

HIS Spring Meeting 2018 – Outbreaks
Wednesday 23 May 2018 | Royal College of Physicians, London

Programme

09:00 – 09: 40	Registration and coffee	
09:40 – 09:45	Welcome	David Enoch, Cambridge University Hospitals NHS Foundation Trust
09:45 – 10:15	An outbreak – Gram negatives CPE outbreak Addenbrookes	Rachel Thaxter and David Enoch, Cambridge University Hospitals NHS Foundation Trust
10:15 – 10:45	An outbreak – Gram positives MRSA outbreak in NICU at Addenbrookes	Sue Broster and David Enoch, Cambridge University Hospitals NHS Foundation Trust
10:45 – 11:15	An outbreak – Fungal: <i>Candida auris</i> – A Global Outbreak	Elizabeth Johnson, PHE Mycology Reference Laboratory
11:15 – 11:45	Coffee and tea	
11:45 – 12:15	Managing outbreaks to reduce errors	Evonne Curran, Glasgow Caledonian University
12:15 – 12:45	Outbreak Surveillance at Local and National Level	Eleri Davies, Head of Healthcare Associated Infection, Antimicrobial Resistance & Prescribing, Public Health Wales
12:45 – 13:00	HIS General Meeting (members only)	



13:00 – 14:00	Lunch	
14:00 – 14:15	Investigation of widespread infections with <i>Pseudomonas aeruginosa</i> following ear piercing	Peter Hoffman, PHE Antimicrobial Resistance and Healthcare Associated Infections Reference Unit
14:15 – 14:30	Narrowing the gap – national rules for screening for MRSA in neonatal intensive care units (NICU) need careful scrutiny	Pernille Ripadal, Aalborg University Hospital, Denmark
14:30 – 14:45	Infection trainees outbreak training experience 2018	Joanna Walker, SpR Microbiology and Infectious Diseases, NHS Grampian
14:45 – 15:15	The cost of an outbreak	Jon Otter, Imperial College Healthcare NHS Trust in London
15:15 – 15:45	A very private outbreak	Jenny Child, Harrogate and District Foundation Trust
15:45 – 16:15	Outbreaks – what you find if you look	Tim Boswell, Nottingham University Hospitals NHS Trust
16:15 – 17:00	Refreshments and networking	



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Speaker abstracts

An outbreak – Gram negatives and CPE outbreak Addenbrookes - Rachel Thaxter and David Enoch, Cambridge University Hospitals NHS Foundation Trust

We present our findings of an outbreak of NDM-producing *Klebsiella pneumoniae* on our intensive care unit and colorectal ward and describe the interventions we did and problems we encountered along the way.

An outbreak – Gram positives and MRSA Outbreak in NICU at Addenbrookes - Sue Broster and David Enoch, Cambridge University Hospitals NHS Foundation Trust

When an outbreak occurs in a clinical area this has a huge impact on those beyond the laboratory, infection control and public health teams. This talk provides the perspective of a clinical team during an MRSA outbreak and what this meant for clinical practice, patient care, staff, families and referring units. In the NICU there is the added vulnerability of our patients some born as early as 23 weeks and weighing less than 500g, whilst as a referral centre for specialist care the impact of reducing activity and closing cots whilst we tried to contain the outbreak had implications well beyond just our own service. This talk provides an opportunity to reflect, learn and share from our experiences.

An outbreak – fungal: *Candida auris* – a global outbreak - Elizabeth Johnson, PHE Mycology Reference Laboratory

Most systemic yeast infections are endogenous in origin and until recently fungal outbreaks involving yeast species were rare and involved small numbers of patients in single units. This talk will discuss the emergence and global spread of *Candida auris*, a pathogenic yeast first recognised in 2009, that has subsequently caused numerous nosocomial candidaemia outbreaks in high intensity care settings on five continents. Mortality rates as high as 60% associated with deep-seated *Candida auris* infection have been reported in many countries, although the UK experience to date does not support this, with no reported attributable mortality to date despite more than 60 clinical infections and more than 200 isolations in total. *Candida Auris* often displays drug resistance, most often to fluconazole but many strains are also resistant to other azoles and sometimes several different antifungal classes. In addition to a worrying innate drug resistance profile, drug resistance also appears to develop quite readily on



therapy. This yeast has a propensity to spread from patient to patient and to persist in the environment and index cases are often associated with multiple cases of colonisation of patients in

adjacent areas, sometimes leading to subsequent infections. Even with rigorous infection control measures UK outbreaks have been difficult to control. Three of the four recognised clades of *Candida auris*, each of which is associated with emergence and subsequent spread in a defined geographical area, have been found circulating in the UK suggesting multiple independent introductions.

Managing outbreaks to reduce errors - Evonne Curran, Glasgow Caledonian University

I will work through a published outbreak using ways of working designed to reduce the risk of errors by those who manage outbreaks. When managing outbreaks, the focus is more commonly on finding the system errors which provoked the outbreak. However, this presentation will illustrate the benefits of error reduction to ensure that the goals of stopping the outbreak and finding out why it happened proceeds without deviation or delay. This is vital because when there are errors in outbreak management, or just delays in getting to the right decisions, people suffer.

These ways of working are:

- Having a plan (1 side of A4) <http://www.documents.hps.scot.nhs.uk/hai/infection-control/toolkits/hospital-outbreak-management-2013-05.pdf>
- Working as a team
- Using Situation Awareness – adapting a tool on airplane safety from Dr Mica Endsley https://en.wikipedia.org/wiki/Mica_Endsley to optimise outbreak decision-making by identifying:
 - Perception: What is happening?
 - Comprehension: So what?
 - Prediction: What will happen next if nothing happens?
- Applying High-reliability Characteristics https://en.wikipedia.org/wiki/High_reliability_organization .
 - Sensitivity to operations – what are the present risks?
 - Commitment to resilience – good as we are how can we strengthen our system?
 - Preoccupation with failure – where are we most vulnerable?
 - Deference to expertise – who do we need to help us?
 - Reluctance to simplify – not dismissing data which indicates investigations are needed. <http://drillscience.com/DPS/Organizing%20for%20High%20Reliability.pdf>

Links to 2 Outbreak Columns which illustrate the above are provided:

<https://www.ncbi.nlm.nih.gov/pubmed/28989433>



Outbreak Surveillance at Local and National Level - Eleri Davies, Head of Healthcare Associated Infection, Antimicrobial Resistance & Prescribing, Public Health Wales

A decision has been taken in Wales to procure the ICNet system for use across all the Health Boards and Trusts in Wales in support of the IP&C teams and to facilitate whole Health Service linkage of IP&C alerts and surveillance. We are currently implementing at local hospital / Health Board level and developing enhanced surveillance at national level using the ICNet Enterprise Monitor platform. One of the enhanced surveillance modules is an Outbreak Surveillance module. This talk will consider the use of surveillance in early identification of outbreaks at local level, the possible benefits of a linked surveillance system across a region and the plans for a national outbreak surveillance programme.

Investigation of widespread infections with *Pseudomonas aeruginosa* following ear piercing - Peter Hoffman, Jane Turton, Dervla Kenna, Zoë Payne, Amy Coward and Noshin Sajedi, Antimicrobial Resistance and Healthcare Associated Infections Reference Unit, Public Health England

In autumn 2016, 2 clusters of *Pseudomonas aeruginosa* infection following ear piercing were reported (more followed soon after, with 11 hospital groups submitting isolates as the eventual total). A batch of contaminated equipment was initially suspected. Within a few days, the main focus moved to an aftercare solution manufactured by a tattoo and piercing supplies company. Samples from used and unused bottles, plus those from the equipment used to manufacture it showed the same strain as was isolated from infections. Out of 3,245 isolates typed by the reference laboratory during 2016, the 68 isolates associated with this outbreak were the only ones of this type. As records of the aftercare solution's distribution were not made available to the investigation, warnings had to be issued via local Environmental Health Departments and piercing networks about this solution (which could be labelled either as from the supplier or with just the piercing salon's name). The investigation then moved to a more legal level with a prosecution of the supplier by their local Trading Standards Department. At the time of writing, the company and its director have pleaded guilty to eight charges of breaching cosmetic product enforcement regulations.

This outbreak involved PHE epidemiologists, a variety of laboratories, Environmental Health Departments and Trading Standards. It was identified and curtailed rapidly. This talk will give an outline of events.



Narrowing the gap – National rules for screening for MRSA in neonatal intensive care units (NICU) need careful scrutiny - Pernille Ripadal (Presenting Author), Anne Kathrine Schultz Christensen and Jens Yde Blom, Aalborg University Hospital, Denmark

In June 2017, an outbreak of MRSA occurred in a neonatal intensive care unit (NICU) at Aalborg University Hospital. Twenty-three persons were affected by the outbreak; Nine premature children, eight parents/siblings and six staff members. The outbreak strain was a human MRSA CC88 st690.

The strain is known in Denmark as related to migrants from the Middle East. A family from the Middle East was among the infected. Investigations revealed that the family harboured the phylogenetically oldest isolate of the strain, thus likely being the index patients. According to national rules, set by the National Health Authority, screening protocols in hospitals for MRSA do not particularly concern migrants. According to regional rules, migrants should be screened before entry to the NICU if they have arrived to the country within the last 6 months. The particular family had stayed in the country for one year. Earlier experience with migrants in the North Jutland region shows that MRSA can occur in a carrier mode far longer than 6 months. The evidence for a 6 month's screening window appears to be poorly described in the literature and probably based on best practice. The question, therefore is: How can we prevent outbreaks with more prudent screening protocols to avoid transmission of MRSA to fragile neonatal patients?

**Infection Trainees Outbreak Training Experience 2018 - Dr Joanna Walker, SpR
Microbiology & Infectious Diseases, NHS Grampian**

Introduction Outbreak management is an essential duty of all Infection doctors whatever their designated role. Its inclusion in JRCPTB Curricula for all Infection Specialties reflects its importance. Trainees gain knowledge and vital experience of the principles of outbreak management during training and the topic is incorporated into examinations. An audit of Infection trainees' experience of outbreak training was completed in February 2018 to assess their perceived requirements for outbreak training.

Methods Medical Microbiology, Infectious Diseases, and Virology trainees were identified across four training centres including NHS Lothian, NHS Greater Glasgow and Clyde, NHS Grampian, NHS Tayside, and twenty four questionnaires on outbreak training were completed during February 2018.

Results 90% of trainees have found no good online learning resources for study on outbreaks; 87% of trainees reported having only a minor or no role in outbreaks occurring in their local hospital; 86% were concerned this would negatively impact on their ability to manage outbreaks as consultants; 87% actively seek new means to increase their outbreak experience and understanding.

Discussion The UK Medical Postgraduate Shape of Training agreement signals decreases in the length of Infection Specialty training. With increasing local service demands, opportunities for trainee outbreak experience may diminish. New innovative approaches are required to reproduce



effective outbreak experiences for trainees. The UK Infection Societies are well placed to respond. Trainees want to seek out and engage with Infection Societies offering creative training opportunities and online resources to facilitate this key aspect of their training.

The cost of an outbreak - Jon Otter, Imperial College Healthcare NHS Trust in London

We know that outbreaks can be expensive. But how do we go about performing accurate economic evaluations in outbreak settings? In this talk, I will relate our experience of constructing a detailed economic evaluation of a CPE outbreak that cost an NHS Trust more than £1m over the space of 10 months. This will highlight the difference between 'opportunity costs', that don't hit the hospital's balance sheet but are financially viable, and 'actual expenditure', which changes the hospital's bottom-line balance sheet. Also, how do the costs that we identified compare with costs published elsewhere? And finally, how can an accurate assessment of the costs of outbreaks and HCAI in general be used to inform cost-effectiveness evaluations and drive quality improvement?

A very private outbreak - Jenny Child, Harrogate & District Foundation Trust

This was a microbiologically confirmed outbreak involving at least three patients who developed MSSA septic arthritis, one with an associated bacteraemia, following an intra-articular steroid injection by a private physiotherapist. They had been treated sequentially. The MSSA isolated from joint fluids, blood culture and screening swabs from the physiotherapist were shown to be the same by spa typing. The three were admitted to a local NHS acute hospital for treatment, and between them clocked up 66 inpatient bed days, 13 procedures under GA, and 18 follow-up clinic appointments.

Outbreaks – what you find if you look - Tim Boswell, Nottingham University Hospitals NHS Trust

Dr Boswell will describe a variety of outbreak investigations from his experiences as Infection Control Doctor at Nottingham University Hospitals. Whilst the majority of hospital based outbreaks are usually relatively straightforward to manage and control, detailed investigation of more unusual outbreaks can demonstrate transmission related to colonised healthcare workers, unexpected environmental sources or unusual breakdowns in healthcare procedures.



Poster abstracts

Endoscope washer disinfectant failure that could have resulted in an outbreak - Dr Olly Allen, Royal Papworth Hospital NHS Foundation Trust

In May 2017 inconsistent consumption of peracetic acid (disinfectant) in the endoscope washer disinfectant (EWD) was noted: the acid is being used up at a slower rate than the buffer.

A total of 21 cycles of disinfection with potentially insufficient amount of disinfectant have been identified.

Assuming the worst case scenario when no peracetic acid injected into the chamber, the endoscopes would not be disinfected from date the problem started. The incident was investigated as a potential outbreak with transmission of various infections via EWD. The timeline was drawn and the endoscopes and patients affected have been identified.

After conducting a thorough look back exercise, the risk to patients from bacterial infections, blood born viruses (BBV) and vCJD (Variant Creutzfeldt–Jakob disease) was deemed to be low for two reasons:

- 1) information about BBV status for some of the patients involved, found by testing as part of their treatment ruled out this risk as they were negative. For patients who were not tested, the medical history was checked and did not reveal a history of BBV's.
- 2) the endoscopes would still undergo a manual cleaning process and the washing cycle with a detergent in the EWD (some endoscopes - several times). This step removes biological material (blood, tissue etc) that potentially might contain viruses or CJD protein.

Despite the fact that the risk of transmission of infections appeared to be extremely low on this occasion, the incident demonstrated how EWD errors could lead to an outbreak and highlighted the importance of having safeguard mechanisms in place to prevent decontamination failures.

Outbreak of *Legionella pneumophila* serogroup 5, subgroup Cambridge - A lesson learnt - Jens Yde Blom (Presenting Author), Dorte Fromberg and Philip K. Thomsen, Aalborg University Hospital, Denmark

Legionnaires' disease is a potentially fatal disease, particularly in immunocompromised patients. Hot water lines are often the source of *Legionella* bacteria. Ice machines have also been established as a source of Legionnaires' disease.

Two patients were diagnosed in May 2014 in the Haematology ward, and hot water tap samples revealed 6,000 cfu/L *Legionella pneumophila* serogroup 5, Cambridge (LP5). Standard precautions to minimize patient exposure were initiated. Later control samples showed 100 cfu/L.



In November 2016, a third patient in the ward was diagnosed with LP5, and water samples showed 1,000 cfu/LLP5. The hot water line was pasteurized, and legionella filters mounted on water taps, showers, and the cold water line to the ward's ice machine.

In September 2017, two intensive patients were diagnosed with LP5 in another building. Investigations pointed to the ice machine, although the machine received water through a legionella filter. A water sample from the machine showed 1,000 cfu/L LP5.

All ice machines in the hospital are serviced every 6 months in the same workshop, and after maintenance and disinfection, the water line in the machines are flushed with cold tap water. A sample from the tap revealed 200 cfu/L LP5. It is likely that all machines were contaminated during maintenance. A legionella filter was mounted to the cold water tap to prevent further contamination of ice machines.

What factors influence the control of Tuberculosis in Emergency Centres in the Western Cape, South Africa? -- Dr Helen Casey (Presenting Author), Dr Bernard Manyena

Introduction The Western Cape in South Africa has a high burden of tuberculosis with rising levels of multi-drug resistant disease. Recent focus has been on the number of healthcare workers infected with tuberculosis. Internationally the Emergency Centre (EC) has been found to be a high risk area for TB transmission however no research has been found looking at the risk of TB or infection control in the EC in South Africa.

Methods A qualitative study was designed to create a mixed qualitative and quantitative data set. An online survey was written based on a Knowledge, Attitude and Practice framework. An analysis of the results was carried out using the grounded theory methodology up to June 2015.

Results A high risk of tuberculosis transmission to both patients and staff was perceived with poor infection control practices. These problems were exacerbated by the high numbers of patients with TB and lack of infrastructure to isolate them. Respondents felt their knowledge of infection control was not up-to-date, especially senior staff, affecting their ability to lead in this area.

Discussion A need was found for an evidence based policy for the control of Tuberculosis within the EC. Training on infection control needs to be improved, both at undergraduate and postgraduate level to allow senior doctors to lead and advocate. As the risks to all within the EC increase with the rise of MDR-TB, addressing factors to decrease the risk of transmission needs to be done urgently to prevent the spread of this deadly disease.

