, Yumi Matsushima, Chiyako Hirose
Infection Control Network of Japan (ICNJ)

Background
In Japan, the Japan Nursing Association (JNA) introduced the Certified Nurse Organization in 1995, and the educational system for the Certified Nurse in Infection Control (CNIC) was started in 2000. CNIC established the Infection Control Network of Japan (ICNJ) to enhance specialty among members in 2003. The Health Care Reform Act 2012 grants an assessment to hospitals that employ an infection control nurse and meet certain conditions. We report here the present conditions and issues surrounding CNIC which we found out throughout one of ICNJ main tasks, fact-finding, within its members.

Method
Diversified analysis on the data from the fact-finding among members registered in ICNJ

Result
The number of CNICs increased from 18, when the authorised system started in 1995, to 1,804 in 2013. The ICNJ membership also increased from 103 at the time of it establishment to 1390, approximately 76% of CNIC. The number of full-time infection preventionists (IPs), dedicated to infection control and prevention, increased from 61% to 72% by the introduction of the Health Care Reform Act 2012. The Infection Control Program implemented throughout the year shows no significant changes over years in teamwork, rounding, and consultation. However, there was a gap in implementation of the surveillance between IPs dedicated to infection control and ones with multiple tasks.

Conclusion
The Certified Nurse Organization has educated many IPs in Japan. The Health Care Reform Act has been helping achieve full deployment of full-time IPs in all medical institutions. However, we should not overlook that a high level of Infection Control Program has not been accomplished due to several factors such as institutional circumstances and IPs' experience. The role of ICNJ and its responsibility should be to support IPs so that they can fully serve patients with specialized knowledge and skills on a daily basis.

Abstract ID: 2899

In the patient zone: healthcare staff's perceptions of the 5th Moment and implications for hand hygiene education

Lesley Price[1], Lisa Ritchie[2], Jacqui Reilly[1], Jackie McIntyre[2], Jon Godwin[1], Donald Bunyan[2]
[1]*Glasgow Caledonian University,* [2]*Health Protection Scotland*

Introduction
Hand hygiene is one of the most effective measures in preventing healthcare associated infection. The 5 moments for hand hygiene provides guidance on when hand hygiene should be performed. Compliance with the 5 moments is lowest for the 5th moment. The research aimed to evaluate healthcare staff's perceptions of moment 5 for hand hygiene relative to compliance with this moment.

Methods
A mixed methods study was conducted using focus groups, non-participant observation and survey with focus groups informing the design of the questionnaire. The population was healthcare staff observed during three National Hand Hygiene Audits in three Scottish Health Boards. The purposive sample was staff observed who had an opportunity to perform hand hygiene in accordance with the 5th moment. Of the 484 participants observed 410 returned a questionnaire; a response rate of 85%.

Results
Results showed that hand hygiene compliance following the 5th moment was high with 93% of staff performing hand hygiene. Compliance varied with Health Board ($\chi^2$3 (2)=10.3,1p=0.006) but not professional group ($\chi^2$3=5.3,1p=0.2). Staffs' perception of the 5th moment were positive with over 65% indicating that it was clearly defined, achievable, valuable, encouraged, widely known and not too time consuming. Participants were less positive about the repetitive nature of the 5th moment with 60% indicating that it was repetitive. There was a positive relationship between compliance and the perception that the 5th moment was widely known (Mann-Whitney U, 2p <0.001).

Discussion
Although staff were generally positive about the 5th moment hand hygiene compliance was not optimum. Lack of understanding of the guidelines regarding the implementation of the 5th moment may be contributing to staffs' perception that it is repetitive. There provides an opportunity to improve compliance by focusing education to raise awareness of the 5th moment and how it should be implemented in practice.

Abstract ID: 2939

Don't be a Bug Rug - engaging children in infection prevention

Josephine Keward, Vicky Charnock
Alder Hey Children's NHS Foundation Trust

Improvement issue and Context
Alder Hey Children's NHS Foundation Trust provides care for babies, children and young adults. Information is widely available on Infection prevention topics for adult patients but there is a lack of child friendly patient information available in a format that children are able to understand.

The Infection prevention team worked with the Trust Arts for Health Co-ordinator, Patient information lead and a Children's author to produce a child friendly booklet about the infections that are common in a Paediatric Hospital.

Methods and Measurement
The Infection Prevention Team provided a Children's author with information and descriptions and photographs of commonly occurring pathogens in a Paediatric Hospital. The organisms chosen were RSV, Influenza, Rotavirus, Norovirus, MRSA, Chickenpox and ESBL. A children's author Hilary Keating worked with children who were inpatients at the hospital to produce illustrations, stories and poems. Hilary collated these in a book "Don't be a Bug rug". The Infection Prevention Team reviewed all the stories to ensure that the Infection prevention messages were accurate. The completed books were produced with laminated pages and were spiral bound so that they could be easily cleaned.

Evidence of Improvement
The child friendly books were distributed to the clinical areas for use by the Nursing staff, parents and Play leaders. Stories from the book have now been turned into animations by Twin Vision a multi -media charity. Children were involved in all stages of the process from making the puppets to filming. The Infection Prevention Team achieved Investors in Children Status for their involvement in the project.

Future steps
Having identified the benefits of working with patients to provide information in a format that they can understand, we are now involving our patients in all our forthcoming educational campaigns.

Abstract ID: 2959

Making hand hygiene child's play!

Kate Bickerstaffe[1], Denise Boyle[1], Julie Sellers[1], Pat Tyler[2], Alan Watson[3]
[1]Alder Hey Children's Foundation Trust, [2]JTO Photography, [3]Vocalbooth

Improvement issue and context

The importance of hand hygiene to prevent the spread of infection has long been established. The World Health Organisation (WHO) identifies 5 key moments when hand hygiene is required. The Infection Prevention & Control Team (IPCT) was looking for a novel way to ensure not only staff, but children and their care-givers were aware of, and could remember all "5 Moments".

Methods and Measurement

The IPCT wrote lyrics, set to the tune of "Magic Moments", and a storyboard for an accompanying video was designed. Copyright was obtained and the song produced by a local sound engineer incorporating the voices of children attending clinic. The Trust Forum children and their parents were then spoken to about the video project. All children approached agreed to take part in the making of the video; some acting, some making costumes and others working behind the camera. Children attended on two Saturdays. The first day was spent talking about bugs and the "5 Moments"; discussing the proposed storyboard; designing and making costumes and assessing their Ayliffe technique using the UV light box. Shooting the video took place on the second day and a third and final day was spent capturing examples of the "5 Moments" throughout the Trust featuring a variety of staff, patients and their families.

Evidence of improvement

The children involved gained awareness of the "5 Moments" and had fun doing so. By producing a format other than written information, we have broadened our audience to include very young children and people for whom literacy is an issue.

Future Steps

Once the video is completed, it will be uploaded to the Trust website and social media accounts.

Epidemiology and surveillance of HCAI

Abstract ID: 2803

First community cluster of New Delhi Metallo-beta-lactamase-1 (NDM-1) *Escherichia coli* in Scotland

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Introduction
We report a cluster of urinary tract infection caused by New Delhi Metallo-beta-lactamase-1 (NDM-1) *Escherichia coli* in the community between August and November 2013. There have been 12 Scottish isolates of this organism since 2007, mostly associated with acute settings, so the occurrence of three community infections in a small geographical area is of public health significance.

Methods
All cases were identified by the local clinical diagnostic laboratory. Surveillance was increased in the local laboratory, and suspicious isolates were promptly dispatched to the reference laboratory. Cases were investigated epidemiologically. Since no specific questionnaire was available for CRE community outbreaks, a new form was adapted from the existing PHE acute questionnaire. Enhanced surveillance of catheter urine specimens was continued until January 31st but identified no further CRE isolates.

Results
Epidemiological investigation revealed links between cases: a locum doctor; the Out-Of-Hours care; and a local dental surgery. Microbiologically, final reporting concluded that the isolates belong to a cluster of NDM producers from diverse geographical locations, suggesting that it represents a successful international lineage.

Discussion
It is clinically significant to have a community cluster of this rare organism in Scotland. We hypothesise this cluster may represent the spread of the problem from England into Scotland. We also highlight that attendance at dental surgeries and community healthcare facilities may be an under-recognised route for the spread of infections such as these. Prompt and thorough environmental decontamination, combined with education of staff in community healthcare settings is important to prevent further infection, however this alone is insufficient. Continued surveillance efforts are critical to ensure early detection and alternative methods of treating infection must be contemplated. Antibiotic stewardship is vital in limiting the spread of these highly resistant organisms. Regulation of antibiotic use in agriculture should be considered. Development of new classes of antibiotics is required.

Abstract ID: 2809

Findings from mandatory surveillance of *Escherichia.coli* bloodstream infections in the West Midlands, England, 2012-2013

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Introduction
Escherichia.coli (E.coli) bacteraemia is an important healthcare associated infection (HCAI) which laboratory reports have shown has been increasing. Mandatory surveillance was introduced in June 2011. We described and compared the epidemiology of *E.coli* bacteraemia in the West Midlands against that of the rest of England during 2012-2013.

Methods
Data on all cases were obtained from the mandatory surveillance system. Categorical variables were summarised as counts and proportions with p-values for differences. Cumulative incidence and 95% confidence intervals were calculated.

Results
During 2012/13, 7101 episodes of *E.coli* bacteraemia were reported in the West Midlands representing 11 % of all reports in England. The cumulative incidence was 126 per 100,000 population (95%CI 123,129) and 123 per 100,000 (95%CI 122, 124) in England, with similar distributions for age and sex.

The most common primary foci of infection (available data, n=4,808 cases) were urinary tract (44%), unknown sources of infection (26%), and hepatobiliary system (13%), these proportion were significantly different ($p<0.05$) from those in the rest of England, although the ranking of these sources remained unchanged.

The clinically assigned likelihood (completed for n=4,969 cases) that an episode represents a "likely" or "possible" HCAI was 27%. This was significantly different from the rest of England where it was 22% ($p< 0.0001$).

Discussion
Estimates of primary foci of infection and clinical likelihood of HCAI were different in the West Midlands compared to the rest of England. Further work is needed to understand the key drivers for infection and identify effective prevention measures.

Abstract ID: 2825

Pseudo outbreak of *Kluyvera ascorbata* Infections

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Introduction
Kluyvera ascorbata, famous for chromosome carrying blaCTX-M genes, was never isolated in Taiwan before. Even this organism is still rarely detected in medical practice till now. However, in a regional hospital in southern Taiwan, a strain of *K. ascorbata* was isolated from bile of one patient with acute cholecystitis on 17 March 2014. Thereafter, another strain of *K. ascorbata* was isolated from urine of another patient with urinary tract infection on 17 April 2014 at the same intensive care unit. We thought that this event was very unusual; hence, this study was conducted to investigate whether outbreak of *K. ascorbata* infections had occurred.

Methods
Pulse-field gel eletrophoresis (PFGE) was used for bacterial typing. PFGE patterns were interpreted as follows. Two isolates were considered as the same strains if they had three or less band differences, and considered as the distinct strains if they had four or more band differences.

Results
PFGE patterns revealed that the two isolates of *K. ascorbata* had more than four band differences indicating that they were distinct strains.

Discussion
In this study, we proved that this was a pseudo outbreak of *K. ascorbata* infections. Herein, we must warn that an outbreak should be highly suspected if two or more rare organisms of the same species are isolated successively, especially from the same medical unit.

Abstract ID: 2834

The association between Central line-related bloodstream infection (CLABSI) and catheter-related bloodstream infection (CRBSI) according to various organisms

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Introduction
Diagnosis of catheter-related bloodstream infection (CRBSI) requires specific laboratory evidences. A simpler definition, central line-associated bloodstream infection (CLABSI), is recommended for surveillance purposes. To our knowledge, a few studies have reported that the positive predictive value (PPV) of CLABSI for CRBSI was less than 50%. In this study, we attempted to explore that according to various organisms.

Methods
A retrospective study was performed at a regional hospital in southern Taiwan from September 2012 to March 2014. Of all CLABSI cases collected by infection control practitioner, only those with catheter tip culture were enrolled, and the remaining cases were excluded. CRBSI was defined as the identification of same organisms from the paired blood and catheter tip cultures (≥ 15 colony-forming units) without evidence of secondary bacteremia from other infection sources.

Results
Overall, 82 organisms from 73 CLABSI cases and 35 organisms from 35 CRBSI cases were collected and analyzed. According to the CLABSI cases, the PPV for CRBSI was 47.9 % (35 of 73). According to the causative organisms, that was 82.4 % (14 of 17) in *S. aureus*, 40% (4 of 10) in CoNS, 60 % (6 of 10) in *P. aeruginosa*, 8.3 % (1 of 12) in Enterobactericeae, 58.3% (7 of 12) in *Candida*, and 14.3% (3 of 21) of other organisms.

Discussion
In this study, we found that the PPV of CLABSI for CRBSI varied with different causative organisms from 8.3% (Enterobactericeae) to 82.4 % (*S. aureus*). The three organisms, including *S. aureus*, *P. aeruginosa*, and *Candida*, had a higher PPV (≥ 58.3%); hence, if the causative organisms of CLABSI cases are these three organisms, the diagnosis of CRBSI should be highly suspected. By contrast, if the causative organisms are other organisms, CRBSI are less likely; hence, further laboratory studies may be necessary to diagnose CRBSI.

Abstract ID: 2850

Utility of community combined with hospital data to explain local variations

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Introduction
Norovirus impact in NHSScotland is assessed by Health Protection Scotland (HPS) undertaking a weekly point prevalence of closed wards. Norovirus season 2013-2014 was exceptionally quiet in Scotland; however, concern was raised in NHS Borders as impact seemed to be on a par with previous years. NHS Borders sought reassurance that hospital norovirus outbreaks were being introduced primarily from the community.

Methods
A review of available data was undertaken to compare: Wards closed in NHSScotland and NHS Borders against a 5 year average, The highest numbers of ward closures over multiple seasons, and Calls to the national helpline NHS24 related to 'diarrhoea' and 'vomiting' from NHSScotland and from NHS Borders against a historical average.

Results
HPS received 300 fewer reports of wards closed in 2013-2014, compared to season 2012-2013. NHS Borders had 16 wards closed for both seasons. Local data on impact showed that at no time were more than 2 wards closed in the acute hospital during 2013-2014. Compared to the historical average, NHS24 data showed that NHSScotland had fewer calls for help with 'vomiting', whilst NHS Borders' calls for 'diarrhoea' and 'vomiting' were on par with previous years, with several peaks noted.

Discussion
NHS24 data on calls on 'diarrhoea' and 'vomiting' during winter is likely to be mainly due to norovirus. This is the first time NHS24 calls data has been used as an adjunct to the HPS prevalence data – this confirmed a local community norovirus issue. NHS Borders could reassure their community that multiple data sources supported the premise that the norovirus outbreaks in the hospital were the result of repeated introductions from the community and not a continuous hospital outbreak. Additional work is needed to explore the utility of NHS24 calls in reducing the incidence and impact of norovirus.

Abstract ID: 2869

The application of Biochip to identify *Mycobacterium tuberculosis* complex

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Introduction
Mycobacterium tuberculosis complex (TBC) can result in nosocomial outbreak, especially in the setting of delayed diagnosis. Traditionally, acid-fast stain (AFS) and traditional culture method (TCM) are used to identify TBC. However, AFS has a lower detectable rate of TBC and cannot differentiate between TBC and *non-tuberculosis Mycobacterium* (NTM). Although TCM is regarded as the golden standard of identifying TBC, it is a time-consuming method. The aim of this study was to evaluate the role of identifying TBC by Biochip (DR.Chip Biotech, Inc., Taiwan), a quick diagnostic molecular method.

Methods
This was a retrospective study at Chi-Mei medical center in southern Taiwan. From January to December 2013, all clinical samples sent for identifying TBC were enrolled in this study. Three methods were used to identify TBC, including Biochip, TCM, and AFS.

Results
A total of 6819 samples, mostly obtained from sputum, were enrolled in this study. The detectable rate of TBC was 5.8 % (n = 396), 5.8 % (n = 394), and 3.9% (n = 269) by using Biochip, TCM, and AFS, respectively. In addition, 510 (7.5%) and 473 (6.9%) NTM were also detected by Biochip and TCM, respectively. Of all the samples, 460 had positive result by AFS; the accurate rate of identifying TBC by AFS was 58.5% (269 of 460).

Discussion
As a result of this study, the detectable rate of TBC was similar between Biochip, a rapid method (less than 24 hours), and TCM, a time-consuming method. In addition, Biochip had a higher detectable rate and more accurate rate than AFS (5.8% vs. 3.9% and 100 % vs. 58.5%, respectively). Hence, we consider that Biochip should have an important role to identify TBC, resulting in rapid diagnosis and treatment of tuberculosis as well as decreasing nosocomial spread.

Abstract ID: 2882

Multi-disciplinary approach to reducing Surgical Site Infection following cardiac surgery

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Introduction
A retrospective audit was conducted to assess minimum surgical site infection (SSI) following cardiac surgery because of anecdotal observations of increased

infection rates. The audit reviewed all cardiac surgery patients from July 2010-August 2012 and identified a minimum rate for deep incisional SSI and organ/space of 2%. An action plan was developed to improve clinical practice for the prevention and monitoring of SSI.

Methods

Procedures were reviewed in accordance with guidelines for the prevention and treatment of SSI (NICE, 2008), including pre and post-operative skin/nasal/mouth decontamination, peri-operative antibiotic prophylaxis, best practice for intra-operative care and wound management. Endoscopic vessel harvesting was established. Compliance with standards were audited and reported monthly.

An advanced nurse practitioner was appointed to conduct prospective SSI surveillance and monitor compliance with SSI prevention policies and guidelines. Wounds are monitored regularly for evidence of infection through observation, review of medical/nursing notes, observation charts and microbiology liaison.

All suspected deep incisional or organ/space infections are discussed at multi-disciplinary team meetings to conduct root cause analysis and agree infection classification according to Public Health England definitions.

Results

From April 2013 to March 2014 the rate of deep incisional and organ/space infection has been reduced to 1%.

Discussion

Improvement in patient outcomes and a reduction in the rate of deep incisional and organ/space infection have been achieved through a variety of interventions. Incidents of SSI are reported to clinical governance. Learning from case review meetings is disseminated to continue to the reduction in the rate of SSI after cardiac surgery.

Abstract ID: 2887

Comparison of caesarean section Surgical Site Infection post discharge surveillance methods, within NHSScotland

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Introduction

The Scottish Surveillance of Healthcare Associated Infection Programme (SSHAIP) within Health Protection Scotland (HPS) coordinates the surgical site infection (SSI) surveillance programme in NHS Scotland. All NHS boards are currently required to undertake surveillance for caesarean section procedures as per the mandatory requirements. Post discharge surveillance (PDS) until day 10 post operatively is carried out for all caesarean section procedures. The proportion of caesarean section SSI detected by PDS to day 10, not including inpatient infections, accounted for 85.5% of all the SSI detected for caesarean section during 2013 within NHSScotland. A review of the methods used to collect caesarean section PDS data was conducted by HPS in 2014 to ensure consistency and comparability between NHS boards.

Methods

SSI surveillance in NHS Scotland is conducted according to the SSHAIP protocol, with adherence to the definitions for SSI. Data are collected prospectively on eligible patients from the time of surgery to discharge, death or 10 days for caesarean section post operatively, whichever occurs soonest. A telephone questionnaire on PDS methods was conducted by HPS with a surveillance coordinator from each of the boards. Questions included the methods used to capture PDS data (paper, electronic or telephone) definition training and midwife involvement.

Results

There was variation between the boards in the methods used for collecting PDS data. The majority of NHS boards (85.7%) continue to perform local SSI surveillance using paper forms however there has been interest in transferring to electronic systems of collection. Definition training methods also varied between NHS boards.

Discussion

Results from this study help inform and improve practice within NHSScotland to ensure that PDS methods currently used across NHSScotland adequately capture the patient population and that data presented in the public domain are accurate thus ensuring comparability between NHS boards.

Abstract ID: 2892

Transmission dynamics of Methicillin-Resistant *Staphylococcus aureus* on an acute care medical unit

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Introduction

Factors affecting the transmission of healthcare-associated infections in hospitals, including Methicillin-Resistant *Staphylococcus aureus* (MRSA), are poorly understood. Using a micro-epidemiological framework typically applied to vector-borne diseases, we examined the transmission dynamics of MRSA on a medical unit of an acute care hospital in Vancouver, Canada.

Methods

We calculated the basic reproductive number (R_0) and the relative impact of infection control interventions from 1 June to 31 July, 2013 (medical unit size, n=125 beds). Interventions included: nursing-patient contact, hand hygiene compliance and contact precaution. Patients with laboratory confirmed MRSA were identified by an electronic flag in our patient management system.

Results

The estimated basic reproductive number for MRSA was 0.37 without compliance to hand hygiene and 0.12 without compliance to contact precaution. The effective reproductive number was reduced to 0.07 when all infection control measures were included. The impact of infection control interventions reduced the prevalence from a predicted 17% to an observed 13%. Under the circumstances tested, MRSA was stabilized primarily by the constant introduction of patients previously known to be MRSA-positive.

Discussion

MRSA persistence on our medical unit was found to be associated with the high prevalence of MRSA in the population served by the hospital. Future investigations and implementation of infection control strategies need to take into consideration local epidemiology.

Abstract ID: 2911

A Review of *E. coli* bloodstream infections in a large teaching hospital

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Introduction

A review of *Escherichia coli* (*E. coli*) bloodstream infections diagnosed from May to November 2013 across the medical division at a large London teaching hospital was undertaken. The aim was to establish the predisposing risk factors, inform and improve practice.

Method

A total of 17 patients with *E. coli* positive blood cultures were reviewed. The patients' clinical records were examined to establish if these patients had any of the following predisposing risk factors: urinary catheter (UC), vascular access device (VAD), other invasive/indwelling device(s), surgical, other invasive procedure, neutropenia and wounds/ulcers. The management of these patients was measured against the Trust best practice guidance to identify any breaches in care protocols.

Results
All 17 patients had one or more predisposing risk factors. Sixteen patients had a VAD, 12 had an indwelling UC, 11 had both UC and VAD and 6 of the patients had wounds prior to the positive blood culture. The care of all the patients' VAD and wounds was well documented in the clinical notes and this was taken as evidence of adherence to Trust best practice guidance on the care of VAD. Documentation of UC was generally poor.

Discussion
The predisposing risk factors identified in this cohort of patients were: indwelling VAD, UC and wounds. The Trust best practice guidance recommends accurate documentation of the care of VAD and UC. These results have prompted a review of how the medical division ensures this happens. For patients whom a UC is present or inserted, an electronic work order should be generated which nursing staff are required to complete. The documentation of all indwelling devices and wound care is now reviewed during the senior nurse rounds. Medical staff record the clinical need for indwelling devices as part of a structured ward round approach.

Abstract ID: 2918

Development of an outbreak tool to aid effective management of outbreaks in an acute hospital

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Improvement Issue and Context
Effective and timely management of outbreaks, including accurate record keeping, is crucial to minimise the transmission of infection across wards within an acute hospital. Prior to 2011 our approach to outbreak management involved a paper form to gather information on symptomatic patients. The requirement to update information at least daily resulted in multiple paper forms per ward, which had the potential to be misplaced. Documentation was further complicated by the need to record patient moves and changes in symptoms. This paper system proved time consuming and caused inaccuracies.

Methods and Measurement
An outbreak management tool was developed using Microsoft Excel. Excel was chosen for its extensive range of formulae and availability across the Trust IT network. The tool mirrors the appearance of the original paper template but is able to calculate patient symptom timescales, which in turn shows when it is possible to re-open a ward. An ongoing record of advice from the Infection Prevention Nurse is maintained for ready reference.

Evidence of Improvement
The tool has delivered key benefits in collating and communicating accurate and timely data. It shows clearly the ward closure status and the infection status of individual patients. It is accessible via a tablet PC, enabling data entry on the ward. Information from the tool, including the total number of patients and staff infected, the number of wards affected and the total lost bed days is disseminated to key staff in the Trust by means of a daily summary report.

Future Steps
We plan to refine the tool and link it to the Microsoft Access database used by the Infection Prevention Team to record routine clinical activity. This will enable transfer of data from the tool to the main database to produce automatic final outbreak reports and avoid duplication of effort.

Abstract ID: 2932

Sampling cyclone and the collection of respirable pathogens

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Introduction
Sampling cyclones are powerful tools with which to capture bioaerosol material and the initial aim of this study is to assess the potential of sampling cyclones to collect respirable pathogens from within hospital environments. To achieve this aim the separation grade efficiency of the cyclone must be modelled in order to determine the size of particles that can be collected.

Methods
The operating conditions and dimensions of the cyclone influence the separation grade efficiency, whereas cyclone models and computational fluid dynamics (CFD) are used to determine this efficiency. This study chose four established models in addition to using validated numerical modelling techniques, to predict the separation grade efficiency of a 70 mm diameter glass sampling cyclone.

Results
The modelling of the cyclone operating at 600 l/min predicts that there is a 100% probability of particles of between 3 – 6 microns and greater in size being successfully collected. The particle size captured with 50% efficiency is estimated to be within the range of 1 – 2 microns, whereas particles below this range have a diminished chance of collection with decreasing size.

Discussion
Given that the respiratory spray from a cough or sneeze includes particles in a <1 to 500 micron range, the 70 mm diameter sampling cyclone is predicted to have the potential to collect 99% of this particle size range. The cyclone is also predicted to collect with 100% efficiency particles of 4 microns and airborne pathogens of this size have the potential to reach the respirable regions of the lungs. This study suggests that sampling cyclones offer the chance to investigate how the risks associated with airborne pathogen distributions, such as with influenza and norovirus, work in normal clinical practice in order that effective interventions at patient, environmental and building design level can be constructed.

Abstract ID: 2933

Alert organisms at a specialist Paediatric Trust 2011-2014

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Introduction
Paediatric patients can present unique challenges to an Infection Prevention & Control Team due to their susceptibility to infections prevented in older patients by previous exposure or vaccination. As a result the micro organisms causing healthcare associated infection (HCAI) in Paediatrics can be different to those affecting adult patients. This prospective study looked at the incidence of alert organisms at a specialist Paediatric Trust and identified those organisms identified as causing HCAI and being responsible for outbreaks of infection over a 3 year period.

Methods
Alert organisms identified in the laboratory were entered into a database on a daily basis by the Infection Prevention & Control Nurses. Data for the 3 year period from April 2011- March 2014 was reviewed. Agreed definitions for nosocomial infection were applied to the data.

Results
Incidence of Hospital acquired MRSA colonisation and infection were low during the 3 year period. Outbreaks of MRSA were associated with long stay patients with multiple indwelling devices. The incidence of *Clostridium difficile* associated disease was very low and limited to the Oncology unit. CLABSI were a significant cause of HAI. Significant numbers of MSSA bactearemia were identified during the 3 year period. Multidrug resistant organisms such as ESBL producers and CPE led to outbreaks in high risk areas. The admission of large numbers of patients with viruses such as RSV and rotavirus during the winter and early spring each year place considerable pressure on the isolation facilities and staff workload and each year a number of HAI were identified. Exposure to childhood illnesses such as Chickenpox and Measles led to nosocomial infection in unvaccinated children.

Discussion
Nationally set targets fail to address the frequent causes of HCAI in a Paediatric Trust. Local targets should be set to target the causes of HCAI within Paediatrics.

Abstract ID: 2938

An outbreak of an Extended Spectrum Beta lactamase (ESBL) producing *Escherichia coli* in a Neonatal Surgery Unit

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Introduction
Between May-July 2013, 12 babies were identified as having acquired an extended spectrum B-lactamase (ESBL) producing *Escherichia coli* on our 12 cot neonatal surgical unit. Eight babies had rectal colonisation and four developed clinical infection. One baby subsequently died as a result of *E.coli* sepsis. The unit had limited isolation facilities and babies colonised with ESBL frequently were nursed in the open ward. Clinical procedures commonly undertaken included stoma recycling and bowel washouts which could easily contaminate the ward environment with bowel flora.

Interventions
The unit was closed to admissions after an initial outbreak meeting. The babies were moved to a vacant ward to allow HPV fogging and remedial building work to be undertaken. Swabbing of the environment and patient equipment was undertaken but failed to identify the outbreak strain. Unit infection prevention specific guidelines were introduced including the cleaning of equipment and the wearing of PPE by staff and parents. All babies were nursed under strict contact precautions (long sleeved gowns / gloves) if identified as carrying an ESBL. Babies remained under contact precautions if their surveillance screens were negative. Education was provided to staff and parents on hand hygiene after audits identified that compliance with WHO 5 moments of hand hygiene was poor. A parent safety card was introduced to provide the parents with infection prevention guidance on their baby's admission to the unit.

Results and Discussion
The outbreak was declared over when no more cases had been identified for 1 month. The interventions introduced during the outbreak have been continued without modification. The NSU moved back onto a refurbished unit at the end of October 2013. The capacity of the unit was reduced to 9 cots including 5 single rooms and staffing levels were increased to reflect a high dependency unit (1:2). There have been no further cases of the outbreak strain identified.

Abstract ID: 2953

Psychiatric disorders, psychotropic treatments and *Clostridium difficile* Infection

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Introduction
Previous research has suggested that the use of psychiatric drug treatments increases the risk of developing *Clostridium difficile* infection (CDI). The aim of this study was to assess the presence of intrinsic and extrinsic risk factors for CDI, paying special attention to the presence of psychiatric disorders and their treatment.

Methods
A retrospective cross-sectional descriptive study was carried out at the Hospital Universitario de Canarias (HUC) Microbiology Service in the period 2009-2013.

Results
A total of 127 episodes of CDI corresponding to 122 patients were identified. Of these, 12 had at least one recurrence within the same episode. Mean age was 63 years. Prevalence rates of CDI increased from 0,34 to 1,81 cases per 1,000 hospitalised patients from 2009 through 2013. Tempo-spatial case study did not identify the presence of outbreaks. The average length of stay of patients prior to the development of infection was 21,2 days. The vast majority (71.9%) of the episodes were of nosocomial origin. Almost all the patients (98.5%) were using antibiotics prior to the development of the CDI, being the average number of 2.4 antibiotics per patient. Carbapenems were the most prevalent antibiotics (45.3%) used. Nearly half of patients (44,5%) suffer from psychiatric disorders, particularly depression and anxiety, using 39% of them benzodiazepines and 32% antidepressants, mainly selective serotonin reuptake inhibitors. Metronidazole and vancomycin were the most used drug treatment for CDI. Although 10 of the patients died during admission, it was not possible to relate in any of the cases the cause of death with the episode of CDI.

Discussion
The incidence figures recorded are relatively low compared with those published in similar healthcare devices, although there is a clear trend of increase. Our findings support the psychiatric disorders and their treatment risk factors listed in the literature.

Abstract ID: 2964

Epidemiology of nosocomial secondary bacteremia to other infectious processes in a Tertiary Hospital

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Introduction
Although many studies have already investigated epidemiology and risk factors related to Primary and Central-line associated Bloodstream Infections (BSI), knowledge of Secondary BSI to an infection at another body site is very limited. Our study aimed to investigate the epidemiology of Nosocomial Secondary BSI at a 661 bed tertiary hospital.

Methods
Retrospective and observational study of patients diagnosed of Nosocomial Secondary BSI during 2009-2013, following the 2008 CDC criteria. The medical records of these patients were retrospectively reviewed. We analyzed epidemiological and microbiological data.

Results

Table 1.

	Total		Total
TOTAL BSI (N)	1633	Microorganisms*	
2° BSI (N)	345		
2° BSI (%)	21.13	GPC	130 (30,1%)
		S. aureus	26
Primary Infection	78 (22.22%)	NC *Staphylococcus*	28
Respiratory tract	85 (24.21%)	*Enterococcus* spp.	69
Urinary tract	92 (26.21%)	*Streptococcus* spp.	10
Surgical site	28 (7.98%)	GPB	1
Skin/Soft tissue	43 (12.25%)	GNB	258 (61,1%)
Intra-abdominal	25 (7.12%)	Enterobacteriae	162
Other		NFGNB	93
		Other	3
Service	114 (31.84%)	YEAST	
Medical	114 (31.84%)		25 (6%)
Surgical	89 (24.86%)		
Intensive care unit	41 (11.45%)	ANAEROBICS	
Hemato- oncology			8

* 56 were polymicrobial infections.
GPC = Gram positive cocci
NC Staphylococcus = Coagulase negative staphylococci
GPB = Gram positive bacilli
GNB = Gram negative bacilli
NFGNB = Non-fermenting Gram-negative bacilli

Discussion

Secondary Bloodstream Infections are an important factor of morbidity and involve a rise in healthcare cost. They could be prevented with proper diagnosis and treatment to other infections.

Abstract ID: 2965

The Incidence of oxacillin-resistant *Staphylococcus aureus* at a Regional Hospital in Southern Taiwan

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Introduction

Staphylococcus aureus is an important pathogen in medical practice. Furthermore, oxacillin-resistant *Staphylococcus aureus* (ORSA) has increased difficulty in treatment. The incidence of ORSA is growing in some regions worldwide. Some interventions have been reported to decrease successfully the incidence of ORSA. In this hospital, contact precautions only are implemented as the infection control measure to decrease the incidence of ORSA. This study was conducted to explore whether this measure can reduce the incidence of ORSA in this hospital.

Methods

This was a retrospective study at a regional hospital in southern Taiwan. From 2007 to 2013, all *S. aureus* isolates obtained from blood cultures were enrolled in this study. If multiple isolates were identified from the same patient during the same hospitalization period, only the first isolate was enrolled. *S. aureus* were divided into oxacillin-susceptible *S. aureus* (OSSA) and ORSA.

Results

A total of 1101 *S. aureus* isolates, including OSSA (n = 511, 46.4%) and ORSA (n = 590, 53.6%), were enrolled. The ORSA accounted for 57.1% (97 of 170), 53.3% (81 of 152), 66.9% (107 of 160), 48.1% (62 of 129), 43.6 % (71 of 163), 51.3 % (78 of 152), and 54.3 % (94 of 175) of *S. aureus* in 2007, 2008, 2009, 2010, 2011, 2012, and 2013, respectively.

Discussion

As a result of this study, the incidence of ORSA was about 53.6 % in this hospital, being higher in 2009 (66.9%) and lower in 2011 (43.6%). However, that seemed to remain constant during the 7-year follow-up period, indicating that contact precautions only were not sufficient to decrease the incidence of ORSA. Consequently, more effective infection control measures should be implemented to decrease the incidence of ORSA in this hospital.

Abstract ID: 2967

Emergence and outbreak of OXA-48-producing *Klebsiella pneumoniae* in a Tertiary Hospital in Canary Island (Spain): epidemiology and control measures

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Introduction

The dissemination of carbapenemase-producing *Klebsiella pneumoniae* and the difficulty to treat its infections make it necessary to focus the efforts on infection control measures. Our aim was to describe epidemiological features and control measures of OXA-48 -producing *K.pneumoniae* outbreak at a Spanish teaching hospital.

Methods

Clinical, demographic and microbiological data of patients with infection or colonisation withOXA-48-producing K.pneumoniae were collected from 10/19/2013 to 5/2014. Cases were confirmed with standard microbiological methods and molecular typing was performed in a reference laboratory.

Results

The outbreak of OXA-48-producing *K.pneumoniae* was detected between 10/19/2013 and 11/4/2013 in three patients admitted to general and digestive surgery unit, who coincided in time and space. Thus, infection surveillance, control and educational programs for healthcare workers, were conducted by the Infection Control Team. Active screening culture of rectal swabs was performed in all hospitalized patients at affected units. Patients colonized or infected were placed on contact precautions followed by chlorhexidine bathing.

Until 5/30/2014, 63 cases were reported: 23 (36%) in clinical sample (only or with a rectal swab) and 40 (64%) in rectal swabs. Out of the clinical samples, 15 (65%) were classified as nosocomial infections, 4 (17,5%) nosocomial colonizations and 4 (17,5%) extra-hospital infections (2 UTI and 2 bacteriemia). Evolution of the incident cases is described in Table 1.

Table.1.

Months	N° clinical samples	N° rectal swabs
October 2013	1	0
November 2013	4	6
December 2013	4	10
January 2014	5	5
February 2014	5	6
March 2014	2	4
April 2014	2	4
May 2014	0	5

All of OXA-48-producing K.pneumoniae were CTXM-15 producers. Pulsed-field gel electrophoresis identified one main clone type.

Discussion

This study showed a diminution of OXA-48-producing *K.pneumoniae* in clinical samples versus surveillance cultures. Our findings highlight the importance to implement prevention and infection control measures.

Abstract ID: 2972

Implementing surveillance of Surgical Site Infections in C-sections performed in an Acute Trust

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Introduction

Saint Mary's Hospital is a large tertiary referral centre serving the population of Central Manchester and patients with complex medical conditions referred from across the North West. As part of a service improvement exercise, the Infection Prevention & Control and Tissue Viability (IPC/TV) team conducted a programme of enhanced surveillance of Surgical Site Infections (SSI) following C-section deliveries with a view to incorporation into on-going SSI surveillance.

Aim

To determine a baseline rate for C-section SSI/identify associated risk factors in the population studied.

Method

With advice from the Surgical Site Infection Surveillance Service (SSISS) at Public Health England (PHE), data collection sheets, patient information and discharge letters/questionnaires were devised. Over a three month period, all elective and emergency C-sections were identified via theatre booking systems and surveillance forms were completed for each procedure on daily basis. A 30-day follow-up phone call was made to determine if there were any issues with wound healing, and criteria set forth by SSI surveillance were used to determine if the healing issues were true SSI.

Results

Of the 478 ladies who underwent delivery by C-section during the period of observation, follow-up data was obtained for 284 (59%). Using patient reported SSI classification criteria set forth by SSI surveillance, 71 ladies contacted were deemed to have experienced a SSI, representing 15% of the cohort studied.

Discussion

A baseline level of patient-reported C-section SSI has been established. Issues around data collection methodology and ownership were experienced and subsequently resolved. Whilst SSI surveillance following C-sections is mandatory in the rest of the UK, this is not the case in England. This study identified that useful data can be obtained once clear guidelines and protocols have been established. In addition to improving service provision and patient experience, significant financial savings can be made due to reduced readmissions and treatment costs.

Abstract ID: 2982

Prognostic indexes, length of stay and nosocomial infection in Intensive Care Unit: analysis of 835 cases From Brazil

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Introduction

Studies describing the occurrence of Infection Related to Health Assistance (IRHA) in the ICU and its relation to some selected predictive factors are lacking. We aimed to analyze the occurrence of IRHA in ICU, according to severity, length of stay (LOS) and nursing work load.

Methods

Cross-sectional study was done in 9 heterogeneous ICUs (clinical and surgical) belonging to a public hospital in São Paulo, Brazil, during 3 months. Data was collected from medical records of patients. Age, gender, LOS, occurrence of infection, number of infections per patient, admission criteria (clinical or surgical), prognostic indexes (SAPS II, Charlson, LODS) and the Nursing Activities Score (NAS) were analyzed. Non-parametric tests were used for the analysis and the Logistic Regression selected to enter the model all the variables whose p-value was ≥ 0.20. Data was considered significant when $p \leq 0.05$.

Results

Sample was composed by 835 cases, mostly males (57.5%) with mean age of 54.26±17.29. IRHA was present in 12.5% of the cases (ranging from 1 to 8 events/patient). Among subgroup of IRHA patients, the occurrence of infection was more prevalent among male (8.4%; p<0.030), admitted for clinical treatment (8.1%; p<0.004), with a mean LOS of 6.98 days (p< 0.000). The number of infectious event was correlated to the LOS ($r_s = 0.403$, p<0.000), burden of disease measured by Charlson ($r_s = 0.075$; p<0.030), severity measured by SAPS2 ($r_s = 0.182$; p<0.000) and by LODS ($r_s = 0.128$; p<0.000). Age and NAS was not correlated to IRHA. By logistic regression, it was observed that LOS and SAPS 2 prognostic score were independent related to the occurrence of IRHA.

Discussion

The increase in the LOS and the severity of the disease are associated to the risk of infection in ICU patients, despite the type of ICU or admission criteria.

Abstract ID: 2796

Knowledge, practice and attitudes of nurses towards infection control standards in West Bank governmental hospitals

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Background
Adherence to infection control (IC) standards is a key component of nursing practice to reduce the rate of hospital-acquired infections. Low compliance with these standards has been reported in many developing countries. This study aims to explore the knowledge and compliance of nurses working in West Bank governmental hospitals with IC standards, in an attempt to guide future strategies to enhance these standards in Palestine.

Methods
A multi-centre, cross-sectional, descriptive study, using a self-administered questionnaire, was conducted in October-November 2013. Participants' knowledge and compliance regarding specific IC policies were sought and ranked on a scale of 9 (9 is the best score that can be achieved). Needs for training were also explored. SPSS was used for data analysis.

Findings
Of the total 175 nurses surveyed (from 8 hospitals), 54.9% were females, 77.1% had a bachelor degree or above and 72.6% had nursing experience of 5 years or more. According to our analysis, 53.7% had IC training inside the hospital and 80% reported the presence of IC nurse specialist in their hospitals. Respondents' knowledge of and compliance scores with IC standards were 7.44 and 5.23, respectively. Although there was an increase in knowledge scores with academic attainment, gender, years of experience and subspecialty, these had no significant effect on the scores. Interestingly, while previous in-hospital or outside hospital training had no effect on the scores of knowledge or compliance of participants, 97.7% indicated that infection control training is needed.

Interpretation
Education and training of healthcare personnel on IC standards are a prerequisite for ensuring that policies and procedures are understood and practiced. This study provides information about nursing IC practices in West Bank governmental hospitals. Results from this study are expected to guide efforts to develop educational programs to improve nursing IC practices in Palestine.

Abstract ID: 2799

Achieving the National Personal Protective Equipment Policy in Scottish National Blood Transfusion Service

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Improvement Issue and Context
The clinical apheresis service undertakes approximately 2,000 apheresis procedures and 2,000 other procedures such as therapeutic venesection or infusions annually. Following the implementation of the National Infection Prevention and Control Manual in September 2012, which states that 'gloves must be worn when exposure to blood or body fluids is likely/anticipated', the apheresis nurses highlighted that they were experiencing a significant amount of failed cannulation procedures. The nurses identified that whilst wearing gloves they were unable to clearly palpate the more 'difficult' veins before cannulation. The aim of this study was to assess the exposure potential to blood during cannulation through observations of the procedure and in particular of the inner needle, once the cannula has been inserted, or on removal of the fistula needle cap and to identify if patients were being exposed to more cannulation attempts due to staff wearing gloves.

Methods
Observation of 79 procedures was undertaken both when using gloves throughout or for part of the procedure. No observed staff exposure to blood was noted for either method. Four patients received more than one cannulation when staff wore gloves for the complete cannulation procedure. All cannulations were successful when staff wore gloves for part of the procedure. An adaptation of national policy has now been accepted so that for patients with 'difficult to palpate' veins, staff wear gloves only when removing the insert needle/fistula cap.

Discussion
The adaptation has resulted in reduced number of failed cannulation attempts, which has reduced patients' pain/discomfort, reduced waste of sundries and reduced time spent on individual cannulations and improved staff satisfaction with their performance. No adverse events (staff exposures) have been reported. Staff are aware of the need to report any difficulties with implementation/cannulation policy to the Nurse Manager / Senior Nurse Infection Control.

Abstract ID: 2811

Understanding patients' experiences of postoperative voiding difficulty and short-term urinary catheterisation following knee and hip replacement surgery

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Introduction
Urinary retention is a frequent complication following lower limb joint surgery. It is managed by urinary catheterisation (UC), introducing the risk of urinary tract infection. Little is known about patients' experiences of postoperative voiding difficulty and catheterisation or their awareness of the associated risks. The aim of this study was to explore patients' experiences and preferences relating to the management of voiding difficulty and UC following planned knee and hip arthroplasty.

Method
A qualitative study in the elective orthopaedic ward of a large teaching hospital was undertaken. Patients who underwent knee or hip replacement surgery were invited to participate in a semi-structured interview during their hospital stay. A purposive, maximum variation sample was used. Interviews were digitally recorded and transcribed verbatim. Inductive, thematic analysis was undertaken separately by two researchers.

Results
Eighteen interviews were undertaken, 10 following total hip replacement (5 women, 5 men) and 8 following total knee replacement (3 women, 5 men). Participants were aged 43-99 years (mean=70 years). 4 main themes were identified, each with subthemes (Table 1).

Whether catheterised or not, most participants worried about toileting while in hospital and felt their dignity was affected. Six participants who had previously been catheterised said they preferred this, whereas 6 with no previous experience said they preferred to avoid having a catheter. Most patients reported no involvement in decision-making and said they received little or no information about benefits and risks.

Table 1. Interview themes and subthemes.		
Toileting	Using the toilet	Worrying about access Discomfort
	Using bedpans and urinals	Ease of use Over-filling
	Changes to micturition	Unable to void Urgency/frequency/flow
Having a catheter	Benefits versus risks	Convenience Comfort Piece of mind Embarrassment
Preference and choice	Involvement in decisions	Provision of information Choice
	Preferences	Catheter vs no catheter Informed by experience
Privacy and dignity	Loss of control	Wetting and spillage Dependency Coping with embarrasment

Discussion

Patients worry about toileting while in hospital and may have strong preferences relating to UC. The influence of previous experience of UC on future preference suggests preferences may alter if patients were catheterised less. It is important to address patients' concerns about toileting when developing a strategy to avoid routine UC in surgery.

Abstract ID: 2815

Paradoxical increase in patient satisfaction scores during outbreaks of norovirus in a large teaching hospital

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Introduction

Statement 9 of the NICE Quality Improvement Guide on the Prevention and Control of Hospital Acquired Infection recommends the collection of patient experiences during outbreaks of infection.. Therefore we aimed to collect patient feedback data on the overall satisfaction of their inpatient stay in hospital during outbreaks of norovirus between April 2013 and March 2014.

Methods

Net promoter patient feedback data already collected on discharge was used to compare overall patient satisfaction in the 4 weeks following the start of each outbreak with data collected over a 4 week period during July 2013 when no wards or departments were affected by norovirus.

Results and Discussion

The results show that there were 23 outbreaks of norovirus during April 2013 to March 2014. Eighteen of these showed that patient satisfaction scores were greater during the outbreak than during July 2013 on the same ward when no outbreak was occurring.

Conclusion

The results show that patient satisfaction was greater during outbreaks in 78% of cases. This has generated local discussion in terms of whether a closed ward due to norovirus lends itself to a better nurse to patient ratio promoting more care time per patient and a greater focus on maintaining effective environmental standards thus increasing patient satisfaction. Although the net promoter question does not ask specific detail in terms of the patient's perception of cleanliness and hygiene, it is suggested that a simpler, less detailed satisfaction survey may provide a more stable measure of overall standards within the organisation and increase interpretability of changes in patient satisfaction trends over time.

Abstract ID: 2823

Introducing initiatives, both conventional and unconventional, to improve the management of patients with diarrhoea associated illnesses and improve outcomes

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Improvement Issue and Context

The NHS Trust in question is the sixth largest acute Trust in England. During 2012/13, there were 444 patients with diarrhoea (and/or vomiting) who met the norovirus case definition, resulting in multiple bay/ward closures and disruption to services. There were also 40 cases of *Clostridium difficile* infection that year which resulted in the setting of an extremely challenging target of 29 cases for 2013/14. The high incidence of norovirus and challenging *C.difficile* target meant that there was an urgent need to develop new initiatives and "think outside the box".

Methods and Measurement

VitalPAC IPC Manager software system was implemented in October 2013 providing the IP&C Specialist Nurses with a daily list of all patients reported as having diarrhoea (and/or vomiting). The IP&C Nursing Team have since implemented a system of timely follow up and assessment working collaboratively with ward staff.

Outcomes of Root Cause Analysis for *C.difficile* led to the implementation of the Diarrhoea Assessment Tool and various other novel initiatives, some unconventional, to improve the management of patients with diseases associated with diarrhoea.

The measurement of these interventions is described below.

Evidence of Improvement

Only one of the 3 hospital sites had any cases of norovirus (66 cases, compared to 200 cases in 2012/13) and there was an 87% reduction Trust wide. During this period there was a significant improvement in *C.difficile* from 28 in the first 2 quarters to 21 in the last 2 quarters of 2013/14.

Future Steps

New initiatives will continue to be developed in this area including the launch of our "Alternative Stool Chart" (based on chocolate, milkshake, and ice-cream analogies), to aid in the interpretation of the Bristol Stool Chart.

Abstract ID: 2829

Identification and characterization of staphylococcal small colonies variants (SCVs) from a Libyan hospital

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Introduction

We report the first laboratory examination and identification of small colony variants (SCVs) of staphylococcal species from a single-site hospital in Tripoli, Libya. Bacterial small colony variants are atypical organisms, showing unusual phenotypic and virulence characteristics. SCVs represent a challenge to the typical laboratory identification procedures and complicating clinical and antibiotic therapies.

Methods

A single-site collection of gram positive isolates (n=5) with unusual phenotypic and colonial characteristics was examined for SCV and wild type (WT) phenotypes based on cultural and biochemical characteristics and identified at the genera-species

level by both API biochemical and automated identification systems. Also antimicrobial drug susceptibility profiling was carried out on both WT and the SCV colonies.

Results
Of the five isolates, *Staphylococcus aureus* (n=2), *Staphylococcus hominis* (n=2) and *Staphylococcus epidermidis* (n=1), were identified and characterized as typical SCVs with variable phenotypic and antibiotic resistance profiles.

Discussion
This report documents small colony variants (SCVs) of different staphylococcal species from a Libyan hospital. Health care authorities and practitioners should be alerted to the potential emergence of SCVs to aid in timely diagnosis and appropriate therapies.

Abstract ID: 2843

Development of an outbreak crib card to reduce omission error

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Improvement Issue and Context
Guidelines are available for outbreaks caused by common nosocomial pathogens such as *Clostridium difficile*. Infection prevention and control teams (IPCT) and national organisations also need to be prepared for outbreaks of rarer pathogens for which there may be no local experience nor national guidelines, e.g. nosocomial *Bacillus* spp. Should such outbreaks arise, the IPCT could be vulnerable to omission errors and possible delays in instigating appropriate investigations and control measures.

We describe the method used to produce the first Health Protection Scotland (HPS) Outbreak Crib Card with the aim to reduce the risk of omission errors and support optimal outbreak management.

Methods and Measurement
Medline and Cinahl databases were systematically searched for reports of healthcare-associated outbreaks and pseudo-outbreaks of Bacillus spp. Two products were produced: a summary evidence table and a crib card. The evidence table gives details of each outbreak found including the species implicated, the number of patients affected, fatalities, proposed route of transmission and any suspected environmental involvement. The crib card has 2 sides: 1) a short distillation of information on outbreaks commonly seen involving *Bacillus* spp and relevant factors; 2) advice for preventing, preparing for and controlling *Bacillus* spp outbreaks.

Evidence of Improvement
HPS now has a proof of concept Outbreak Crib Card for one rare type of outbreak. The Crib Card for *B. cereus* outbreaks has been presented to the Hospital Outbreak Advisory Group and discussed with infection control colleagues. It will be part of the HPS Outbreak Tool Kit.

Future Steps
The Crib Card will be tested during regular outbreak scenario training. Discussions with IPCTs as to how preparedness can be further increased by producing Crib Cards for other rare organisms that cause nosocomial outbreaks. Maintenance will be achieved through ongoing review of published outbreaks.

Abstract ID: 2851

Heparin infusion bacteraemias - Can they be stopped?

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Introduction
Heparin-related bacteraemias due to in-use contamination of IV heparin infusions with Gram-negative organisms have been previously reported.[1-2] Gram-negative organisms can proliferate in IV fluids[3] and migrate up IV administration sets against fluid flow.[1] Bacteria may contaminate a IV infusion whenever a disconnection occurs, and multiply while the apparatus remains unchanged. The epic3 guidelines state that 'Administration sets in continuous use do not need to be replaced more frequently than every 96 hours ...unless they become disconnected or the intravascular access device is replaced'.[4] However Playford et al[1] controlled heparin-associated bacteraemias by replacement 24 hourly and after cannula change

Methods and measurement
In 2010 we identified three patients with IV-heparin-associated-bacteraemia. Organisms isolated from multiple sets of blood cultures and the heparin infusion from two patients were identified by 16S ribosomal RNA gene sequencing as *Cupriavidus* sp and *Pseudomonas monteilii / P. plecoglossicida*. Isolates from blood and heparin were indistinguishable by pulsed-field gel electrophoresis. An *Acinetobacter lwoffii* (identified by Vitek 2™) was isolated from the third patient's blood cultures only (five sets) as the heparin was unavailable for culture. All three patients responded to changing the heparin-infusion apparatus and intravenous antibiotics.

Evidence of improvement
We have started either using bacterial filters between the cannula and administration line or replacing administration sets 24 hourly and after disconnection. No further bacteraemias have occurred.

Discussion
All three patients recovered, but all had prolonged hospital stays, IV antibiotics, and additional investigations. Serious sequelae such as spinal epidural abscess have occurred[1]. We strongly recommend the above control measures to prevent these bacteraemias.

Abstract ID: 2856

An exercise aimed at integrating the use of N95 masks for protection against airborne infection and droplets.

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Introduction
The purpose of this survey was to improve clinical practice for infection prevention among nursing students. We introduced the use of N95 masks and cough splash under the conditions of cough spray. They were able to deepen their knowledge and technical experience.

Methods
A survey was conducted with subjects for knowledge and technical competence scored on a five point scale. The sample consisted of 102 sophomore's nursing students. The students were assessed according to how well they understood the use of the personal protective equipment for the purpose of infection control, and how well they could incorporate the infection prevention technology under conditions of cough spray. During the exercises nursing students wore PPE. To utilize N95 masks, the students made all the fitting tests. This study protocol was approved by the Ethics Committee of the University of Hyogo, in Japan.

Results
The responses of 57.8% of the students demonstrated the importance of wearing PPE for droplet infection prevention measures. The students also understood the importance and basis of wearing a mask as PPE by observing the scattered spray. The practice score was 4.1 points. A typical comment was" I was surprised by the range of spray." A goal of more than 4.0 points average proving that they could utilize the N95 mask and the students scored more than 4.3 points

Discussion
This training was highly effective in improving the skill of students with regard to the utilization of N95 masks and increasing their awareness of infection prevention. From their experiences, the nursing students understood the need to find a suitable mask size that suits them. Also, they were able to see the extent of spray with their own eyes.

Abstract ID: 2860

To investigate the separation rate and drug resistance of *Acinetobacter baumannii* in blood specimens of intensive care unit patients

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Introduction
To investigate the separation rate and antibiotic resistance of *Acinetobacter baumannii* in blood specimens and to guide the rational usage of antibiotics.

Method
We retrospectively analysed the constituent ratio and antibiotic resistance of *A.baumannii* in the blood specimens of intensive care unit (ICU) patients during 2012 and 2013 at a large state hospital in Beijing.

Results
During the survey, the hospital detected 360 strains of bacteria from ICU patients' blood specimens. The *A.baumannii* separation rate was 16.39% among all bacteria. They were all pan-drug resistant *A.baumannii* (PDR-AB) and showed high drug resistance and multi-drug resistance, with a resistance rate of more than 80% to 12 of the 15 antibiotics. The resistance rate to *Imipenem* was 100%. Antibiotic resistance rates of less than 50% were only *Cefoperazone/Sulbactam* with 5.36% and *Minocycline* with 34.78%.

Discussion
PDR-AB is one of the important pathogenic bacteria in bloodstream infections in ICUs. There are fewer antibiotics which can be selected for treating PDR-AB . A combination of *Cefoperazone/Sulbactam* and *Minocycline* are suggested for treating PDR-AB bloodstream infections. The ICU should properly control over-usage of *Imipenem* to reduce the development of PDR-AB. At the same time, the ICU should strengthen its environmental hygiene, the disinfection of hands and its sterile operations to avoid the nosocomial transmission of PDR-AB.

Abstract ID: 2868

Antiseptic agents in the treatment of chronic wounds with biofilm: an integrative review

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Introduction
This study aimed to examine the scientific evidence on the use of antiseptics on the healing of chronic wounds with biofilm in humans.

Methods
We conducted an integrative literature review considering publications from January 2000 to May 2014, using the databases COCHRANE, EMBASE, PUBMED, CINHAL.

Results
Twelve studies, who met the inclusion criteria, were included; two randomized clinical trials, one prospective cohort, one systematic review and eight narrative reviews. The randomized clinical trials included have low to moderate methodological quality, according to the Jadad Scale and tested different interventions. Both concluded in favour of the intervention (nanocrystalline silver and polihexadine), but have difficulty in affirming the action of the product tested in relation to biofilm. Both highlighted the number of narrative literature reviews that bring together some *in vitro* studies. The systematic review also examined *in vitro* studies to form its recommendations. A summary of the evidence provided by these reviews demonstrates that the biofilm is responsible for delayed healing and that there is need for improvement of techniques for its detection in wounds. The main antiseptics tested were: polihexadine associated with betaine; cadexomer iodine; xylitol associated with lactoferrin; nanocrystalline silver; honey. The evidence supports the use of the antiseptic agent, combined with debridement, to reduce and even inhibit bacterial load and hinder the accession of new biofilm in the wound bed. Also reinforcing the need for good practices associated with wound care to prevent biofilm formation.

Discussion
Although the studies included in this review indicate the use of debridement and antiseptic agent in the treatment of chronic wounds with biofilm, the evidence is weak and based on studies of low methodological quality., It is therefore, necessary to conduct further methodologically rigorous investigations, in humans, to assert which product is really effective in the treatment of wounds with biofilm.

Abstract ID: 2870

A cross-sectional survey of the use of temporary suspension of visiting during norovirus outbreaks in NHS Boards and the independent care home sector in Scotland

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Introduction
Noroviruses have been described as 'the perfect human pathogens', presenting significant challenges in care-settings as they are highly-communicable and have high survivability in the environment. Norovirus outbreaks are the commonest cause of healthcare service disruption due to ward closures. One means of reducing the incidence of norovirus is by reducing the flow of people 'traffic' in affected areas; this can be done by temporarily suspending visitors (TSV). Although widely publicised in the media, TSV is not currently routine policy in Scotland but it is implemented in some care areas. This study aimed to describe current TSV practice in NHS Boards and the independent care home sector across Scotland.

Methods
An on-line cross-sectional survey of all NHS Boards' Infection Prevention and Control Leads (n=21) and a convenience sample of independent sector care home managers (n=107) in Scotland was conducted.

Results
Analysis revealed distinct differences in the operation of TSV between NHS Boards and independent care homes and within NHS Boards. The majority of NHS Boards (n=13, 61.9%) do not have criteria to guide TSV decisions; conversely, the majority of care homes (n=83, 77.6%) do operate criteria for TSV. Respondents who had implemented a TSV in the last two years identified specific circumstances in which an exception would be made, including terminal illness, when a patient is confused and when the visitor has travelled a long distance or is insistent on visiting. The majority of both NHS (78.9%) and care home (78.8%) respondents believed TSV would be helpful in managing norovirus outbreaks.

Discussion
Our findings suggest that the current gap in policy guidance has resulted in a fragmented picture nationally, with inconsistent practice in evidence. This presentation will provide further detail of the analysis of the current nature of TSV practice across NHS Boards and the care home sector in Scotland.

Abstract ID: 2883

Programs for prevention and control of healthcare associated-infections: evaluation of its performance in hospitals of Parana State, Brazil

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Introduction
Programs for prevention and control of healthcare associated Infections are important components of health systems for the evaluation of quality of health care facilities. However, the quality of these programs has been poorly investigated.

Objective
The purpose of this study was to determine and characterize the performance of these programs in hospitals in the State of Paraná, Brazil. The hypothesis: a minimum 75% in compliance with Brazilian government requirements and international literature.

Method
A prospective cross-sectional study of process evaluation, applying a previously validated instrument consisting of 4 indicators related to the proper performance of the programs according to Brazilian government requirements and international literature. The indicators are: 1) Technical-Operational Structure (TOS); 2) Operational Guidelines (OGS); 3) Epidemiological Surveillance System (ESS); 4) Control and Prevention Proceedings (CPP). The study was conducted from 2013 to 2014 in 50 hospitals.

Results
Overall compliance achieved by these programs was 71.0%. The compliances of each indicator were: TOS-79.4%; ESS-76%; OGS-65.5%; CPP-63.2%.The overall performance was below that previously expected, because of the lower values obtained in OGS and CPP indicators.

Discussion
Programs have minimum suitability for its operation and to perform epidemiological surveillance. It is possible to consider that the appropriate process is hindered due to lack of quantitative and qualitative operational guidelines and actions to control and prevent these infections. Paraná is considered one of the most developed states in Brazil, therefore, the results of this study are alarming and motivate the need to recognize and characterize these programs in other regions of the country. Finally, these indicators evaluation allowed further recognition of the modus operandi of associated infection control programs in health care. Moreover, further investigations need to be developed in order to recognise the impact of the conformity of these programs according to the occurrence of infections in healthcare institutions.

Abstract ID: 2900

Development of index for evaluating compliance on hand hygiene in dialysis unit in Japan

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Introduction
Although many measures for the improvement in hand hygiene (HH) and evaluation of compliance are performed, there is little extant evidence on dialysis units. A direct observation method has been recommended to evaluate HH compliance among health-care workers (HCWs), however, this method takes significant time and workload. Therefore, the purposes of this research were to develop a new index for evaluating HH compliance among HCWs in dialysis units and to examine its validity.

Methods
The formula of the developed index for HH compliance among HCWs in dialysis unit was as follows: Compliance rate ="total number of actual HH opportunities" / "the expected HH opportunities" × 100. To calculate the value of the denominator, we collected the data of its components, which are "disease severity classification of dialysis patients" and "indications for HH (care and treatment during dialysis)", and set the numbers of them. To calculate the value of the numerator, the total amount of alcohol-based hand rub consumption was measured and divided by the amount of one-time usage. This study was approved by the ethical review committee.

Results
To examine its validity, the HH compliance rates by the developed index were compared with those by a direct observation method. The average compliance rate from May to September 2012 by the index was 25.5%, and the average HH compliance by the direct observation method at the same period was 33.4%. The result of regression analysis examining compliance rate by the index for each patient was reasonable as an index to predict the HH compliance rate by the direct observation method ($R2 = 0.549$, $S.E. = 0.061$, $p = 0.01$).

Conclusion
Although it is necessary to examine the expected HH opportunities for different facilities, this developed index could be used as an alternative method for the direct observation to evaluate HH practice.

Abstract ID: 2904

Adopting an alcohol free hand rub into clinical practice

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Alder Hey Children's NHS Foundation Trust

Improvement issue and context
Hand hygiene plays an essential role in infection prevention and control (IP&C).

Alcohol hand rubs are popular. However problems with these rubs may include; skin stickiness/tackiness after use, the need to wash hands after several applications to remove emollient build-up from the skin, damage to paint/plastics/fabrics etc. where alcohol rubs splash/drip during use, limited virucidal efficacy, adverse skin reactions. IP&C at one NHS trust want to implement an alcohol-free hand rub throughout the new hospital which is currently undergoing construction and will be occupied in 2015. The improvement issue was to identify and evaluate a suitable alcohol-free hand rub for use within the new build.

Methods and measurement
In April/May 2013 IP&C identified a water-based, alcohol-free hand rub. Fifty ml tottles were issued to all staff in HDU and cardiology to determine user acceptance of the new product. IP&C monitored product usage and staff feedback over four weeks to determine product suitability for the new build when it opens.

Evidence of improvement
During the evaluation, use of the 50 ml tottles was high and staff had a clear preference for the water-based product over existing alcohol rubs. Feedback from staff was so positive that IP&C adopted the product trust wide, issuing all staff with 50ml tottles of the new hand sanitiser. Within the past 12 months staff have used in excess of 9,000 tottles, indicating excellent user acceptance. Staff were particularly impressed with how the product feels on their hands and the fact it left no tackiness/residue on their skin.

Future steps
Due to its popularity with staff, broad-spectrum antimicrobial efficacy and prolonged antimicrobial effect on the skin IP&C will be installing the water-based product as their hand sanitiser of choice once the new building is complete in 2015.

Abstract ID: 2907

Universal admission screening for antibiotic resistant organisms: assessing compliance for patients admitted to medicine units

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Providence Health Care, Canada

Introduction
Universal admission screening for antibiotic resistant organisms (ARO) was implemented on selected hospital units due to poor adherence with risk factor based targeted screening, and because we serve a high-risk patient population. The objective of this study was to evaluate compliance with universal admission screening for patients admitted from the emergency department to medicine units.

Methods
We conducted a cross-sectional chart review on four medicine units in November 2013. An Infection Control Practitioner (ICP) performed the review using the hospital's patient care management system. Screening compliance was assessed by examining whether (1) the orders for specimen collection were entered and collected, (2) the location of the orders and the collection of the screening specimens (emergency or medicine units), and (3) the time from patient admission to the orders being entered and collected.

Results
Of the 102 patients on the four medicine units, 86 (84%) were admitted from the emergency department and were eligible for chart review. Of these, 66 (77%) patients had screening orders entered and 43 (65%) were from the emergency department. Among those with orders, 61 (92%) had specimens collected, the majority of which (47 [77%]) were collected on the medicine units. Almost all orders were placed (64 [97%]) and collected (56 [92%]) within 72 hours of patients being admitted to the medicine units.

Discussion
A high proportion of patients had ARO screening specimens ordered and collected within 72 hours of admission. Although there is still room for improvement to ensure patient orders are being entered on all patients, this review suggests that universal admission screening can be successfully implemented on selected units. Early detection of ARO colonization/infection among high-risk patients being admitted to hospital is essential to minimize health care associated ARO transmission.

Abstract ID: 2909

Implementing guidance on respiratory protective equipment (RPE)

Lisa Ritchie, Jackie McIntyre, Laura Macdonald
Health Protection Scotland

Improvement issue and context
The legislative requirements and product design features of Filtering Face Piece (FFP3) respirators present unique challenges in healthcare settings. This contributes to low healthcare worker compliance with national guidance on the use of RPE. Furthermore, a wide variety of different respirators are available across NHS Scotland. In this presentation we provide: an overview of the challenges in implementation of RPE; an assessment of the legislation on RPE fit-testing; and thoughts on developing a strategy to optimise RPE use by healthcare staff.

Methods and measurement
Health Protection Scotland (HPS) has engaged with the Health and Safety Executive (HSE), colleagues from NHS Boards and NHS Scotland's National Procurement organisation to agree a national risk assessment for RPE use in healthcare settings. HPS has also examined: the variety of RPE products used across NHS Scotland; alternatives to tight-fitting FFP respirators (e.g. powered respirator hoods), including outcomes from a trial of disposable powered respirator hoods in NHS Forth Valley; the compatibility between NHS Board RPE stock and that of the national stockpile; and opportunities for RPE manufacturers/suppliers to undertake fit-testing across NHS Scotland.

Evidence of improvement
There is now an NHS Scotland agreed risk assessment for the use of RPE in healthcare settings. The number of types of FFP3 respirator in use has been reduced from 23 to six. It is hoped that this will simplify the procurement process and aid standardisation across NHS Scotland.

Future steps
An NHS Scotland-wide risk assessment on fit-testing is under consideration, and HPS is working with RPE manufacturers and product designers to develop a respirator that is better suited to the unique requirements of healthcare settings.

Abstract ID: 2910

Developing a national infection prevention and control manual for NHSScotland

Lisa Ritchie, Jackie McIntyre, Laura Macdonald
Health Protection Scotland

Improvement Issue and Context
In 2009, the Scottish Government tasked Health Protection Scotland (HPS) with developing a national infection prevention and control manual (NIP&CM) to reduce variation and optimise infection prevention and control (IP&C) practices throughout Scotland.

Methods and Measurement
Literature reviews generated IP&C recommendations based on best quality scientific evidence. Expert advisory groups with members from a range of disciplines representing every area in NHSScotland agreed pragmatic recommendations on issues with limited evidence.

These recommendations formed the basis of the NIP&CM, which was developed and finalised through an iterative process of consultations with expert advisory groups and wider stakeholder consultations.

The first chapter of the NIP&CM, Standard Infection Control Precautions (SICPs) was published in 2012 followed by Chapter 2, Transmission Based Precautions (TBPs), in 2014.

Evidence of Improvement
The NIP&CM became mandatory in 2012 under the instructions of the Chief Nursing Officer for Scotland, requesting adoption by all NHSScotland Boards. Feedback has been positive:

"There is now clear standardised information available for clinical staff throughout Scotland. Duplication of effort has been avoided, allowing time to be redirected and re focused into other aspects of providing safe, effective and person centred care at the bedside." [NHS Lanarkshire]

NHS Education for Scotland has developed IP&C educational resources for healthcare staff based on the content of the NIP&CM. The key recommendations in Chapter 1 of the NIP&CM are used by the Healthcare Environment Inspectorate as the basis for their safety and cleanliness inspections of NHSScotland hospitals.

Future Steps
Maintaining the NIP&CM to ensure it remains up-to-date and evidence-based. Consideration is being given to the addition of further chapters to supplement current content, and to the development of a NIP&CM webpage for Scotland. HPS are working with key stakeholders representing social care settings to ensure that the NIP&CM is applicable across all care settings.

Abstract ID: 2915

The introduction of blood culture packs to reduce MRSA bacteraemia and contamination rates

Angela Cobb
Queen Elizabeth Hosptial Gateshead Health NHS Foundation Trust

Introduction
Previously, within the organisation, if a patient has suspected sepsis and blood cultures were required, the necessary equipment for the procedure was collected separately. In 2008/2009 the blood culture contamination rate was above the national expectation at 5% and the health care acquired MRSA bacteraemia rate was ten.

Methods and measurement
A system was developed to ensure all necessary equipment for blood cultures was centrally located with the aim of promoting Aseptic Non Touch Technique (ANTT) and reducing the bacteraemia and contamination rate. Within one year the contamination rate had reduced to the national expectation of <3%.

The Infection Prevention and Control Team (IPCT) worked collaboratively with other Trust staff to ensure correct equipment was available in all clinical areas. An outcome following discussion was that the equipment should be produced in a single pack. Procurement sourced an appropriate sized tray for all of the products to be stored in. However, it was identified that all of the products were from different manufacturers therefore no single company could produce a single pack. To overcome this difficulty, CSSD was approached and asked if they could manufacture a blood culture pack with all of the sourced equipment. This was agreed, trialled and implemented with educational support for the clinical teams from the PDT.

IPCT also supported this focused work with the implementation of an IPCN investigating blood culture contamination results. Difficulty in tracing the individual practitioner was recognised and after discussion with clinicians, an identification label was devised and added to the pack which clearly identifies the printed name of the person taking the blood cultures and if the ANTT was compromised.

Evidence of improvement
The development of the blood culture packs and the named identification labels has assisted in the sustained reduction of the organisations blood culture contamination and MRSA bacteraemia rate.

Abstract ID: 2920

Implementation of glycopeptide resistant enterococci screening - results for action?

Vickie Longstaff, Gema Martinez-Garacia, Monique Laberinto
Homerton University NHS Foundation Trust

Introduction
There were four cases of glyocpeptide resistant enterococci (GRE) isolated from patients on the intensive care unit (ICU). Previously GRE cases were rarely seen. Three of the isolates were sent for pulsed-field gel electrophoresis (PFGE) typing. Two represented a single strain, not previously reported from the hospital. Immediate actions included placing patients on contact precautions, environmental screening, deep cleaning and admission and weekly surveillance screening of patients. There were no new cases for over 2 months. There was however over the next 6 months a number of cases identified from admission and weekly screening swabs .

Methods
Environmental swabs were taken on a number of occasions from various sites, with all results being negative. Deep cleaning of the unit was performed. All patient isolates were sent for PFGE typing. All colonized patients were nursed on contact precautions. A complete review of practices and decontamination took place with the ICU staff. An external review of practices and the environment also took place.

Results
Over a 6 month period there continued to be cases identified from admissions and weekly screening swabs. The PFGE typing results showed there were two main strains. One identified in the first cluster of cases and another strain identified in the second cluster of cases. Both strains had not previously been reported from the hospital. Following implementation of a number of actions from the reviews of the environment and practices the number of cases reduced.

Discussion
Prior to the first cluster of cases the number of GRE cases on the ICU was low. The significance of the typing results from screening swabs was questioned and it was possible that there could be isolates with similar patterns among epidemiologically unrelated isolates. The implementation of a complete review of practices and decontamination processes reduced the number of cases.

Abstract ID: 2922

Aseptic Non-Touch Technique in nail surgery and wound care in podiatry

Mohammed Tamim
Berkshire Healthcare Foundation Trust

Introduction and Rationale
Nail surgery procedures in podiatry pose a higher risk of wound infection than non-invasive procedures. Poor asepsis can lead to the risk of cross contamination of microorganisms from the healthcare workers' hands and/or the equipment to susceptible patient sites, which can result in life threatening infections. The primary objective of the project was to review aseptic non-touch technique (ANTT) practice and adapt the ANTT Standard Operating Procedure (SOP) against best practice guidelines.

Methods & Measurement
The visits have been completed in 7 podiatry clinics in the BHFT East since May 2013. Individual members of staff were also assessed on their hand hygiene compliance based on WHO 5 Moments of Hand hygiene at the point of care.

Evidence of Improvement
We report the score compliance in three aspects of infection control namely five moments for hand hygiene, use of PPE and safe management of sharps during invasive procedure.

Future Steps
It is recommended that the instrument pack should be placed on sterile drape on the table and sterile instruments spread out carefully to ensure they are not touching each other. Staff should pick up the sterile gauze with a nominated hand, dip into saline and pass it to the other hand or use forceps. Staff must ensure that all packs and instruments are available at the beginning of the procedure. Sterile paper towel should be used prior to nail surgery. Staff should avoid over use or unnecessary use of sterile gloves. Apron should be worn prior to hand washing. The challenge remains to embed standard process in all areas to ensure all staff members perform the appropriate ANTT procedure in the Podiatry clinic.

Abstract ID: 2936

Developing an understanding of the culture of visiting time to identify opportunities for reducing the risk of healthcare-associated infection in the older people's ward of an acute hospital

Denise Richards
Poole Hospital NHS Foundation Trust

Introduction
Current developments in infection prevention and control (IPC), whilst acknowledging wider holistic factors, remain for the most part applied to healthcare

professionals. However, professional rhetoric demonstrates concern that the hospital visitor poses a risk to IPC. Such concern can give rise to tension between staff, patients and visitors. This research sought to examine the phenomenon of visiting time so as to provide a greater understanding of the activity taking place on wards during this period, including the people present and the behaviours exhibited. Through identification of the culture of visiting time it was anticipated that targeted and culturally competent approaches to risk reduction could be achieved.

Methods

A qualitative, ethnographic approach utilising non-participant observation and documentary review was used to collect data over a four month period. Data was analysed through domain and taxonomic analysis to identify themes relevant to IPC.

Results and Discussion

Visiting time was found to comprise a complex performance of roles by individuals and groups who whilst sharing the same focus i.e. the best interest of the patient, demonstrate different and competing needs. The central theme identified was a form of *negotiated order*, which whilst serving the goals of individuals was not found to always support best practice in IPC. Opportunities to improve IPC can be achieved through greater understanding of visitor and patient needs with enhanced interaction by healthcare professionals to negotiate in favour of IPC.

Abstract ID: 2937

Implementation of a tuberculosis airborne line list as a tool to improve infection control interventions

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Introduction

Tuberculosis (TB) can be a diagnostic challenge and failure to consider TB on the differential diagnosis can result in exposures and nosocomial transmission. The Canadian TB Standards recommend that airborne precautions be implemented for patients suspected of active pulmonary TB. We developed and evaluated a TB airborne line list (TALL) as a tool for optimizing infection control interventions for patients, including those not placed on airborne precautions within 4 hours of hospital admission.

Methods

TALL is a consistent and systematic approach to identify and follow patients with suspected TB based on acid fast bacilli (AFB) orders from our patient care management system. At two acute care facilities in Vancouver, Canada, from September 2012 - May 2014, the Infection Prevention and Control team reviewed all patients using TALL that were not placed on airborne precautions within 4 hours of admission. Documented reasons for non-adherence with airborne precautions, subsequent interventions and laboratory-confirmed TB cases were reviewed.

Results

Over the study period, 748 patients were identified by TALL and 592 required airborne precautions. Of these, 156 (26.3%) were not placed on airborne precautions within 4 hours. Reasons for non-adherence included: low clinical suspicion (70.5%) and AFBs ordered but airborne precautions not actively implemented (26.5%). Infection control interventions included: consulting with the Medical/Nursing care teams (89.7%), requesting airborne precautions (56.4%) and recommending additional testing (26.9%). Six (3.8%) of these patients were ultimately found to be TB positive.

Discussion

TALL has provided a consistent and systematic approach to identify patients that are not placed on appropriate airborne precautions for suspected TB, to improve communication and awareness with the patient care team, and to recommend additional testing and isolation precautions, as required. Early consideration of TB is imperative to minimize exposures and health-care associated transmission.

Abstract ID: 2947

Understanding factors influencing paediatric nurses compliance with standard precautions: a qualitative study

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Introduction

Healthcare associated infections (HCAIs) are problematic in hospital environments worldwide, resulting in increased patient morbidity and mortality. Healthcare professionals play a vital role in the prevention and control of HCAIs by adhering to evidenced based standard precautions guidelines (SPGs). Non-compliance with SPGs can negatively impact on paediatric patients by increasing their hospital stay, exposing them to the complications of infections and increasing their treatment costs.

Aim

This study was designed to identify how the experience of nursing children affects nurses' decisions regarding compliance with SPGs. It clarifies paediatric nurses' understanding of factors affecting compliance and identifies their perceptions of how to increase compliance.

Methods

This study used a qualitative pragmatic design based on both phenomenology and grounded theory. It was conducted in five Jordanian hospitals and employed purposive sampling of 31 qualified paediatric nurses working in different paediatric areas.

Ethical approval was obtained from the appropriate research ethical committees. Data were gathered from face to face semi-structured interviews which were audio-taped, transcribed and analysed through constant comparative analysis.

Results

Barriers and facilitators to compliance with standard precautions were identified by the participants, with some backed up from peer reviewed literature. The main factors acting as barriers included: workload and poor staffing; negligence; conflicting policies; lack of equipment; knowledge deficit; emergency situations and poor management. The facilitators included: motivation; protection and safety; religious beliefs; cooperation; monitoring and reminder systems. Practitioners highlighted that nursing children impacted both positively and negatively on infection control practice.

Discussions and Conclusion

In general nurses thought that compliance was suboptimal in paediatric departments, but better than in other departments. HCAIs and suboptimal compliance with precautions was viewed as a global problem. Hospital administrators and policy makers should develop effective strategies and policies to improve infection prevention and control programs to find solutions and support compliance facilitators.

Abstract ID: 2949

Characterization of services to prevent and control healthcare-associated infection in Brazil

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Introduction

In Brazil, since 1987, it is mandatory that hospitals must have services to prevent and control healthcare-associated infections (SPCHAI). However, regional and economic differences often define the gap between social reality and law.

Objective

To characterize the SPCHAI in hospitals from Paraná state (Brazil) and to recognize the difficulties in carrying out its activities.

Method
A prospective cross-sectional study, that interviewed nurses of SPCHAI from 50 hospitals with more than 50 beds, between 2013-2014.

Results
The hospitals were general hospitals (82%); had between 51-150 beds (64%); had ICU (70%); obstetric specialty (76%); operating room, medical and surgical clinics (100%). SPCHAI were present in 82% hospitals. The SPCHAI team was composed of nurses (100%), physicians (95%) and pharmacists (34%). Nurses worked daily more hours (8h-63%) than physicians (4h-44%) and pharmacists (≤2h-21%, 6h-21%). The majority of nurses had been working in SPCHAI for more than one year, but they did not have previous experience in SPCHAI before engaging in the service (59%). They sought infection control and prevention knowledge from courses (specialization-95%, short-term courses-85%) and self-taught (76%). The main difficulties of working in SPCHAI were lack of support (88%) and qualification in infection control (80%), non-adherence of the hospital staff to infection control measures. Fewer difficulties were attributed to structure and material resources (14.6%) and support from managers (17%).

Discussion
Paraná, one of the most developed Brazilian states, has not yet established SPCHAI services in all hospitals, after 27 years of implementation of specific legislation and regulation. All SPCHAI heed the mandatory requirement for nurses and other healthcare personnel. Nurses devoted more work hours to SPCHAI. In addition, minor difficulties related to structure, material resources and support from managers show that the main problems for improving the SPCHAI are more related to human resources than to regional and socio-economic differences.

Abstract ID: 2951

Looking for the needle in the haystack: a cluster of pacemaker surgical site infections

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Introduction
Following reports by cardiologists suggesting an increase in permanent pacemaker (PM) surgical site infections (SSIs) in our Cardiac Catheterization Suite (CCS) in June 2013, retrospective review identified nine infections over 4 months. Four cases required explantation.

Methods
We collected epidemiological data from patient and CCS records. We process mapped the patients' journey through observation of practice within the CCS and outpatient clinic and discussions with the teams. Several practice shortcomings were identified, changed and the changes documented in a revised CCS infection control policy.

Results
Lack of information prevented historical PM SSI comparisons. All cases presented within 2 months of procedure in new device implantations or box changes. Five had positive cultures from the wound or aspirate from the surgical site. All micro-organisms cultured were different and all cases were operated on by different personnel. No single point source or cause could be identified but no further SSIs were reported in the twelve months following practice changes.

Discussion
Despite thorough investigation, no single cause or source was identified. Several practice changes were implemented including: changed timing and location of laying out of sterile instruments, better respect of the sterile field, skin preparation technique and antibiotic prophylaxis changes. Poor and dispersed patient and procedure information was addressed by the development of an integrated care pathway. This allows for improved documentation and auditing of the essential elements of the patient's management. No further cases were reported in the twelve months following the interventions. SSIs in PM are rare but serious. Management is traumatic for patients and costly; removal of implanted material requires transfer to a specialist centre in Italy, costing circa €100,000. CCS practices are crucial in preventing PM SSIs and should be audited routinely. Surveillance of PM SSI could result in early identification of clusters.

Abstract ID: 2952

Enhanced cleaning intervention in two DGH acute hospitals in the North East Region

Jean Robinson
C/O Hygiene Solutions Ltd

Introduction
Calderdale and Huddersfield NHS Foundation Trust operates two acute Hospitals with a total of approximately 700 beds. Infection Prevention remains one of our top priorities, and has a key focus from our Executive Board.

Background
New and emerging technologies support strategies of traditional infection control practice to enhance the results achieved. We have evaluated the use of Hydrogen Peroxide Vapour (HPV) decontamination, and the impact this has had on our rates of Clostridium difficile.

Previous studies have shown by statistical analysis that the introduction of HPV decontamination has reduced the incidence of *C. difficile*.

Since March 2013, the Trust has operated HPV decontamination in house with regular cleaning staff. A RAG-Rated cleaning system has been introduced to ensure a risk-based rationale is applied to decontamination. With this clear and concise risk matrix-cum-communication tool, the Trust has been able to ensure to a much greater level that patients are admitted to a safe environment.

Results
The Trust *C. difficile* ceiling was 28 for year 2013/14; the result at the outturn was only 15 post-admission *C. difficile* cases. When compared with other hospitals in the region, this is a significant result, with only 30% of hospitals (3/19) coming within their trajectory. Whilst some of the hospitals in our region have used HPV decontamination, Calderdale and Huddersfield is the only Trust in the region with fully developed and implemented RAG-scoring applied to our cleaning. This shows the importance of a risk-based approach to cleaning and decontamination in order to reduce the spread of infection.

Conclusion
HPV technology (Deprox™, Hygiene Solutions Ltd) has been shown to eradicate important environmental pathogens from environmental surfaces and clinical evaluations have demonstrated an impact on rates of infection.

Abstract ID: 2961

Compliance with hand hygiene for circulating health-care professionals in an operating room setting: an observational study in Japan

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Miyagi University school of Nursing

Background
Compliance with hand hygiene (HH) of circulating health-care professionals (CHCPs) in operating rooms (OR) has not been adequately measured in Japan. Therefore, the purpose of this study was to measure HH compliance for CHCPs in OR using the World Health Organization's (WHO) 5 moments for HH.

Methods
Data collection was conducted at an OR of one general hospital in Japan. A primary researcher performed direct observations of CHCPs who were engaged

in total hip arthroplasty (THA) and total knee arthroplasty (TKA) procedures from April to September, 2012. HH opportunities were observed using the WHO's 5 moments. HH compliance rate was calculated using the following formula: The total number of HH opportunities that CHSPs actually did during the above surgeries / the total number of HH opportunities that CHSPs were required during the above surgeries X 100 (%).The protocol of this study was approved by the ethical review committee of International University of Health and Welfare.

Results

During the study period, 27 THA and TKA procedures were observed. The total observation time was 95.9 hours and the number of the required HH opportunities was 3,916. The number of the actual HH opportunities was 1,187. The mean HH compliance rate was 30.3%.The compliance rate of nurses was statistically significant higher than other CHCPs ($p<0.05$). For the WHO's 5 moments, the compliance rate after contact with body fluids or excretions was the highest, 42.7%. On the other hand, the rate after patient contact was the lowest, 21.7%.

Conclusions

Although the surgical procedures were limited to THA and TKA, this study is the first report of the compliance rate of CHCPs in OR by the direct observation using WHO's 5 moments. The number of HH opportunities which CHCPs were required seems to be higher than for HCWs of wards, and the compliance rate of CHCPs was relatively low.

Abstract ID: 2962

Improving isolation in critical care using the Bioquell Pod

David Tucker
Guy's and St Thomas' NHS Foundation Trust

Improvement Issue and Context

Intensive Care Units (ICUs) frequently care for patients requiring single rooms, including an increasing number who are colonized with multidrug-resistant pathogens; however, single rooms are in short supply in many NHS ICUs. The Bioquell Pod is a semi-permanent structure that is used to provide additional single-occupancy pods in multi-occupancy areas.

Methods and Measurement

Due to a relative lack of side rooms (less than 10% of total critical care beds), two Pods were installed in the ICU. Usage of the Pods was monitored and evaluated through discussions with patients, relatives and staff.

Evidence of Improvement

Installation of the Pods was achieved quickly and with minimal disruption. The Pods enabled isolation of high-risk patients (including CPE carriers), who would otherwise have been nursed on the open bay. Patients and relatives preferred the improvement in privacy and dignity, and especially noise and light reduction at night. In terms of drawbacks, staff noted: increased staffing pressures, isolation from colleagues and tiredness, reduced ability to respond to emergencies, heat gain, and delays in discharging patients to wards (isolation to isolation). Staff noted the following benefits: improved infection prevention and control capacity, increased footprint of the bed spaces, improved physical definition of the isolation cubicles, and the ability to terminally decontaminate using hydrogen peroxide vapour (HPV).

Future Steps

The Pods on the ICU are viewed as a positive addition to existing facilities, and have been generally well received by staff and patients. They have improved the options for housing patients requiring isolation precautions and potentially allow admission of patients with infection risk more rapidly from A&E. The Trust is currently evaluating the installation of pods in other areas of the critical care service and in other services throughout the Trust.

Abstract ID: 2963

The impact of low-level resistance to mupirocin on *Staphylococcus aureus* decolonisation failure: an *in vitro* investigation

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Introduction

Mupirocin is used to treat patients who are nasally colonised with MRSA. Eradication rates up to 80% have been reported, but relapse at 4-weeks is more frequent with strains displaying low-level mupirocin resistance (LLR) compared to mupirocin sensitive (MupS) isolates. The aim of this study was to assess *S.aureus* LLR isolates for *in vitro* tolerance to mupirocin as a route to determining the mechanism underlying decolonisation failure.

Methods

Thirty-four clinical strains of *S.aureus* were evaluated for cell survival after exposure to mupirocin for 24h: 14 MupS (4 MRSA, 10 MSSA) and 20 LLR (19 MRSA, 1 MSSA). Cells were attached to mucin-coated microtitre-plate wells for 4h, planktonic cells removed and surface adherent cells challenged with 200mg/l mupirocin for 24h. Selected strains were then observed over a time-course of 1,4,6,12 and 24h of treatment. After challenge, cell viability was determined using the metabolic-dye resazurin and the percentage decrease compared to untreated adherent cells.

Results

Following exposure to 200mg/l mupirocin (at least 6-fold above the MIC) for 24h there was no statistical difference in the proportion of MupS (mean 14%; range 3-41%) and LLR (mean 16%; range 2-94%) cells that remained viable, though two LLR strains displayed tolerance (72% and 94% remained). Over a 24h time-course all the MupS strains showed a loss in cell viability proportionate to exposure time. Nine LLR strains showed a decrease in viability comparable to the MupS isolates, whilst 6/20 showed an ability to recover before a reduction in cell viability at 24h, and 5/20 demonstrated a clear recovery at 24h. Antibiotic tolerance was genotype independent.

Discussion

Whilst MupS strains were susceptible to mupirocin, 55% (11/20) LLR strains demonstrated tolerance with two strains (10%) showing clear recovery. The tolerance exhibited by a number of LLR isolates might underlie treatment relapse observed in patients undergoing decolonisation therapy.

Abstract ID: 2966

Does converting a ward to single rooms reduce rates of infection? A systematic review

Jon Otter[1,2], David Tucker[2]
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Introduction

Single rooms provide physical segregation of patients, which many consider to be important in reducing the transmission of key hospital pathogens such as MRSA, Clostridium difficile and CPE. However, the majority of bed spaces in the NHS are in multi-occupancy bays. The importance of single rooms in reducing transmission can be inferred by evaluating the impact of converting multi-occupancy bays to single rooms.

Methods

Pubmed was searched using the following term without date or language restrictions: "conversion room infection". In addition, bibliographies of articles identified by the database search were hand-searched. Studies were eligible for inclusion if they reported the impact of converting a multi-occupancy ward into a single occupancy ward including some measure of infection or colonization rate.

Results
A total of seven articles met the inclusion criteria. All studies were performed in the critical care setting. Study lengths ranged from 11 months to 20 years. Two studies included the use of a control ward, whereas five studies evaluated rates of infection before and after the conversion. Infection outcomes varied, including infection / colonization with individual or all pathogens. Six of the seven studies reported that converting a multi-occupancy ward into single rooms reduced infection / colonization rates. The one study that did not identify reduced infection lacked a control unit, and reported low rates of hand hygiene compliance before and after the intervention (18% vs. 24%).

Discussion
It is not clear whether reduced infection associated with conversion to single rooms is due to improved physical segregation of patients, or other factors, such as improved hand hygiene compliance. Furthermore, single rooms can have drawbacks, such as negative patient experiences due to isolation or harm due to reduced observation. Nonetheless, conversion to single rooms is associated with reduced rates of colonization or infection with hospital pathogens.

Declaration of Conflict of Interest
Jon Otter is employed part-time by Bioquell.

Abstract ID: 2970

Carbapenemase producing Enterobacteriaceae: emergence and management in the acute setting

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Background
The first CPE was identified within our Trust during 2009, and the numbers increased considerably during 2010/2011. In order to manage the situation and limit spread, the Trust adopted a proactive response employing a number of management strategies in conjunction with Public Health England.

Aim
To describe the management and control strategies implemented.

Method
The identification and subsequent rise in the number of patients with CPE was raised at Board level and a control strategy put into place to manage the incidence of CPE across the whole organisation. Here we describe the management strategies employed and describe our screening programme.

Discussion
The number of patients in the Trust who are colonised with CPE remains above the national average, but shows no sign of worsening. CPE persists within the Trust despite careful management and interventions since its emergence, due in part to the number of colonised patients who are re-admitted for further care. Enhanced surveillance and proactive management has proved essential in limiting the spread of CPE.

Abstract ID: 2973

Improving isolation capacity in an acute foundation trust using the Bioquell Pod

Caroline Bell
City Hospitals Sunderland

Improvement Issue and Context
Our Infection Control Ward has a mixture of single rooms and bays. Patients with the same infectious disease are cohorted together in the bays; this can result in underutilisation of the ward, as empty beds in mixed bays cannot be used to accommodate patients with different infections. The Bioquell Pod is a semi-permanent structure providing additional single room capacity within bays.

Methods and Measurement
Following extensive consultation with key stakeholders, two Pods were installed into bays on the ward to increase the number of single occupancy bed spaces available. In order to gather feedback, patients; relatives and staff were issued a questionnaire to complete.

Evidence of Improvement
The Pods were installed with minimal disruption, with the bay closed for five days during installation. All other beds on the ward remained open. Six patients and eight staff members completed questionnaires. Patients and staff were satisfied with the Pod in >70% of their responses, and <10% indicated dissatisfaction. Patients commented that the Pods were warm and initially dingy, but that they were spacious and private. Staff commented that the Pods were warm, however increased the capacity for isolation, were high quality appearance, offered increased privacy and dignity and provide more flexibility especially at times of bed pressure.

Future Steps
The Pods have provided a high standard of patient care and greater flexibility in caring for a variety of patients requiring isolation. We believe they have reduced the risk of the spread of infection by increasing side room capacity and negating the need to nurse patients in bays. We hope to extend the evaluation of the Pods for a further six months to gather additional quantitative evidence.

Abstract ID: 2974

Keeping an eye on new ophthalmic procedures

Catherine Cook, Peter Addison, Carlos Pavesio
Moorfields Eye Hospital NHS Foundation Trust

Introduction
In February 2013 the infection control nurses identified from surveillance systems three cases of endophthalmitis following biodegradable dexamethasone implant injections. This was a relatively new procedure approved by NICE in 2011 but published with very low rates of infection. The infection control team had developed a benchmark for intravitreal injections but this procedure was considered to be more complex and have the potential for more severe outcomes. The clinical lead and infection control team agreed to establish the trust rate of infection, centralise data, monitoring and institute control measures for practice.

Methods
The cases of endophthalmitis were retrieved from the infection control surveillance system. The numbers of procedures were obtained from all sites via pharmacy records and clinician records. The clinical lead developed a central data system with pharmacy and implemented a competency process for all new clinicians administering the implant.

Results
Three cases of endophthalmitis were identified from a total of 446 procedures. This resulted in a trust rate of infection of 1:149 or (0.67%). The data showed that most patients had received one implant, but around a quarter had received multiple doses. The patient cases developed endophthalmitis at 1st, 2nd and 3rd dose respectively. Two of the three surgeons involved in patient cases had low levels of experience, however, following competence training no further cases have emerged.

Discussion
The trust rate of 1.149 was considered comparable to the HURON study that reported one possible case of endophthalmitis in 153 procedures. However, it was difficult to benchmark with a similar organisation as the number of procedures excelled other ophthalmic units. There was also limited research into the effect of multiple doses.

Abstract ID: 2979

Validation of the Sanicare compliance program enabling hospitals to comply with epic 3 hospital environmental hygiene requirements (SP1-5)

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Improvement and Context
Sanicare was implemented in a test ward at Royal Liverpool Hospital to determine if making the products available at point of use, ensuring staff receive appropriate training, and the ongoing measurement of the training and ATP levels, would improve the hospitals compliance to epic3 (sp1-5)

Method and Measurement
A test and control ward was used. The program was implemented in the test ward, with no intervention in the control ward. A Qualitative (Training recollection), and Quantitative (ATP on 30 of the same devices) base-line audit was undertaken in both the control and test wards. This was followed by 3 further audits, at 4 week intervals (same days and time of the week).

Evidence of improvement
1) Qualitative Audit
In the control ward the questions were not answered correctly. The test ward results showed an improvement in the questions being answered correctly.

2) Visible clean Audit (epic SP1)
Surfaces in both the control and test ward achieved 100% compliance during the 12 week test period.

3) Quantitative Audit - Utilising ATP
The evidence from the study showed over the 12 week period that the test ward, was able to reduce bioburden from visibly clean surfaces by 72%, whilst the control ward had an increase of 27% from its baseline audit. The improved understanding, technique and frequency of cleaning resulted in improved compliance leading to better cleaned devices.

Future steps
To implement the Sanicare compliance program across the whole Trust.

Declaration of Conflict of Interest
PDI Ltd who supply the Sanicare compliance package provided this package to the Royal Liverpool & Broadgreen Hospital Liverpool. Linda Knight and Glen Harrison are employees of PDI Ltd.

References and definitions
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Abstract ID: 2980

Diagnostic dilemmas and infection control implications for cystic fibrosis

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Introduction
Pulmonary decline, exacerbated by bacterial infection, classically resulted in the early death of cystic fibrosis (CF) sufferers. Due in part to the introduction of rigorous infection control measures and aggressive antibiotic treatment regimes, survival rates have dramatically improved. *Pseudomonas aeruginosa* and members of the *Burkholderia cepacia* complex (Bcc) have the greatest impact on lung health so rapid, accurate identification methods are fundamental to the success of treatment and infection control strategies.

Methods
Precise identification of bacterial pathogens from patients attending a paediatric CF Centre relies on in-house molecular methodology and referral of isolates to a Reference Laboratory. These results were compared to those generated by the BioMerieux Maldi-TOF available on-site and the Bruker Maldi-TOF available in other Scottish Laboratories.

Results
Five isolates catergorised as *P.aeruginosa* on the BioMerieux system were identified by in-house 16s ribosomal DNA sequencing or Reference Laboratory testing as *P.nitroreducens*. On retesting on the Bruker Maldi-TOF all 5 strains were identified as *P.nitroreducens*. Ninety four PCR-confirmed Bcc strains were tested in parallel and both Maldi-TOF machines categorised them within the cepacia complex. At Genomovar level, *B.multivorans* and *B.vietnamiensis* gave concordant results on the 2 systems. All of 28 *B.cepacia* identified on the BioMerieux maldi-TOF were *B.cenocepacia* according to Bruker.

Discussion
Maldi-TOF technology offers the prospect of rapid generation of clinically valuable information to enhance treatment and infection control in the CF setting. Misidentification of *P.aeruginosa* is unacceptable as incorrect segregation and antibiotic management of patients would ensue. Additional concerns apply to inaccurate characterisation of *B.cenocepacia*, which is understood to be the most aggressive Bcc strain and currently precludes lung transplantation. Refinement of Maldi-TOF databases to overcome the anomalies identified in this study is essential before this technology can replace current DNA based identification methods.

Abstract ID: 2984

6 point 60 day hand hygiene campaign

Julie Cawthorne, Janice Streets, Soo Jones
Central Manchester University Hospitals NHS Trust

Improvement issue and context
Hand Hygiene is a fundamental measure in preventing healthcare associated infections (HCAI) yet compliance amongst healthcare workers continues to be low. Studies demonstrate campaigns are effective at increasing awareness and changing behaviour to improve compliance. Developing a bespoke campaign was an approach to promote positive reinforcement to engage and collaboratively work with staff to improve compliance as a fundamental aspect central to delivery of safe patient care.

Methods and Measurement
A multifaceted approach was adopted across the trust with six key themes identified. The intention was to heighten awareness of the importance of hand hygiene to reduce HCAI and improve patient outcomes.

The campaign included; review of the hand hygiene policy; re-launch of a commitment pledge - each division devised a 'commitment to adhere to hand hygiene pledge' for all staff; a challenge campaign- leadership at all levels of the organisation committed to challenge poor practice, the campaign provided a platform to further empower staff in challenging non compliance; engagement with our patients; a review of hand hygiene facilities; and a review of hand hygiene products.

The 6 point 60 day campaign was launched trust wide in October 2013.

Evidence of Improvement
Success of the campaign and compliance was measured through direct observation of hand hygiene practice. Overall compliance increased from 66% to 78%.

Overall Trust Wide Results	October 2013	February 2014
Total Number of Observations	1599	1860
Total Number of Compliance	1050	1457
Trust Wide Compliance (%)	66%	78%

A specific campaign raised the profile using a different method and one that could engage staff in different ways.

Future Steps

The authors acknowledge that the dynamics of behavioural change and the longevity of improved compliance is unknown and we will continue with the concept.

Abstract ID: 2985

Prevalence of hypothermia in surgical patients

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Introduction

Monthly point prevalence audit of Surgical Site Infection (SSI) has been undertaken at University Hospital Coventry and Warwickshire (UHCW) NHS trust including compliance with NICE (2008) SSI guidelines since January 2013. This data collection has shown a number of themes where UHCW were not compliant with NICE recommendations, the most significant being patient hypothermia at pre, peri and post operative stages. The data collected in the point prevalence study has limitations and therefore a temperature specific audit was required to gain a more in depth analysis of hypothermia during -pre, peri and post operative stages.

Methods

Audit was undertaken over a two-week period in September 2013. One hundred and fifty four patient records were collected reflecting approximately 17% of the patients undergoing surgery. Sample size on commencement of the audit was not limited. Previous data collections of similar audits have been varied in response rate and audit completion has been unpredictable. The data was collected on the day of surgery by recovery staff whilst the patient was awaiting theatre to ward transfer. Data collected included: ward temperature; holding bay temperature; peri-operative temperature; and post operative temperature. Further information was obtained via patient identification number. The term "Cold" was applied to temperatures of 35.9C and below.

Results

Results showed those requesting surgical specialities on day of admission had higher prevalence of hypothermia. Those attending theatre cold had a 45% chance of remaining so, of the 97 patients pre-operatively within normothermia range, 97% remained warm post operatively, providing strong evidence towards pre-operative warming.

Discussion

From this audit recommendations have been highlighted including; staff and patient clarification of hypothermia/ normothermia and its links to SSI outcomes, involvement of different groups in data collection to ensure meaningfulness of data to allow behavioural change and improvement of warming equipment availability.

Abstract ID: 2990

How long do SARS and MERS coronaviruses, and influenza survive on dry surfaces? A systematic review

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Introduction

A number of important viruses with pandemic potential have emerged in recent years, including H1N1 and H5N1 influenza, and SARS / MERS coronaviruses.

Methods

PubMed was searched using the following terms with no date or language restrictions: [coronavirus or influenza] AND survival surface OR fomite transmission OR surface contamination OR disinfection transmission. Articles were included if they evaluated survival of influenza of SARS / MERS and their surrogates on dry surfaces in laboratory studies, or in field settings.

Results

Thirty one articles met the inclusion criteria. SARS, MERS and influenza have the capacity to survive on environmental surfaces for extended periods, sometimes measured in months. Important factors that influence the survival of these viruses on surfaces include: strain variation, titre, substrate, suspending medium, mode of deposition, temperature and relative humidity, and the method used to determine the viability of the virus. All these viruses are able to survive in an aerosol for a considerable length of time. Environmental sampling has identified contamination in field settings with SARS and influenza, although the frequent use of molecular methods may not necessarily represent the presence of viable virus.

Discussion

Influenza, SARS and by extension MERS are shed into the environment, can survive for extend periods on surfaces and can be transferred from surfaces to hands. Contaminated hands can then initiate self-inoculation through contact with the nose, eyes or mouth. However, the importance of contact transmission involving contamination of inanimate surfaces is uncertain compared with other routes. The infection prevention and control implications of these findings include the need to wear appropriate PPE to account for contact, droplet and airborne transmission routes, including gloves, gowns, an N95 / FFP3 mask and eye shield / goggles, combined with hand hygiene and enhanced surface cleaning and disinfection.

Conflict of interest

Jon Otter is employed part-time by Bioquell.

Abstract ID: 2807

Current knowledge, attitude and behaviour of hand and food hygiene in a community of a developed country: a cross-sectional study

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Background
Although there is great accessibility and availability to clean water, sanitation and hygiene promotion in developed countries, diarrhoeal incidence has moderately increased over the past years. The aim of this study was to determine the current knowledge, attitude and behaviour towards hand and food hygiene in a developed country so as to provide a better understanding behind the increasing diarrhoeal incidence.

Methods
A cross-sectional study was conducted in a residential area in the west of Singapore from June to July 2013. A total of 1,156 household units were randomly sampled and invited to participate in an interviewer assisted survey using standardised questionnaires. Analyses were performed using descriptive statistics, Fisher's Exact Test and multivariate logistic regression.

Results
A total of 240 units (20.8%) responded and consented to the survey invitation. About 77% of the questions on knowledge and attitude, and about 31% of the questions on behaviour had over 80% choosing the ideal response. Being single [adjusted odds ratio (AOR)=2.29;95%CI=1.16-4.48], having flu in the past six month period (AOR=3.24;95%CI=1.74-6.06), preferred self-medication (AOR=2.07;95%CI=1.06–4.12) were risk factors of diarrhoea. Washing hands with water before attending to children or sick persons (AOR=0.30;95%CI=0.11–0.82), washing hands with water (AOR=0.16;95%CI=0.05–0.45) and water with soap (AOR=0.29;95%CI=0.12–0.72) after attending to children or sick persons, and hand washing between 30 seconds to a minute (AOR=0.44;95%CI=0.20-0.90) were protective factors against diarrhoea. Interventions such as a self-reporting online portal, early emphasis since young age, provision of alcohol-based disinfectant on public transport system, and annual hygiene campaign were well-accepted and may reduce diarrhoea incidence.

Discussion
The good knowledge and attitude of the participants did not completely influence their compliance and motivation to perform good hygiene practices. This lack of compliance may attribute to the increasing diarrhoeal incidence in a developed country.

Abstract ID: 2810

Catheter designs, techniques and strategies for intermittent catheterisation – What is the evidence for preventing symptomatic UTI and improving user acceptability? A Cochrane systematic review

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Introduction
The most frequent complication of intermittent catheterisation (IC) is urinary tract infection (UTI), but user acceptability and ease of use are also important. It is unclear which catheter designs, techniques and strategies affect the incidence of UTI, are acceptable to users and are cost effective.

Objectives
To compare in relation to UTI, other complications and user acceptability: single-use (sterile) versus multiple use (clean) catheters, one catheter design versus another (e.g. hydrophilic-coated versus uncoated), aseptic versus clean catheterisation technique.

Methods
We searched the Cochrane Incontinence Group Specialised Trials Register (updated Sept 2013), reference lists of relevant articles, conference proceedings and contacted other investigators for unpublished data. Inclusion criteria were randomised controlled trials or randomised crossover trials comparing at least two different catheter designs, catheterisation techniques or strategies. Two reviewers assessed the methodological quality of trials and abstracted data as per standard Cochrane methods.

Results
Thirty one studies met the inclusion criteria. A total of 1737 participants were enrolled and 1388 (80%) completed. Sixty per cent of participants were male. There were no significant differences between single-use (sterile) catheters versus multiple use (clean) catheters, aseptic catheterisation technique versus clean technique, or one catheter design versus another. Most studies were small and underpowered. Attrition was a problem which may have led to bias. There was considerable variation in length of follow-up and definitions of UTI. No studies addressed cost effectiveness. Where there were data, confidence intervals were wide and hence clinically important differences in UTI and other outcomes could neither be identified nor reliably ruled out.

Discussion
Despite 31 randomised trials on intermittent catheterisation, there is still no convincing evidence that UTI, other complications and user acceptability are affected by the use of single use catheters, by catheters with specialised coatings or by the use of sterile technique.

Declaration of Conflict of Interest
Katherine Moore was a co-investigator on a trial sponsored by Coloplast (Cardenas 2011) and received products from Coloplast for another trial (Moore 2013). Mandy Fader has received intermittent catheter products for research purposes from Astra Tech AB.

Abstract ID: 2842

Preventing infection workbook - an innovative way forward for delivering IPC education

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Harrogate and District Foundation Trust

Improvement issue and context
We provide an Infection Prevention and Control (IPC) service to 156 GP Surgeries across North Yorkshire. Since April 2013, GP Practices had to register with the Care Quality Commission and achieve compliance with the Health and Social Care Act 2008 which states that all staff receive IPC education.

Methods and measurement
Due to the wide geographical area and number of GP Practices, delivering IPC education face-to-face would be an impractical option as well as e-learning, as many staff encounter difficulties with computer access. Therefore, as we had previously produced a highly acclaimed Workbook for Health and Social Care staff

we concluded that production of a Workbook for all staff in GP Practice would be the best approach.

The innovative A5, 68 page Preventing Infection Workbook and Guidance for General Practice is aimed at not only frontline clinical staff but all groups including receptionists. The Workbook is designed so each member of staff receives their own copy and can work through it at their own pace. It provides latest national guidance and evidence-based information on topics such as Hand Hygiene, Standard Precautions, MRSA, *Clostridium difficile*, MRGNB and norovirus. Each topic includes 'It's a fact' and 'test your knowledge' sections. When 100% competency has been achieved, managers sign the 'Certificate of Completion' at the end of the Workbook, providing evidence for CQC compliance. The Workbook is kept by the member of staff as part of their portfolio of evidence of learning and can be used as a reference guide for day-to-day working.

Evidence of improvement

The Workbook has been extremely well received by all our GP Practices and is viewed as best practice by local CQC inspectors. We aim to make the Workbook available to GP Practices nationally to purchase, with the aim of improving IPC standards and helping GP Practices achieve CQC compliance.

Declaration of Conflict of Interest

The Preventing Infection Workbooks for General Practice were provided free of charge to all our GP Practices. They are now available to purchase nationally at a cost to cover production and printing.

Abstract ID: 2864

Issues concerning the uptake of the seasonal influenza vaccine by nurses working in the long-term older person setting in Ireland

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Introduction

The experience of nurses who work in the long-term care setting for older people regarding the seasonal influenza vaccine is often overlooked, with a paucity of published qualitative studies in the literature. Systematic reviews of the literature acknowledge this deficiency and make reference for the need to explore the specific views of nurses regarding influenza vaccination. Hence, the importance of this study.

Methods

Using a broad qualitative research approach, data was collected through audio taped semi-structured individual interviews. The data was thematically analysed using guidelines developed by Braun and Clarke (2006).

Results

Three main themes arose from the textual data: 1. Knowing- the seasonal influenza vaccine. 2. Mandatory vaccination- Balancing autonomy and control. 3. Meaningful education.

Conclusions

From this study it emerged that nurses' views of the seasonal influenza vaccine may be influenced by multiple complex factors such as media, family, alternative medicine, peers and trusted role models. Unlike some of the findings alluded to in published quantitative data, nurse participants in this study demonstrated some general knowledge of the seasonal influenza vaccine and a desire to protect their patients.

However, participants were unaware of the possibility of asymptomatic carriage by themselves and that the vaccine is inactivated and that collective vaccination is required to elicit protection for older persons in the residential long term care setting. Findings further suggest that the position of nurses within the organization may also impact on how nurses view the seasonal influenza vaccination programme.

A recommendation from this study is that health care policy makers should collaborate with nurses to devise health strategies that incorporate the diverse empirical, aesthetic, and moral ways of knowing that are unique to nurses (Carper, 1978) to reach a concordant holistic policy that considers the well being and concerns of nurses as well as patients.

Abstract ID: 2891

Switching from saline solution to an antimicrobial solution for skin cleansing before urinary catheterization

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Improvement Issue and Context

Urinary catheterisation is linked to a high incidence of catheter associated urinary tract infections (CAUTIs), but taking appropriate action may reduce CAUTIs by 33%. Four hundred and seventy seven patients with a long term urethral or supra pubic catheter are cared for by the local Continence service. Twenty two of the 477 patients were colonised with MRSA on their skin but with no signs of clinical infection. Six patients of the 22 had a history of a positive result for MRSA in the urine.

Methods and Measurement

It was agreed to use an antimicrobial solution instead of saline solution to clean the meatus before urinary catheterisation. The antimicrobial selected needed to have a broad antimicrobial efficacy, be non-irritating, available for single use and cost no more than saline.

Octenilin® cleaning solution sachets (an octenidine based antimicrobial solution) met these criteria. Octenidine is a broad-spectrum antimicrobial active against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Proteus mirabilis*, *Streptococcus pyogenes*, *Klebsiella pneumoniae*, *Escherichia* coli, *Pseudomonas aeruginosa* and *Candida albicans*.

To provide a benchmark, all patients with an indwelling urethral or supra pubic catheter were screened for MRSA in the urine **before** catheterisation and *before* the use of Octenilin solution.

After twelve months, the data will be analysed looking at MRSA in the urine and at the catheter site. Rates of *E. coli* and Klebsiella will also be monitored.

Evidence of Improvement

Early results have been promising. After nine months of antimicrobial solution use, patients have not developed UTI issues post catheterisation. Three patients who had previously tested positive for MRSA (before switching to the antimicrobial solution) continue to be MRSA negative when screened after catheterisation.

Future Steps

Data will continue to be collected and analysed. The community urinary catheterisation protocol incorporating the antimicrobial solution will provide the starting point for the development of a hospital tool.

Abstract ID: 2895

A time limited audit to measure the prevalence of meticillin-resistant *Staphylococcus aureus* (MRSA) in 10 nursing homes over 6 months and to determine whether application of topical decolonisation agent was an effective intervention to reduce the burden of MRSA within the homes

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Introduction

It has been reported that the risk of invasive infection following Meticillin-resistant *Staphylococcus aureus* (MRSA) colonisation increases between four to fifteen fold. The incidence of MRSA colonisation within care homes is unknown in our local population.

Method
A proactive approach to MRSA screening and decolonisation was adopted with the Clinical Commissioning Groups (CCG) and acute trust working together. An Infection Prevention and Control Nurse carried out nasal swabbing of the care home residents to ensure a consistent approach adopted. If a resident was found to be MRSA nasal positive they were prescribed a 5 day course of topical treatments. A follow-up screen 2-3 days post treatment was carried out to determine if the treatment was successful. If a resident remained positive, a second course of treatment was prescribed.

Results
In total, there were 799 MRSA swabs taken during the two completed surveillance periods which were 3 months apart. This consisted of 390 in the first prevalence and 409 in the second prevalence. The MRSA prevalence for the first screen was 10.3% and 6.8% for the second. Forty % of MRSA positive screens from the first prevalence were detected in residents who had a previous history of MRSA colonisation making this a significant risk factor. Patients were treated with Prontoderm® body foam and Mupirocin® nasal gel and had a clearance rate of 80% after one application. By the end of the second surveillance period the overall clearance rate was 100% demonstrating the intervention of decolonisation was effective.

Discussion
This audit demonstrated that a simple approach requiring limited resources can significantly reduce the burden of MRSA. Following the positive results a long term proactive screening regime for nursing and residential homes has been adopted within the health community, based on an 'at risk criteria', which includes residents with wounds, devices, new residents and recent hospital discharge.

Abstract ID: 2925

Knowledge, attitude and practices regarding personal hygiene of food handlers in Kuala Lumpur, Malaysia: A pilot study

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Introduction
Foodborne diseases have caused a significant morbidity and mortality around the world. Food safety is an increasingly important public health issue since years ago until now. Food handlers have a major role in the prevention of food poisoning during food production and distribution. However, food contamination by food handlers could occur and leading to foodborne diseases if they lack knowledge and neglect of their personal hygiene on food handling practices in their premises. This study was aimed to assess the level knowledge, attitude and practices among food handlers in Kuala Lumpur.

Methods
A cross sectional study was carried out on 30 food handlers. The information consisting of demographic, knowledge, attitude and practices on personal hygiene was collected using self-administered questionnaire.

Results
Overall results showed that the majority of the food handlers had a good knowledge, attitude and practices on personal hygiene. Analyzed data obtained stated that mean score for knowledge is 2.84±0.10 out of total 3 respectively, attitude is 4.38±0.25 and practices is 4.37±0.68 out of total 5 respectively.

Discussion
This study revealed that, although food handlers personal hygiene knowledge, attitude and practices were good, some of the hygiene aspects need to be emphasized. However, more effort is needed such as continuous education and food safety training should be provided periodically and frequently in order to minimize foodborne hazards.

Abstract ID: 2927

Knowledge, attitudes and practice of hand hygiene among parents of nursery children in Ampang, Selangor- a pilot study

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Universiti Sains Islam Malaysia

Introduction
Infections spread easily among children in nurseries due to overcrowding and their natural intimacy. Contact transmission is preventable through proper hand hygiene and good sanitation. This is a pilot study that evaluated knowledge, attitudes and practice (KAP) of hand hygiene among parents. Further study will focus on KAP among parents and caregivers in nurseries and its association with *Staphylococcus aureus* nasal carriage.

Methods
This cross-sectional study involved 30 university support staff who sent their children to nurseries. Participants were given questionnaires consisting statements related to personal hand hygiene, hand hygiene practices during the care of children and infection related to poor hand hygiene.

Results
The mean score for knowledge of hand hygiene was 2.71 ±0.257 out of 3. Meanwhile, the mean score for attitude and practice of hand hygiene were 4.59 ±0.395 out of 5 and 4.54 ±0.362 out of 5 respectively.

Discussions
Overall results showed that the majority of parents had a good understanding of hand hygiene. However more effort is needed to ensure good hand hygiene technique is taught as early as in nurseries and practiced in the community. This is very important for prevention of communicable diseases in the community.

Abstract ID: 2935

MRSA care in the community-why education matters

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Introduction
In primary care, patients are prescribed decolonisation treatment to eradicate meticillin-resistant *Staphylococcus aureus* (MRSA). This complex treatment process requires the patient to apply a topical antimicrobial treatment as well as adhering to rigorous cleaning regimes to ensure the environment is effectively managed. Patients have to apply treatment correctly in order for it to successfully eradicate MRSA from the skin. Patients need adequate information about this to allow them to complete the treatment regime effectively.

Methods
A pilot study was carried out which involved developing an enhanced nurse-delivered education tool, training a community nurse to use it, and then testing its use with a patient. Three interviews were carried out; one with a patient who received usual care, one with a patient who received the enhanced education and one with the community nurse who delivered the enhanced education tool.

Results
The patient who received the enhanced education reported better knowledge and understanding of the application of treatment and ways in which they could prevent the spread of MRSA compared with the patient who did not receive the enhanced education.

Discussion
This study compared one patient who had received enhanced education, with one who had not. This study suggests improved knowledge around MRSA for

both the community nurse and the patient and is therefore more likely to ensure treatment is both adhered to and effective. The interviews highlighted that providing patients with topical treatment regimens is not enough. More detailed information about how and when to use the treatment and the importance of maintaining a clean environment is an essential part of the treatment and is likely to make an important contribution to treatment outcomes. This pilot study highlights the need for further research to establish more effective ways to educate patients around the management of MRSA in primary care.

Abstract ID: 2943

Ulcerative keratitis: Lifestyle, other risk factors and treatment outcome

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Introduction
Ulcerative keratitis can be caused by infectious and noninfectious factors, potentially leading to significant visual morbidity. Regardless of the underlying etiology, it may be complicated by secondary microbial infections, which contribute further to disease burden and worsening prognosis. As in many cases the disease and its complications can be preventable, understanding, detecting and managing it promptly is critical.

The aim of the study was to identify the predisposing risk factors in patients with corneal ulcers and evaluate the management outcome.

Methods
The medical records of patients with signs and symptoms of ulcerative keratitis within a one-year period (2013-2014) were reviewed retrospectively. Age, gender, socioeconomic status, ophthalmological and other medical history, contact lens wear and smoking as potential risk factors were evaluated.

Results
A total of 27 patients (16 males,11 females), with mean age 52 years, all high school graduates, were enrolled to the study. None of them received treatment prior to hospital visit. Trauma was detected in 32% of them. The percentage of contact lens wearers was 23%, while 15% had a medical history of herpetic keratitis, 13% had bullous keratopathy and 5% history of corneal transplant. Twenty eight of the participants were smokers. The location of corneal ulcer was central in 48% of them. In 13% of the cases an organism was identified in corneal scraping culture while all responded positively to treatment (antibiotics with later addition of corticosteroids), apart from a patient with history of keratoplasty, whose eye was subsequently enucleated. There was a positive correlation between trauma and contact lens wear with gender (male) and age (young patients).

Discussion
Trauma and contact lens wear are the most important risk factors for corneal ulcers. Public health education about the potential visual loss, preventative measures and significance of timely and appropriate intervention is recommended as prognosis can be good.

Abstract ID: 2944

Acknowledging a rare cause of herpes simplex reactivation resulting in keratitis: report of an interesting case

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Introduction
Glaucoma is one of the leading causes of preventable blindness and prostaglandin analogues have been used widely in its therapy. There have been few case reports in the literature suggesting the potential association between the topical use of prostaglandin analogues and herpes simplex virus (HSV) recurrence causing keratitis. We present a case of HSV keratitis reactivation following the instillation of tafluprost for glaucoma management, and the lessons learnt.

Methods
A 65 year old female patient attended the outpatient glaucoma clinic of our hospital complaining of blurred vision, pain, redness, tearing, photophobia and foreign body sensation in her right eye. She had been under the care of the same clinic after being diagnosed with ocular hypertension and increased risk for glaucoma. She had been treated with prostaglandin analogue (first line treatment) for a week before the development of the above mentioned symptoms. The patient's past medical history was insignificant for immune system disorders, other infections, receipt of immunosuppressant medications or corticosteroids.

Results
The slit lamp examination revealed a linear-branching dendritic ulcer with characteristic terminal buds, located centrally, stained well with fluorescein, accompanied by reduced corneal sensation, which is pathognomonic of HSV corneal infection. Prostaglandin analogue was discontinued and treatment with antiherpetic agents (acyclovir ophthalmic ointment 3% applied five times daily) and lubricants was initiated. After 2 weeks of therapy, the dendritic ulcer was resolved and the patient's vision was restored to pre-event levels in 2 months' time.

Discussion
It has been reported that the final pathway of HSV reactivation appears to be mediated by prostaglandins. Therefore, prostaglandin analogues should be prescribed with caution in patients with previous herpetic infections and especially those with history of HSV keratitis. Case reports like this can promote awareness between health care professionals for the unusual side-effects of commonly used medications.

Abstract ID: 2945

Unexplained intraocular inflammation, but not inexplicable: is syphilis the answer?

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Introduction
Syphilis, an infectious systemic disease that mimics various clinical entities, has re-emerged in several developed countries. The aim of the study is to present a case of acute, progressive visual loss caused by syphilitic intraocular inflammation and to highlight the importance of considering the 'great imitator' in the differential diagnosis of similar cases.

Methods
A 45 year old male was referred to our clinic from an ophthalmologist in private practice with the diagnosis of acute retinal necrosis possibly secondary to cytomegalovirus. He reported a 10-day history of acute, progressive visual loss in the left eye. Past medical and family history were unremarkable. The findings of the ophthalmological examination were as follows: best-corrected visual acuity (BCVA) 10/10 in the right eye and counting fingers at 30 cm in the left eye, anterior uveitis (hypopyon)/posterior uveitis (vitritis) and multiple retinitis foci. A thorough laboratory investigation including ANA, ANCA, RF, CMV IgG/IgM, HSV-1 and 2 IgG/IgM, VZV IgG/IgM, T. gondii IgG/IgM, HIV, was performed. Inpatient treatment with IV acyclovir and methylprednisolone was started.

Results
A reduction in retinitis foci number was observed, the hypopyon was diminished and the visual acuity of the LE was improved to 1/10 after 2 days of treatment. Interestingly, after day 10, a deterioration of the visual acuity occurred, with an increase in the number of retinitis foci, while similar symptoms and signs in the other eye were developed. Corticosteroids were discontinued and laboratory testing for syphilis (RPR, VDRL, FTA-ABS) turned out to be positive. Treatment with IV penicillin G was initiated with subsequent improvement.

Discussion
Syphilis serology should be considered to be mandatory in all patients presenting with unexplained intraocular inflammation. It is relatively inexpensive and reliable tool to unmask the great imitator. Syphilitic intraocular inflammation has excellent prognosis with early and adequate treatment.

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Optic neuritis in a young cattleman: Ocular brucellosis or multiple sclerosis?

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Introduction
Ocular brucellosis can affect any ocular structure and present with a variety of symptoms. Multiple sclerosis is a well-known cause of optic neuritis. Our purpose is to present a case of optic neuritis of unspecified etiology, with involvement of Brucella infection.

Methods
A 25-year-old male presented at the outpatient department of our hospital complaining of acute visual loss in his right eye with no associated symptoms and signs. He was a cattleman and his personal/family history was unremarkable.

Results
The results of the ophthalmological examination were: visual acuity of counting fingers in the right eye, positive relative afferent pupillary defect (RAPD), colour vision of 0/13 on Ishihara plates, normal anterior segment. Fundoscopy revealed inflammation of the optic disc vasculature with exudation of fluid into the peripapillary retina. These findings were compatible with acute neuroretinitis and optic neuritis confirmed by OCT examination. The rest of the clinical examination identified low-grade fever (37.5oC), liver and spleen enlargement and truck lymphadenitis. Blood laboratory tests detected an increased white cell count while both the Widal and Wright tests were positive, with the titer of the latter being >1:320. Blood cultures were negative for Brucella spp. MRI of brain and orbits showed few non-specific white matter lesions and isoelectric focusing of CSF detected oligoclonal bands, all suggestive of MS. The patient was treated with steroids IV (1g pulsed for 3 days and subsequent tapering) with a dramatic improvement of his ocular symptoms and signs. Systemic antibiotics (doxycycline) were also added to medication.

Discussion
Brucellosis remains an important health problem in many developing areas. Ocular involvement in brucellosis has been reported before. The signs and symptoms of it can be nonspecific, mimicking those of other diseases. Therefore, it should be taken into consideration in differential diagnosis of optic neuritis, especially in high-endemicity areas.

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Bilateral herpetic keratisis secondary to long-term immunosuppression – How to prevent the worst

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Introduction
Herpes simplex keratitis is, in general, a unilateral disease, but bilateral occurrence has also been reported especially in patients with compromised immune system. We report a case of a patient with Subcorneal Pustular Dermatosis (Sneddon and Wilkinson syndrome) who developed bilateral herpetic keratitis related to long–term immunosuppresion.

Methods
A 78 year old female patient was admitted to the Department of Dermatology for the investigation of skin lesions, resulting in the diagnosis of Subcorneal Pustular Dermatosis (Sneddon and Wilkinson syndrome) and treatment with dapsone. She developed haemolysis as a side effect of the above medication and she was started on corticosteroids. After 3 weeks of the initiation of corticosteroid treatment, the patient complained of blurred vision, pain, foreign body sensation, tearing and redness in both eyes and an ophthalmological evaluation was requested.

Results
The slit lamp examination revealed characteristic dendritic corneal ulcers in both eyes, which were suggestive of HSV keratitis. They were associated with reduced corneal sensation. The patient was treated with antiviral agents (acyclovir 3% ointment five times daily) and lubricants with a good outcome.

Discussion
Patients with systemic diseases on long-term corticosteroid treatment are immunosuppressed. Therefore, they are at high risk for reactivation of latent HSV infections. Although herpetic keratitis involving both eyes is rare, it is more often seen in patients who are immunocompromised. These patients should receive regular and thorough ocular examinations aiming for an early diagnosis and treatment of this condition.

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Championing infection control in care homes: the Anglia experience

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Improvement issue and context
Compliance with infection prevention and control standards in care homes are a marker of quality of care. In the past there was a large variation, from none to regular workshops, in provision of support and training for care home staff from different NHS organisations. From experience of managing communicable disease outbreaks and remedying inappropriately managed situations we have identified lack of training as the main underlying issue. There are over 600 registered care homes in our area.

Methods and measurement
1) To provide infection control training for care home staff. 2) To acquire a picture of existing training. 3) To introduce the concept of a Champion role. As well as a programme that would be of interest to staff attending and develop their knowledge, we wanted to acquire a picture of what already existed in the provision of infection control training. We also wanted to introduce the idea of an infection control champion in each home. We conducted 2 training events. A total of 118

staff attended. From workshop discussions we found a wide variation in infection control training provision, although most had this at induction and the majority had an annual refresher. Many reported in-house training; some private companies, several used e learning programmes or DVD. Quality was described as good to poor.

Evidence of improvement

High expectations were expressed re the Champion role and the level of influence and knowledge they would require. All staff expressed preference for face to face, group learning rather than e learning. The aim is a reduction in duration of outbreaks and number of exposed vulnerable individuals, potentially reducing complications arising from the illness; leading to a reduced burden on the wider health economy.

Future steps

Develop training programme for the Champion role. Maintain network of infection control Champions.