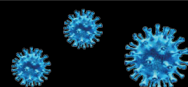


CONTENTS

	Page
Chairman's Welcome	2
Programme Overview	3
Monday - Scientific Programme	7
- Speaker Abstracts	11
Tuesday - Scientific Programme	19
- Speaker Abstracts	26
- Keynote Lecture	52
Wednesday - Scientific Programme	53
- Speaker Abstracts	57
Interactive Poster Walks	79
Poster List	80
Major Sponsors	91
Exhibitors	92
FIS 2014 Collaborating Societies	100

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CHAIRMAN'S WELCOME

Thank you very much for joining us in Harrogate UK for FIS 2014.

Within the spheres of interest of Infectious Diseases, Microbiology and Tropical Medicine are many of the most important issues facing modern medicine, and FIS 2014 is bringing together some of the best and most thoughtful minds around in the world of healthcare to inform about, discuss and debate these issues.

Topics covered over an exciting and challenging three days include the threats to humanity posed by Ebola and similar serious infections, antimicrobial resistance, HIV, viral hepatitis and tuberculosis. While there are, for example, first rate sessions covering cutting edge elements of basic science as related to infection, infection prevention and control and diagnostics, the relevant legal, ethical and training frameworks within which good and safe scientific and clinical research and clinical practice in this field function are also being considered.

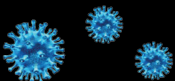
Furthermore, the conference enjoys input not only from clinical scientists working in the laboratory and clinicians who deal day to day with adult patients at the "clinical coal face", but also includes talks from paediatricians and public health physicians. Also, beyond the oral presentations there are a large of number of excellent posters for you to peruse and contemplate during any quieter moments you may happen to have.

All of the above are relevant, and may even be crucial, to us doing things better in the future.

The organising team very much value your attendance and support, and welcome in advance the contributions you will no doubt be making personally to this major medical event over the course of its 3 days. Knowledge, insight and discussion are the parents of progress.

So, to reiterate, a very warm welcome to Harrogate!

Steve Green
Chair of the Organising Committee of FIS 2014
Meetings Secretary of the British Infection Association



PROGRAMME OVERVIEW

Day 1 - Monday 24th November

08:30 - 09:30

REGISTRATION

09:30 - 09:45

Welcome Address and Introductions

09:45 - 11:30

Plenary Session: State of the Art

Meningitis B vaccine

Staphylococcus aureus – a super bug

Biologics and virology

11:30 - 12:00

COFFEE, Trade Exhibition & Poster Viewing

12:00 - 13:30

Plenary Session: HIV

Anti-retrovirals in 2014

HIV and viral hepatitis

Paediatric HIV grows up

13:30 - 14:30

LUNCH, Trade Exhibition & Poster Viewing

13:30 - 14:00

Poster Walk

Viral hepatitis

14:00 - 14:30

Poster Walk

HIV

14:00 - 14:30

Queen's Suite 1

National Infection Trainee Collaboratives in Audit and Research (NITCAR)

14:30 - 15:30

Plenary Session: Tuberculosis

TB and HIV co-infection

New drugs for TB

15:30 - 16:15

Satellite Symposium

Perspectives in practice - an update on dolutegravir

Organised and supported by Viiv Healthcare

16:15 - 16:40

COFFEE, Trade Exhibition & Poster Viewing

16:15 - 16:40

Poster Walk

Clinical cases

16:40 - 18:25

Parallel Society-Supported Sessions

Main Auditorium

Infection in nephrology and dialysis

Supported by BIA

Queen's Suite 1

HIV related clinical conundrums

Supported by Welsh Microbiology Association & BHIVA

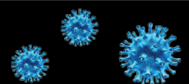
Queen's Suite 2

Infection control in paediatrics

Supported by HIS

18:30 - 19:30

WELCOME RECEPTION, Trade Exhibition & Poster Viewing



PROGRAMME OVERVIEW

Day 2 - Tuesday 25th November

07:30 - 09:30

REGISTRATION

08:00 - 09:30

Clinical Lessons

09:30 - 10:45

Parallel Society-Supported Sessions

Main Auditorium

Implantable cardiac electronic device infection

Supported by BSAC

Queen's Suite 1

Travel medicine

Supported by NaTHNaC

Queen's Suite 2

Fungal infection

Supported by BSMM

10:45 - 11:15

COFFEE, Trade Exhibition & Poster Viewing

10:45 - 11:15

Poster Walk

General bacteriology and general virology

11:15 - 12:15

Barnet Christie Lecture

Whole genome sequencing in your lab – opportunity or distraction?

12:15 - 13:15

Satellite Symposium

Managing *Clostridium difficile* infection: real world evidence

Organised and supported by Astellas Pharma UK

13:15 - 14:15

LUNCH, Trade Exhibition & Poster Viewing

13:15 - 13:45

Poster Walk

Public Health and epidemiology

13:45 - 14:15

Poster Walk

Antibiotics and resistance issues

13:15 - 14:15

Queen's Suite 1

Satellite Symposium

Fosfomycin i.v. ...

Back to the Future in difficult to treat infections

Organised and supported by Nordic Pharma

14:15 - 15:30

Parallel Sessions

Main Auditorium

Ebola Virus Disease (EVD)

Queen's Suite 1

Satellite Symposium

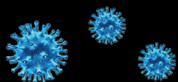
The clinical impact of near patient influenza A and B testing

Organised and supported by Alere

Queen's Suite 2

Approaches to the prevention and treatment of sexually transmitted infections - successes and challenges

Supported by SGM



PROGRAMME OVERVIEW

Day 2 - Tuesday 25th November (continued)

15:30 - 16:00

COFFEE, Trade Exhibition & Poster Viewing

15:30 - 16:00

Poster Walk
TB and other mycobacteria

16:00 - 17:00

Scientific Free Papers

17:00 - 18:15

Parallel Society-Supported Sessions

Main Auditorium

**Infection control:
addressing the human factors**

Supported by HIS and IPS

Queen's Suite 1

**Practical examples of
implementing the UK 5 year
Antimicrobial Resistance
Strategy - 1 year on**

Supported by UKCPA-PIN

Queen's Suite 2

**Do law and ethics matter when
it comes to infections?**

Supported by BIA

18:15 - 18:45

Keynote Lecture

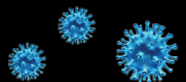
Ebola and other infectious disease outbreaks in Africa

Professor Robert Colebunders

Emeritus Professor of Tropical Diseases, Institute of Tropical Medicine and
Emeritus Professor of Infectious Diseases, University of Antwerp, Belgium

20:00

CONFERENCE DINNER, Royal Hall, Harrogate International Centre



PROGRAMME OVERVIEW

Day 3 - Wednesday 26th November

07:30 - 09:30

REGISTRATION

08:00 - 09:30

Lessons in Microbiology & Infection Control

Supported by HIS and IPS

09:30 - 10:45

Plenary Session: Antibiotic Trilogy - Genes, Capsules and Enzymes

Gene sequencing and prediction of antibiotic resistance

Vaccines, serotypes and resistance in *Streptococcus pneumoniae*

Emerging resistance in Enterobacteriaceae

10:45 - 11:15

COFFEE, Trade Exhibition & Poster Viewing

10:45 - 11:15

Poster Walk

Diagnostics

11:15 - 12:15

J.D. Williams Lecture

On definitions: when is an infection not an infection?

12:15 - 13:15

Scientific Free Papers

13:15 - 14:00

LUNCH, Trade Exhibition & Poster Viewing

13:15 - 13:35

Poster Walk

Mycology

13:35 - 14:00

Poster Walk

Travel and tropical

13:15 - 14:00 Queen's Suite 1

Satellite Symposium

Using technology to support

Antimicrobial Stewardship -

A Canadian perspective as a

working model for implementation

Organised and supported by ICNet

14:00 - 15:15

Plenary Session: Innate Immunity

Innate immunity in the lung during bacterial infection

Innate immunity: C-type lectins and anti-fungal host defense

15:15 - 16:15

Parallel Society-Supported Sessions

Main Auditorium

Paediatric Infection

Supported by BPAIG

Queen's Suite 1

From joint training to joint practice: how are the UK's Microbiology and Infectious Diseases services responding to the challenge

Queen's Suite 2

Satellite Symposium

How point of care rapid

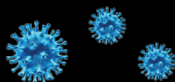
diagnostics can enable

Antimicrobial Stewardship

Organised and supported by Alere

16:15 - 16:30

FORMAL CLOSING CEREMONY



SCIENTIFIC PROGRAMME

MONDAY 24TH NOVEMBER

MAIN AUDITORIUM

09:30 - 09:45 **Welcome Address and Introductions**

Dr Peter Moss, *BIA President* & Professor Steve Green, *Chairman of Organising Committee*

09:45 - 11:30 **Plenary Session**

State of the Art

Chairs: Dr Nick Beeching, *Senior Lecturer in Tropical & Infectious Diseases, Liverpool School of Tropical Medicine* and Dr Bridget Atkins, *Consultant in Microbiology & Infectious Diseases, Oxford University Hospitals*

Group B meningococcal vaccine

Professor Andrew Pollard
Professor of Paediatric Infection and Immunity, University of Oxford

Staphylococcus aureus – a super bug

Professor Simon Foster
Professor of Molecular Microbiology, University of Sheffield

Biologics and virology

Dr Mohammad Raza
Consultant Virologist, Sheffield Teaching Hospitals

11:30 - 12:00 **COFFEE, Trade Exhibition & Poster Viewing**

MAIN AUDITORIUM

12:00 - 13:30 **Plenary Session**

Supported by BHIVA and CHIVA

HIV

Chairs: Dr Alastair Miller, *Deputy Medical Director, Joint Royal Colleges of Physicians Training Board* and Dr Andrew Ustianowski, *Consultant in Infectious Diseases, North Manchester General Hospital*

Anti-retrovirals in 2014

Dr Chloe Orkin
Consultant Physician in HIV Medicine, Barts Health NHS Trust, London

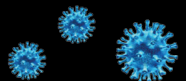
HIV and viral hepatitis

Dr Andrew Ustianowski
Consultant in Infectious Diseases, North Manchester General Hospital

Paediatric HIV grows up

Dr Sean O'Riordan
Consultant in Paediatric Infectious Diseases, Leeds General Infirmary

13:30 - 14:30 **LUNCH, Trade Exhibition & Poster Viewing**



13:30 - 14:00 **Poster Walk**

Viral hepatitis

Dr Peter Moss
Consultant Physician, Hull & East Yorkshire Hospitals

14:00 - 14:30 **Poster Walk**

HIV

Dr Alastair Miller
Deputy Medical Director, Joint Royal Colleges of Physicians Training Board

QUEEN'S SUITE - ROOM 1

14:00 - 14:30 **National Infection Trainee Collaboratives in Audit and Research (NITCAR)**

Chair: Dr Jonathan Sandoe, *Associate Clinical Professor, University of Leeds*

NITCAR

Dr Andrew Kirby
Consultant Microbiologist, Leeds Teaching Hospitals

MAIN AUDITORIUM

14:30 - 15:30 **Plenary Session**

Supported by BHIVA

Tuberculosis

Chair: Professor David Lalloo, *Dean of Clinical Sciences and International Public Health, Liverpool School of Tropical Medicine*

TB and HIV co-infection

Dr Anton Pozniak
TB Service Lead, Chelsea and Westminster Hospital, London

New drugs for TB

Dr Derek Sloan
Consultant Physician, Liverpool School of Tropical Medicine

15:30 - 16:15 **Satellite Symposium**

Organised and supported by ViiV Healthcare

Perspectives in practice - an update on dolutegravir

Dr Ed Wilkins
Consultant and Clinical Director of Infectious Diseases, North Manchester General Hospital

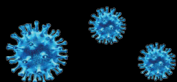
16:15 - 16:40 **COFFEE, Trade Exhibition & Poster Viewing**

16:15 - 16:40 **Poster Walk**

Clinical cases

Dr Paul McWhinney
Consultant in Infectious Diseases, Bradford Teaching Hospitals

Professor David Lalloo
Dean of Clinical Sciences and International Public Health, Liverpool School of Tropical Medicine



16:40 - 18:25 Parallel Society-Supported Session

Infection in nephrology and dialysis

Supported by BIA

Chairs: Professor Steve Green, *Consultant Physician, Sheffield Teaching Hospitals* and Professor Tom Rogers, *Professor of Clinical Microbiology, St James's Hospital, Dublin*

How bacterial and fungal infection affect haemodialysis and peritoneal dialysis – a nephrologist's view

Dr Arif Khwaja

Consultant Nephrologist, Sheffield Teaching Hospitals

How bacterial and fungal infection affect haemodialysis and peritoneal dialysis – a microbiologist's view

Dr David Partridge

Consultant Microbiologist, Sheffield Teaching Hospitals

Infections and nephrology - perspectives from Turkey and its regional neighbours

Professor Rumezka Kazancioglu

Professor of Nephrology, Bezmialem Vakif University School of Medicine, Istanbul, Turkey

Hepatitis C in Scotland: Lessons from the action plan and the way forward

Professor David Goldberg

Consultant Epidemiologist, Health Protection Scotland, Glasgow

Renal transplant tourism and infection-related risk – the UK experience

Dr Anand Odedra

Registrar in Microbiology & ID, Sheffield Teaching Hospitals

QUEEN'S SUITE - ROOM 1

16:40 - 18:25 Parallel Society-Supported Session

HIV related clinical conundrums

Supported by Welsh Microbiology Association and BHIVA

Chair: Dr Brendan Healy, *Consultant in Microbiology & Infectious Diseases, Public Health Wales, Cardiff*

Expert Panel:

Dr Andrew Freedman, *Consultant in Infectious Diseases, Cardiff University School of Medicine* and

Dr Federica Faggian, *Consultant in Microbiology, Public Health Wales, Cardiff*

Blurred lines: handling the indeterminate HIV result

Dr Harriet Hughes

Consultant in Microbiology and Infectious Diseases, University Hospital of Wales, Cardiff

Pirate radio and other illegal transmissions - how to deal with a case of possible reckless transmission

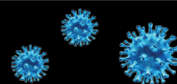
Dr Bazga Ali

Specialist Registrar in ID & Microbiology, University Hospital of Wales, Cardiff

Headaches all round – management of central nervous system lesions in advanced HIV

Dr Owen Seddon

Specialist Registrar in ID & Microbiology, University Hospital of Wales, Cardiff



16:40 - 18:25 Parallel Society-Supported Session

Infection control in paediatrics

Supported by HIS

Chair: Dr Ann Pallet, *Lead Microbiology Consultant for Child Health, Southampton University Hospitals*

***Clostridium difficile* in children**

Professor Saul Faust

Professor of Paediatric Immunology & Infectious Diseases, University of Southampton

A *Pseudomonas* outbreak in a neonatal unit: lessons learnt

Dr Clifford Mayes

Neonatal Consultant, Belfast Health and Social Care Trust

MRSA screening and decolonisation in neonate ICU

Dr Kavita Sethi

Consultant Microbiologist, Leeds Teaching Hospitals

Paediatric ID and microbiology teams – a joint infection prevention service

Dr Sanjay Patel

Consultant in Paediatric Infectious Diseases and Immunology, Southampton Children's Hospital

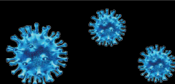
Professor Saul Faust

Professor of Paediatric Immunology & Infectious Diseases, University of Southampton

Dr Ann Pallett

Lead Microbiology Consultant for Child Health, Southampton University Hospitals

18:30 - 19:30 WELCOME RECEPTION, Trade Exhibition & Poster Viewing



SPEAKER ABSTRACTS

MONDAY 24TH NOVEMBER

Plenary Session: State of the Art

Group B meningococcal vaccine

Professor Andrew Pollard

Professor of Paediatric Infection and Immunity, University of Oxford

Introduction of capsular group C meningococcal vaccines in 1999 in the UK immunisation programme has had a dramatic effect on the epidemiology of meningococcal disease with most cases since then caused by Group B, W and Y meningococci. Development of a capsular group B meningococcal vaccine has been hampered by lack of immunogenicity of the B capsule in man and the considerable variability of subcapsular proteins. In January 2013 a new meningococcal vaccine was licensed by the European Medicines Agency and recommended for use in 2014 by the Department of Health's Joint Committee on Vaccination and Immunisation. The decision to use a capsular group B meningococcal vaccine in the UK is complex as there remain a number of scientific and technical uncertainties about the potential impact of the vaccine and because the cost-effectiveness of the vaccine, whilst favourable, is very low. If the vaccine is implemented in the UK, and use of data from other jurisdictions where the vaccine is being used (e.g. some regions of Quebec), will provide new information about the potential of this vaccine to control meningococcal disease. Emergence of a highly invasive clone of capsular group W meningococci over recent years provides a new challenge in the battle against this important cause of death in early childhood.

Staphylococcus aureus - a super-bug

Professor Simon J. Foster

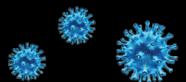
Professor of Molecular Microbiology, Florey Institute, University of Sheffield

S. aureus is a major human pathogen, made more dangerous by the insidious spread of antibiotic resistance. There are few new antibiotics on the horizon and all vaccine trials have failed up to now. How can we make better use of existing treatments and develop new control regimes? Our studies of host:pathogen interaction have revealed complex *in vivo* dynamics, involving the interplay between bacterial and host factors. This has important implications, not only for vaccine development, but also for antibiotic intervention. How we can translate basic studies into new strategies to combat *S. aureus* will be discussed.

Biologics and virology

Dr Mohammad Raza

Consultant Virologist, Sheffield Teaching Hospitals



Plenary Session: HIV

Anti-retrovirals in 2014

Dr Chloe Orkin

Consultant Physician in HIV Medicine, Barts Health NHS Trust, London

This talk will encompass the most clinically significant new ART data over the past year covering CROI and IAS. The initial focus will be on changes in guidelines for first line ART, new paradigms in the first line strategy. There will be a focus on toxicity of regimes and how discontinuations due to toxicity affect the primary endpoint data. Robustness of regimes will be discussed as well as durability. New data will be presented on the newest ART compound to be licensed by the FDA both in first and 3rd line therapy.

HIV and viral hepatitis

Dr Andrew Ustianowski

Consultant in Infectious Diseases, North Manchester General Hospital

There are multiple interactions between HIV and the hepatitis viruses that are clinically important. These vary from differences in presentation and outcomes, to issues with diagnostics and therapies. A brief overview of the important interactions with hepatitis B, hepatitis C and hepatitis E will be discussed, though the focus will be mainly on hepatitis C with a relook at the paradigms that we have previously accepted – that liver disease progression is worsened and that the success rates of HCV therapies are diminished – are these still true in the present era?

Paediatric HIV grows up

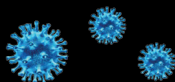
Dr Sean O’Riordan

Consultant in Paediatric Infectious Diseases, Leeds General Infirmary

Management of children and young people with HIV has long been driven by expert opinion and extrapolation from adult data. The mercifully small number of infected children and young people in Europe and North America, the success of mother to child transmission prevention, and a reluctance on the part of pharmaceutical companies to expose themselves to the risks of paediatric trials, with a small potential market, had conspired to limit the opportunities to develop an evidence base to underpin paediatric HIV care, despite European and transatlantic collaborations. This situation has improved in the last 5-10 years. The international rollout of antiretrovirals has facilitated large scale studies in Africa and Thailand, an increased number of new antiretrovirals are being brought to market with paediatric data, and existing European and North American programmes have concluded studies addressing important issues in the management of HIV as a treatable chronic condition in children and young people.

The newly published 2014 PENTA Guidelines for the treatment of paediatric HIV infection draw on the last 5 years of published results to provide more robustly evidence based advice on optimising care for infected children and young people. This talk will present the guidelines, and summarise the key data synthesised therein.

Paediatric HIV data has excited the world in one area, with the prospect of cure raised by the Mississippi baby. No paediatric HIV plenary talk would be complete without an update on the outcome, and reflection on how this informs our understanding of viral reservoirs.



Plenary Session: Tuberculosis

TB and HIV co-infection

Dr Anton Pozniak

TB Service Lead, Chelsea and Westminster Hospital, London

There are over 1 million new TB cases in HIV+ persons and 320,000 HIV/TB deaths every year, however TB is preventable and curable. There have been important changes in the management of HIV/TB co-infection in the last 2 years. New and better diagnostics, some POC, have allowed rapid and effective screening for TB and drug resistance in resource limited countries. The important questions of when to start HIV treatment in patients with TB and what dose of efavirenz is effective in patients on rifampicin have been resolved. TB chemopreventative strategies targeted for high risk groups have been implemented with easier drug regimens and schedules developed.

The hope that shorter TB regimens could be used in treatment have not been realised with disappointing trials involving quinolones. Drug interactions remain the major limitation to treating HIV and TB together but the newer classes of HIV drugs, integrase inhibitors provide new options.

IRIS presents a major treatment challenge in HIV/TB and novel treatment approaches are promising.

New drugs for TB

Dr Derek Sloan

Consultant Physician, Liverpool School of Tropical Medicine

Current first-line treatment regimens for tuberculosis (TB) were developed from clinical trials in the 1970s and 80s. Since then, global TB control has been thwarted by an upsurge in case notifications and the emerging threat of multi- and extensively- drug resistant (M[X]DR) disease. In 2013, there were 9 million active TB cases and 1.5 million deaths worldwide. It is clear, therefore, that new therapeutic strategies are required; standard treatment of less than 6 months duration will improve management of drug susceptible TB, and more effective, less toxic medications are needed to tackle drug resistant strains. Progress towards these goals has been variable. Although attempts to shorten first-line therapy by use of 8-methoxyfluoroquinolones have been unsuccessful, two new agents (bedaquiline and delamanid) have been provisionally licensed and continue to be assessed in M(X)DR-TB patients. Other compounds are at earlier stages of development. This talk will review the current state of TB therapeutics, outlining key challenges to drug development and discussing the likely clinical impact of new medications.

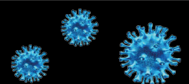
Parallel Session: Infection in nephrology and dialysis

How bacterial and fungal infection affect haemodialysis and peritoneal dialysis – a nephrologist's view

Dr Arif Khwaja

Consultant Nephrologist, Sheffield Teaching Hospitals

Infections are a major cause of morbidity, mortality and hospitalisation in the dialysis population. This talk will outline the scope of the problem, the common infections seen in this population and strategies to reduce the risk of infection in patients on dialysis.



How bacterial and fungal infection affect haemodialysis and peritoneal dialysis – a microbiologist's view

Dr David Partridge

Consultant Microbiologist, Sheffield Teaching Hospitals

Renal failure is associated with an increased risk of infection and sepsis was the leading cause of death in patients with renal failure in the pre-dialysis era. Although dialysis greatly reduces the immunosuppressive effects of uraemia, it brings with it its own risks of infective complications, whether the PD or HD modality is chosen.

This talk will complement the talk given from the nephrology perspective and will focus primarily on peritoneal dialysis infections and on the common dilemmas encountered during treatment of infections related to both peritoneal and haemodialysis.

Infections and nephrology - perspectives from Turkey and its regional neighbours

Professor Rumezka Kazancioglu

Professor of Nephrology, Bezmialem Vakif University School of Medicine, Istanbul, Turkey

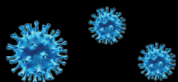
In addition to infections associated with dialysis access devices, patients with end-stage renal disease (ESRD) who require renal replacement therapy may be susceptible to non-access-related infections. Diagnostic strategies for these infections are similar to those used for patients without renal failure. However, a higher index of suspicion and a lower threshold for the initiation of a search is appropriate since patients with ESRD are frequently diabetic and/or immunosuppressed because of the retention of uremic toxins.

66711 patients are on renal replacement therapies (RRT) in Turkey. Hemodialysis (HD) is the most commonly used RRT (79%). With a rate of 8.4%, infectious diseases were the fourth most common death causes in HD patients according to the national registry 2013. Similarly, cause of death was due to 14% infectious diseases in peritoneal dialysis (PD) patients. Hepatitis serologies are reported to 4% and 6.9% respectively for HbsAg (+) and AntiHCV (+) among HD patients. The serologies were better among PD patients (2.9% for HbsAg + and 3% AntiHCV+). 40.91% of the deceased kidney transplant patients was associated with infection in 2012.

Compared with the population with normal kidney function, chronic kidney disease (CKD) and ESRD patients are at higher risk of contracting bacterial infections, particularly urinary tract infections, pneumonia, and sepsis. Moreover; tuberculosis is endemic in our region and the clinical presentation of tuberculosis is different in patients with CKD than in those with a competent immune system. Extrapulmonary tuberculosis is more common in both the HD and PD population, with rates of 38-50% having been reported. The diagnosis is usually late, sometimes postmortem, because of nonspecific clinical presentation (fever of unknown origin, fatigue, loss of weight), negative tuberculin skin test (anergy), and a low probability of microbiologic evidence (acid-resistant bacilli, culture in tuberculosis media). As a result, an effective program for the prevention, screening, early diagnosis, and treatment of tuberculosis is needed in this population.

The transplant programs are still encountering numbers of patients who return after receiving an organ transplant abroad. Our previous experience demonstrated that post-transplant course of these patients was complicated by numerous surgical and/or medical complications, and many of the latter were unconventional infections caused by malaria, invasive fungal infections, and pneumonia due to various opportunistic pathogens.

Many of the infections are not unique to the CKD patients. As a result, although the likelihood of their occurrence may be increased, guidelines only for CKD patients are not available. Hence, diagnostic and treatment strategies should be developed for each patient, including the effects of kidney failure and other comorbid conditions, the geographic location, and specific environmental exposures.



Hepatitis C in Scotland: Lessons from the action plan and the way forward

Professor David Goldberg

Consultant Epidemiologist, Health Protection Scotland, Glasgow

It is estimated that 1.2% of the EU's population (502 million) is chronically infected with HCV – a prevalence almost identical to that observed in the US. Despite many initiatives by agencies/organisations (including EASL, European Liver Patients Association and the Viral Hepatitis Policy & Prevention Board) in the EU to promote the Hepatitis C public health effort, an over-arching co-ordinated approach to the problem is still absent. Instances of good practice at a country specific level do exist but these are few and far between; invariably, they are limited in terms of scope, financial backing and governance. France paved the way in 1999 with the launch of its National Hepatitis C Prevention Programme – one that placed a major emphasis on case-finding in primary care settings.

Scotland's Hepatitis C Action Plan – characterised by i) industrial scale investment (£100 million of dedicated funding during 2008-2015), ii) actions ranging from the education of schoolchildren to the provision of antiviral therapy, iii) a web of managed care and prevention multidisciplinary networks and iv) a government-directed performance management approach ensuring strong accountability – is acknowledged as a paradigm of good practice.

While considerable achievements in case finding, treatment administration and HCV transmission reduction have been demonstrated, major challenges remain - not least the identification and successful treatment of those with advancing disease who would benefit most from intervention.

Arguably, the principal benefits of the Plan to date have been the generation of a fit-for-purpose workforce and estate, sophisticated communication, coordination and monitoring systems, a research team acting in synergy with service developments to answer many questions of critical importance and an ethos of excellence in managing one of the world's greatest infectious disease challenges. And so Scotland is now ready and well equipped to take full advantage of spectacular therapeutic advances. If it does, the incidence of life threatening HCV-related liver disease-still not in decline-will fall in a way not dissimilar to that observed for HIV in many countries during the late 1990s.

Through the Action Plan experience, numerous lessons have been learnt – not least those associated with planning, funding, organisation, implementation, communication and evaluation. These and other high level EU lessons will be presented.

References

1. Delarocque-Astagneau E, Meffre C, Dubois F, Pioche C, Le Strat Y, Roudout-Thoraval F et al. The impact of the prevention of Hepatitis C over more than a decade: the French experience. *J. Viral Hepat* 2010; 17: 435-443.
2. Scottish Government Health Department. Hepatitis C Action Plan for Scotland: Phase II: May 2008-March 2011. 2008. <http://www.scotland.gov.uk/Publications/2008/05/13103055/0>

Renal transplant tourism and infection-related risk – the UK experience

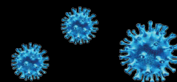
Dr Anand Odedra

Registrar in Microbiology & ID, Sheffield Teaching Hospitals

Due to poor availability of organs, increasingly patients from developed countries are reported to be travelling abroad for renal transplants. We aimed to assess the extent and characteristics of this trend across the UK and Republic of Ireland.

A questionnaire-based cross sectional survey. 397 renal consultants from 33 hospitals with renal units across the UK and the Republic of Ireland were contacted through email, 62 replied (16%).

57/62 (93%) renal consultants managed transplant patients, and of these 36/57 (63%) had managed at least one patient who had undergone a transplant abroad. The most popular reason reported for this practice was being on the UK transplant list but seeking a shorter wait. Respondents reported commencement by overseas doctors of appropriate routine post-transplant prophylaxis with the following



medications in all cases they had encountered as follows: co-trimoxazole 12%, isoniazid 3%, antifungals 0%, and Cytomegalovirus prophylaxis or treatment 0%. While 44% of renal consultants reported having some prior warning of a patient undergoing a renal transplant abroad.

Renal transplant tourism has become widely established in the UK and the Republic of Ireland, and that care for these patients is often suboptimal. Furthermore, the opportunity exists for pre-transplant counselling.

Parallel Session: HIV related clinical conundrums

The WMA will be presenting a selection of real life HIV cases that illustrate issues that are relevant to microbiologists and virologists and are representative of cases that they might reasonably be contacted about for advice regarding investigation and management. The cases will be presented with opportunity for audience discussion and participation via voting handsets and for those present to gain knowledge relevant to their own practice.

Blurred lines: handling the indeterminate HIV result

Dr Harriet Hughes

Consultant in Microbiology and Infectious Diseases, University Hospital of Wales, Cardiff

Currently approved tests for the diagnosis of human immunodeficiency virus (HIV) infection have high sensitivity and specificity, exceeding 98% in most cases. HIV screening involves the use of a highly sensitive test to capture all true positives. National testing algorithms then recommend the use of a sequence of additional tests to confirm infection and identify any biological false positives. As we increasingly screen for HIV across a wide range of patient groups, there is a tendency to uncouple history and investigation. We will use interactive cases to illustrate some of the pit falls in HIV diagnosis and to highlight some of the reasons for indeterminate HIV tests results. We will also explore ways in which these cases can be sensitively and appropriately managed, emphasising the importance of the essential link between laboratory investigation and patient history.

Pirate radio and other illegal transmissions – how to deal with a case of possible reckless transmission

Dr Bazga Ali

Specialist Registrar in ID & Microbiology, University Hospital of Wales, Cardiff

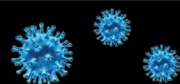
An interactive discussion based around a clinical case exploring the issues surrounding both the reckless and intentional transmission of HIV. The session will take the format of a criminal trial in which both the medical and criminality perspective will be considered. By the end of the session a verdict of guilty or not guilty will be decided. There will be ample opportunity to ask questions and clarify any issues surrounding this case in particular and in general with the help of the expert panel.

Headaches all round – management of central nervous system lesions in advanced HIV

Dr Owen Seddon

Specialist Registrar in ID & Microbiology, University Hospital of Wales, Cardiff

Central nervous system illnesses are a relatively common finding in advanced HIV. The talk highlights two cases of advanced HIV with intracranial mass lesions evident at presentation. In both cases there were significant obstacles to obtaining a definitive diagnosis. The management of these cases with reference to the current evidence base and national treatment guidelines will be presented in an interactive format. The cases will be used to highlight some of the challenges faced in dealing with these types of cases including real life management issues that are not covered by guidelines.



Parallel Session: Infection control in paediatrics

Clostridium difficile in children

Professor Saul Faust

Professor of Paediatric Immunology & Infectious Diseases, University of Southampton

The clinical significance of the presence of *Clostridium difficile* in young children's faeces is often uncertain. *C. difficile* is frequently found in the stool samples of infants without symptoms of gastrointestinal disease, suggesting it may be an incidental finding and perhaps even form part of the normal gut microflora in this age group. In contrast, in older children *C. difficile* can cause overt disease which is associated with considerable morbidity and even mortality. Between these extremes lies a substantial group of children who have diarrhoea and *C. difficile* is identified in a stool sample, in whom the causal relationship is unclear (ie cause, effect or incidental finding). The session will briefly review existing and recent data regarding *C. difficile* in children including the rate and potential role in disease severity of *C. difficile* co-infections in children, and the controversies surrounding clinical trials of novel *C. difficile* therapy trials in infants.

A Pseudomonas outbreak in a neonatal unit: lessons learnt

Dr Clifford Mayes

Neonatal Consultant, Belfast Health and Social Care Trust

In January 2012 a number of Northern Ireland Neonatal Units including the Regional Intensive Care Unit in Belfast were involved in a *Pseudomonas aeruginosa* incident. The Regulation and Quality Improvement Authority in Northern Ireland concluded the different hospitals had separate outbreaks or clusters¹. The Belfast incident was contained by identification of the host (flow straighteners and associated components within sensor taps²) and by stopping any practice involving patient contact with tap water. This event took place against the background of a successful quality improvement initiative focused on the incidence of infection caused by coagulase negative staphylococci, important pathogens in Neonatology. Important learning points include:

1. The need to have clear guidance in place for staff responding to a single case of *Pseudomonas aeruginosa*.
2. The experience of water testing since January 2012 which has led to a series of revisions of tap design including use of UV light technology.
3. The need for clear communication at multiple levels beginning with the parents.
4. The importance of close working between a wide range of staff (clinical, Patient and Client Support Services, medical microbiology, Infection Prevention and Control nursing, Estates Services, managerial).

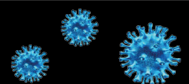
References:

1. http://www.rqia.org.uk/cms_resources/Pseudomonas%20Review%20Phase%20II%20Final%20Report.pdf (accessed 3.11.2014)
2. J Walker et al. Investigation of healthcare-acquired infections associated with *Pseudomonas aeruginosa* biofilms in taps in neonatal units in Northern Ireland. *Journal of Hospital Infection*; 86: (2014) 16-23.

MRSA screening and decolonisation in neonate ICU

Dr Kavita Sethi

Consultant Microbiologist, Leeds Teaching Hospitals



Paediatric ID and Microbiology teams - a joint infection prevention service

Dr Sanjay Patel

Consultant in Paediatric Infectious Diseases and Immunology, Southampton Children's Hospital

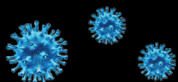
Professor Saul Faust

Professor of Paediatric Immunology & Infectious Diseases, University of Southampton

Dr Ann Pallett

Lead Microbiology Consultant for Child Health, Southampton University Hospitals

The landscape of paediatric infection diseases (PID) is rapidly changing. Tertiary care is being increasingly delivered in a small number of children's hospitals across the UK. Specialised service commissioning has recently resulted in the core activity of PID services being clearly defined. Antimicrobial stewardship, out-patient parenteral antibiotic therapy (OPAT) and infection prevention have all been explicitly listed. The benefits of joint working between paediatric infection specialists and medical microbiologists will be demonstrated using examples from Southampton Children's Hospital. The future of paediatric medical microbiology will also be considered, in terms of workforce planning and defining the role of the medical microbiologist within a paediatric infection service.



SCIENTIFIC PROGRAMME

TUESDAY 25TH NOVEMBER

MAIN AUDITORIUM

08:00 - 09:30 **Clinical Lessons**

Supported by BIA

Chairs: Dr Julia Greig, *Consultant in Infectious Diseases, Sheffield Teaching Hospitals* and
Dr Albert Mifsud, *Consultant Microbiologist, Public Health England, London*

Chronic hepatitis E in two patients with haematological malignancies

Dr Kathy Li, *Glasgow*

How microbiologists sifting through rubbish solved the mystery of 'The Broken Heart'

Dr Eftihia Yiannakis, *Nottingham*

***Aspergillus* spp: A rare infective cause of life threatening airway obstruction in children**

Dr Tejshri Shah, *London*

It's not just arcane - it has a dark side too

Dr Jason Biswas, *London*

Whipple's disease with extraintestinal features

Dr Alison Burgess, *Bristol*

Cry me a fever

Dr Manreet Nijjar, *Southampton*

A bite in Big Apple

Dr Melanie Pathiraja, *Reading*

Early experience of compassionate-use bedaquiline for treatment of XDR-TB in the UK: a case study

Dr Joe Lewis, *Liverpool*

Pneumococcal puerperal sepsis without respiratory infection

Dr Kim Findlay-Cooper, *Exeter*

MAIN AUDITORIUM

09:30 - 10:45 **Parallel Society-Supported Session**

Implantable cardiac electronic device infection

Supported by BSAC

Chairs: Dr Jonathan Sandoe, *Associate Clinical Professor, University of Leeds* and
Dr Richard Watkin, *Consultant Cardiologist, Heart of England NHS Foundation Trust, Birmingham*

Implantable cardiac electronic devices and pathogenesis of infection

Dr Jonathan Sandoe

Associate Clinical Professor, University of Leeds

Dr Richard Watkin

Consultant Cardiologist, Heart of England NHS Foundation Trust, Birmingham

The role of cardiac imaging in implantable cardiac electronic device infection

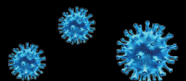
Dr Rick Steeds

Consultant Cardiologist, Queen Elizabeth Hospital, Birmingham

Microbiological diagnosis and sample processing in implantable cardiac electronic device infection

Dr Achyut Guleri

Consultant Microbiologist, Blackpool Teaching Hospitals



QUEEN'S SUITE - ROOM 1

09:30 - 10:45 **Parallel Society-Supported Session**

Travel medicine

Supported by NaTHNaC

Chair: Dr Dipti Patel, *Director, National Travel Health Network and Centre (NaTHNaC)*

Surveillance of travel related diseases

Joanne Freedman

Senior Scientist, Public Health England

Preparing the complex traveller

Lynda Bramham

Specialist Nurse, National Travel Health Network and Centre (NaTHNaC)

Emerging infectious diseases and the international traveller

Professor David Heymann

Chairman, Public Health England

QUEEN'S SUITE - ROOM 2

09:30 - 10:45 **Parallel Society-Supported Session**

Fungal infection

Supported by BSMM

Chair: Dr Richard Hobson, *Consultant Microbiologist, Leeds Teaching Hospitals*

Best practice recommendations for the diagnosis of serious fungal diseases

Dr Silke Schelenz

Senior Clinical Lecturer, Norwich Medical School

Current issues in diagnosis and management of *Pneumocystis*

Professor Rob Miller

Consultant in Infection and Population Health, University College London

10:45 - 11:15 **COFFEE, Trade Exhibition & Poster Viewing**

10:45 - 11:15 **Poster Walk**

General bacteriology and general virology

Professor Tom Rogers

Professor of Clinical Microbiology, St James's Hospital, Dublin

MAIN AUDITORIUM

11:15 - 12:15 **Barnett Christie Lecture**

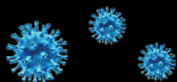
Supported by BIA

Chair: Dr Martin Wiselka, *Consultant in Infectious Diseases, University Hospitals of Leicester*

Whole genome sequencing in your lab – opportunity or distraction?

Dr David Eyre

Academic Clinical Lecturer, University of Oxford



12:15 - 13:15 Satellite Symposium

Organised and supported by Astellas Pharma UK

Managing *Clostridium difficile* infection: real world evidence

Chair: Dr David Jenkins, *Consultant Medical Microbiologist, University Hospitals of Leicester*

Real world evidence

Dr Tim Planche

Consultant Microbiologist, St George's University of London

CDI: Environmental spore cessation

Mr Paul Wade

Consultant Pharmacist – Infectious Diseases, Guy's & St Thomas' Hospital, London

EUCLID – Epidemiology of *Clostridium difficile* infection in hospitalised patients in Europe

Professor Mark Wilcox

Professor of Medical Microbiology, Leeds Teaching Hospitals, University of Leeds, Public Health England

13:15 - 14:15 LUNCH, Trade Exhibition & Poster Viewing

13:15 - 13:45 Poster Walk

Public Health and epidemiology

Professor David Goldberg

Consultant Epidemiologist, Public Health Scotland

13:45 - 14:15 Poster Walk

Antibiotics and resistance issues

Dr Albert Mifsud

Consultant Microbiologist, Public Health England, London

Professor David Lalloo

Dean of Clinical Sciences and International Public Health, Liverpool School of Tropical Medicine

13:15 - 14:15 Satellite Symposium

Organised and supported by Nordic Pharma

Fosfomycin i.v. ... Back to the Future in difficult-to-treat infections

Chair: Professor David Livermore, *Professor in Medical Microbiology, University of East Anglia*

Is i.v. fosfomycin an answer to the resistance problem?

Professor David Livermore

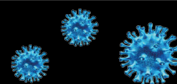
Professor in Medical Microbiology, University of East Anglia, Norwich

Clinical experience with i.v. fosfomycin in difficult to treat infections

Dr Julie Samuel

Consultant Microbiologist, Newcastle Upon Tyne Hospitals NHS Foundation Trust

Questions from the audience



14:15 - 15:30 Parallel Session**Ebola Virus Disease (EVD)**

Chair: Dr Nick Beeching, *Senior Lecturer in Tropical and Infectious Diseases, Liverpool School of Tropical Medicine*

Chair's introduction

Dr Nick Beeching
Senior Lecturer in Tropical and Infectious Diseases, Liverpool School of Tropical Medicine

Care of Ebola patients in the UK

Dr Stephen Mephram
Consultant in Infectious Diseases, Royal Free London NHS Trust

Managing Ebola in West Africa

Dr Colin Brown
Infectious Diseases Lead, King's Sierra Leone Partnership
Speaking on behalf of the King's Sierra Leone Partnership in Country, including Clinical Lead,
Dr Marta Lado

Diagnostics and lessons from the Imported Fever Service

Dr Alastair McGregor
Specialist Registrar, Imported Fever Service, Public Health England

Panel discussion

Speakers above, to be joined by
Professor Robert Colebunders
*Emeritus Professor of Tropical Diseases, Institute of Tropical Medicine and
Emeritus Professor of Infectious Diseases, University of Antwerp, Belgium*
Professor David Heymann
Chairman, Public Health England

QUEEN'S SUITE - ROOM 1

14:15 - 15:30 Parallel Session**Satellite Symposium**

Organised and supported by Alere

The clinical impact of near patient influenza A and B testing

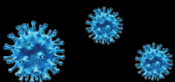
Chair: Dr Celia Aitken, *Consultant and Lead Virologist, West of Scotland Specialist Virology Centre, Glasgow*

Clinical evaluation of near patient testing for influenza A and B using the Alere™ rapid nucleic amplification technique compared to standard laboratory based real time PCR

Dr Susanna Davis
Microbiologist ST2, Sheffield Teaching Hospitals

Near patient flu testing in ITU

Dr Celia Aitken
Consultant and Lead Virologist West of Scotland Specialist Virology Centre, Glasgow



14:15 - 15:30 Parallel Session

Approaches to the prevention and treatment of sexually transmitted infections – successes and challenges

Supported by SGM

Chair: Professor David Livermore, *Professor of Medical Microbiology, University of East Anglia*

**Will gonorrhoea become an untreatable infection?
Meeting the challenge of antimicrobial resistance**

Dr Stephanie Chisholm

Clinical Scientist, Public Health England

The potential for HPV diseases to be eradicated by HPV immunisation

Professor Heather Cubie

Honorary Professor, University of Edinburgh

The importance of rapid, point of care, diagnosis of bacterial STIs – including the core challenges and benefits of this approach

Dr Tariq Sadiq

Reader & Honorary Consultant in HIV/Sexual Health, St George's, University of London

15:30 - 16:00 COFFEE, Trade Exhibition & Poster Viewing

15:30 - 16:00 Poster Walk

TB and other mycobacteria

Dr Derek Sloan

Consultant Physician, Liverpool School of Tropical Medicine

MAIN AUDITORIUM

16:00 - 17:00 Scientific Free Papers

Chair: Professor Jon Friedland, *Head of Infectious Diseases and Immunity, Imperial College London* and Dr Matthew Dryden, *Consultant Microbiologist, Hampshire Hospitals NHS Trust, Winchester*

Phenotypic switching of mucoid *Pseudomonas aeruginosa* to small colony variants in CF patients potentiates biofilm formation and persistent infection

Dr Sharon Irvine, *Glasgow*

An evaluation of the maturity of antimicrobial stewardship in Scotland

Dr Clare Colligan, *Glasgow*

Causes of mortality in 16 to 65 year olds in the two years after invasive pneumococcal disease

Dr Chloe Walsh, *Hull*

The diagnosis of tuberculosis in children in London: room for improvement?

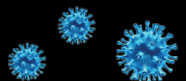
Dr Tejshri Shah, *London*

The role of whole genome sequencing in determining acquisition and transmission in simultaneous renal inpatient and community influenza A (H1N1)pdm09 outbreaks

Dr Rebecca Houghton, *Southampton*

BSAC Bacteraemia Resistance Surveillance Update 2013

Dr Rosy Reynolds, *Bristol*



17:00 - 18:15 Parallel Society-Supported Session

Infection control: addressing the human factors

Supported by HIS/IPS

Chairs: Dr Jennie Wilson, *Reader, Healthcare Epidemiology, University of West London* and Dr David Enoch, *Consultant Microbiologist, Cambridge University Hospitals*

Behaviour change for patient safety: examples from infection prevention

Dr Judith Dyson

Lecturer Mental Health, University of Hull

Dirt and disgust as key drivers in nurses' infection control behaviours

Dr Carole Jackson

Lecturer, Florence Nightingale School of Nursing and Midwifery, King's College London

Changing practice in the management of urethral catheters

Dr Jacqui Prieto

Associate Professor in Health Sciences, University of Southampton

QUEEN'S SUITE - ROOM 1

17:00 - 18:15 Parallel Society-Supported Session

Practical examples of implementing the UK 5 year Antimicrobial Resistance Strategy – 1 year on

Supported by United Kingdom Clinical Pharmacy Association Pharmacy Infection Network

Chair: Mr Mark Gilchrist, *Consultant Pharmacist, Infection, Imperial College Healthcare NHS Trust, London*

Key area 2: Optimising antimicrobial prescribing

(led by Scotland)

Dr Jacqueline Sneddon

Project Lead, Healthcare Improvement Scotland

Key area 3: Improving professional education, training and public engagement

(led by England)

Dr Diane Ashiru-Orelope

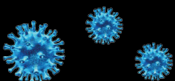
Pharmacist Lead, Public Health England

Key area 5: Better access to and use of surveillance data

(led by Wales)

Dr Maggie Heginbotham

Clinical Scientist, Public Health Wales



17:00 - 18:15 **Parallel Society-Supported Session**

Do law and ethics matter when it comes to infection?

Supported by BIA

Chair: Professor Steve Green, *Consultant Physician, Sheffield Teaching Hospitals*

Legal issues

Dr Robert Hendry

Medical Director, Medical Protection Society

Ethics and infectious diseases

Dr Michael Millar

Consultant in Infection, Barts Health NHS Trust, London

Can regulation and accreditation play a part?

Professor Steve Green

Consultant Physician, Sheffield Teaching Hospitals

MAIN AUDITORIUM

18:15 - 18:45 **Keynote Lecture**

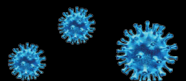
Chair: Dr Peter Moss, *Consultant Physician, Hull & East Yorkshire Hospitals*

Ebola and other infectious disease outbreaks in Africa

Professor Robert Colebunders

Emeritus Professor of Tropical Diseases, Institute of Tropical Medicine and Emeritus Professor of Infectious Diseases, University of Antwerp, Belgium

20:00 **CONFERENCE DINNER, Royal Hall**



Clinical Lessons

Chronic hepatitis E in two patients with haematological malignancies

Dr Kathy Li

West of Scotland Specialist Virology Centre, Glasgow

Introduction

In the past decade the epidemiology of hepatitis E virus (HEV) has shifted from being a rare, acute travel-related hepatitis to the commonest indigenous cause of viral hepatitis, causing chronic hepatitis (defined as persistence of HEV RNA in blood and deranged liver function tests (LFTs) for ≥ 6 months) and cirrhosis in immunocompromised patients. We present the first 2 cases of chronic hepatitis E in patients with haematological malignancies in the West of Scotland Specialist Virology Centre (WoSSVC). HEV was associated with acute self-limiting hepatitis in travellers to endemic countries, with the notable exception of causing a high mortality in pregnant women (~20%). However, the incidence of autochthonous HEV infection is rising in the UK; not explained by increase in laboratory testing alone. HEV genotype 3 has been found in farmed and wild animals native to the UK, including swine, rabbits, and deer, making it a potential zoonosis. Cases of transmission by blood products and organs have also been documented. Various non-hepatic presentations have also been documented, including neurological and renal symptoms. The 2 cases highlight the importance of screening for HEV as a common cause of abnormal LFTs in immunosuppressed patients; the importance being the high risk of chronicity (~60%), with rapid progression to fibrosis and cirrhosis. Additionally, screening using serology is unreliable in such patients, as demonstrated by one of these cases, who failed to seroconvert. As reduction of immunosuppression was not possible, both were treated with ribavirin (RBV). The evidence for the management of chronic HEV is reviewed.

Scientific findings

Case 1: A 39 year old man diagnosed with Hodgkin's Lymphoma was noted to have deranged LFTs prior to an autologous stem cell transplant. He was diagnosed with chronic HEV infection using serology and RT-PCR on stored serum, and treated with RBV after engraftment. He cleared viraemia after 6 months of treatment.

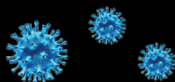
Case 2: A 52 year old woman with progressive chronic lymphocytic leukaemia was diagnosed with chronic HEV using RT-PCR, having failed to seroconvert. Liver biopsy demonstrated acute hepatitis with CLL infiltration. She dropped her viral load on RBV but remains viraemic at a low level after 2 months

Discussion

HEV is a common cause of acute hepatitis. The use of molecular methods to diagnose and monitor viral clearance from the blood is essential in haematological patients who often don't produce detectable antibodies. Treatment with RBV has been used successfully in the clearance and prevention of liver failure in immunosuppressed patients with chronic HEV. Preventative measures include avoiding undercooked pork or venison. There is insufficient evidence for screening of blood products or organ donors at present. A licensed vaccine is available in China, but there is a lack of evidence regarding its efficacy in immunocompromised patients.

Conclusions

HEV is the commonest cause of acute viral hepatitis in the UK. Diagnosis in immunocompromised patients requires virus detection as serology is unreliable. Close monitoring of these patients with regular LFTs, viral load and possibly liver biopsy are essential to diagnose chronicity and initiate treatment to prevent rapid progression to fibrosis and cirrhosis. Reduction of immunosuppression where possible is first-line, where it



is not, there is evidence from case series for use of RBV. Clinicians need to be aware of the change in HEV epidemiology and test accordingly.

How microbiologists sifting through rubbish solved the mystery of ‘The Broken Heart’

Dr Eftihia Yiannakis

Nottingham University Hospitals NHS Trust, East Midlands

Introduction

We describe a case of a young British soldier who presented acutely with a myocardial infarction, coronary aneurysm and aortic valve rupture.

Scientific findings

A 35 year old British soldier presented acutely with severe chest pain on the background of a short history of general malaise and night sweats. Admission investigations revealed not only an acute myocardial infarction but also torrential aortic regurgitation with evidence of a ruptured coronary sinus aneurysm. He required an urgent mechanical aortic valve replacement.

One week post-op, microbiology received an urgent call from the cardiology team following review of histology of the patient’s native heart valve. Histological appearances were consistent with an organising vegetation. Active infective endocarditis had not yet been considered as a cause of the patient’s presentation. Blood cultures and culture of the valve were negative. Samples in our department are stored for 7 days only, but fortunately the valve tissue was salvaged from the waste-bin just prior to disposal and was sent for 16S rDNA PCR. In addition, serology for *Coxiella*, *Bartonella*, *Brucella* and syphilis were requested.

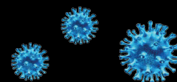
Further questioning revealed the patient to have an extensive travel history which included two tours to Afghanistan, most recently in 2013 as well as travel to Iraq, Bosnia and Belize. He also reported having had an undifferentiated febrile illness in 2008, for which he received a course of antibiotics. He was placed empirically on intravenous ceftriaxone and oral doxycycline pending further results. One week following the commencement of empirical treatment, 16S rDNA on the valve was reported as positive for *Coxiella burnetii*. The plan is for a minimum of 18 months of doxycycline and hydroxychloroquine with regular serological assessment.

Discussion

Q-fever, a rickettsiosis due to *Coxiella burnetii*, is the second most common cause of undifferentiated fever in British troops returning from Afghanistan. Chronic Q-fever, of which endocarditis is the most common manifestation, occurs in approximately 5% of infected patients. Pre-existing valve abnormalities, such as our patient’s previously unknown bicuspid aortic valve, are the most well-established risk factors. Due to the high mortality (up to 25%) associated with Q-fever endocarditis, early and accurate diagnosis is essential to allow for prompt treatment and appropriate follow-up. Our case demonstrates the usefulness of molecular testing of valve tissue in establishing a rapid and conclusive diagnosis. It is notable that the 16S rDNA results were available more than a week before the results of his positive *Coxiella burnetii* serology. In addition, our case also highlights the importance of histology of heart valves in supporting the diagnosis of endocarditis in patients who present with atypical features as it was the histological findings that alerted the team to the possibility of endocarditis and prompted the discussion with microbiology.

Conclusions

Our case reinforces the need to consider Q-fever as a leading cause of undifferentiated fever in returned military personnel, particularly in the context of features of infective endocarditis. It also emphasises the value of 16S rDNA analysis on valve tissue as a diagnostic tool for culture-negative infective endocarditis.



Aspergillus spp: A rare infective cause of life threatening airway obstruction in children

Dr Tejshri Shah

Great Ormond Street Hospital, London

Introduction

Aspergillus laryngotracheobronchitis (AT) is a rare form of invasive aspergillosis, primarily affecting patients with immunodeficiency. In adults, AT has been associated with hematologic malignancies, neutropenia, acquired immunodeficiency syndrome and immunosuppressive therapy. There are no paediatric cases reported in the literature.

Leucocyte adhesion defect (LAD) is a rare, primary immunodeficiency with impaired migration and egression of neutrophils into inflamed tissues. The most common form, LAD type 1 (LAD1) is caused by absent or partial expression of lymphocyte function associated antigen-1 (LFA-1, CD11a/CD18). Patients develop bacterial and fungal infections and inflammatory lesions of the skin and mucosal surfaces. LAD1, where there is no LFA-1 expression is usually fatal without hematopoietic stem cell transplant (HSCT) but patients with partial LAD1 can survive with supportive treatment.

We present the first reported paediatric case of AT, secondary to *Aspergillus fumigatus* in a girl affected by LAD1, presenting with life threatening airways obstruction.

Scientific findings

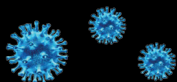
Our patient was diagnosed with LAD in infancy and suffered primary graft failure following HSCT at 7 months of age. She was left with partial LAD: 2% stable residual donor myeloid chimerism, with 0-2% CD18 expression on peripheral polymorphonuclear cells. She had remained clinically stable on bacterial prophylaxis, developing only minor infections. Aged 8 years she presented with a barking cough and progressive stridor. A CT scan demonstrated critical airway obstruction, but normal lung parenchyma. During emergency tracheostomy insertion, laryngotracheobronchoscopy revealed mixed pseudomembranous and polypoid granulomatous lesions distal to the vocal cords. Histology and respiratory secretions confirmed *Aspergillus fumigatus* infection.

Discussion

Pulmonary invasive aspergillosis is a common complication in immunodeficient patients, but AT is much rarer, and not previously described in children. In this case, AT developed in a child with partial LAD (2% functional neutrophils), who had no previous serious infections or typical LAD complications in 7 years since HSCT. Our patient demonstrated no evidence of systemic symptoms, and presented with recurrent croup, which progressed over 6 weeks to critical upper airway obstruction. Infection remained localised to the trachea, with no invasion through her anatomically normal airway. She responded well to treatment with liposomal amphotericin and micafungin and had a successful decannulation of her tracheostomy.

Conclusions

AT should be considered as a cause of upper airway symptoms in children or adults with impaired neutrophil or T-cell function. Atypical presentations, prolonged or treatment refractory symptoms should be investigated urgently and aggressively by teams specialised in the management and direct visualisation of the upper airway. Biopsy samples are critical for confirming the diagnosis. Clinicians managing patients with proven primary immunodeficiency disorders must remain vigilant for severe and unusual infectious complication, even if an individual patient's previous infectious history is unremarkable. Pre-emptive HSCT should be seriously considered patients with partial LAD.



It's not just arcane - it has a dark side too

Dr Jason Biswas

Guy's and St Thomas' NHS Foundation Trust, London

Introduction

Arcanobacterium haemolyticum has been established as the cause of a significant minority of pharyngitis and exanthem cases. It can be difficult to identify from throat swabs as it requires up to 72 hours to become obvious on agar plates. It is usually sensitive to penicillin.

It has rarely been reported as causing deep seated infection, usually cellulitis or osteomyelitis from direct trauma and inoculation. Here we present a case of invasive *A. haemolyticum* infection affecting the pleura and vertebral spine with persistence despite appropriate treatment (and despite sensitivity being established by the reference laboratory).

Scientific findings

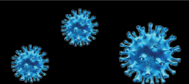
A 61 year old insulin controlled diabetic male presented to his local hospital with shortness of breath on a background of coryzal symptoms. Chest radiograph showed a moderate pleural effusion which was drained and subsequently grew *A. haemolyticum*. He was treated with co-amoxiclav and his symptoms improved somewhat, although he complained of ongoing back pain. He was referred for VATS due to the empyema worsening, and non- resolution despite switching to tazocin, and on arrival at the tertiary centre he was found to have no motor or sensory function in his legs. Emergency MRI revealed complete collapse of T6 and partial collapse of T7 vertebrae. The signal intensity was consistent with discitis of T67 and corresponding osteomyelitis. There was a paraspinal soft tissue mass around this area with a posterior extension into the spinal cord causing cord compression at T6-7, with corresponding signal change in the cord. The empyema was still present adjacent to the paraspinal tissue. Spinal decompression was performed at the same time as lung decortication, and the empyema grew *A. haemolyticum*. Cultures of the vertebral bone and paraspinal tissue were negative, but molecular analysis with 16S PCR identified *A. haemolyticum* in both. He was switched to vancomycin in the light of suspected antibiotic failure, but reference laboratory analysis showed all the isolates were sensitive to penicillin. He was treated with intravenous vancomycin for 6 weeks followed by clindamycin orally. He was transferred for picialist rehabilitation but had not recovered function at the end of antimicrobial therapy.

Discussion

Arcanobacterium haemolyticum is estimated to cause up to 5% of sore throats. Typically it has been thought of as merely a cause of exanthema and mild morbidity from pharyngeal pain or cellulitis when directly inoculated. Rare cases have demonstrated more sinister pathology However our case demonstrates some unique features- not only the fact that the organism caused both the pyothorax and osteomyelitis, but also the very nature of the contiguous spread from lung to bone (in itself a rare event in the literature, and never for this organism, and the lack of clearance despite appropriate penicillin therapy. Given that penicillin is usually the first line therapy for bacterial pharyngitis, this potential for severe sequelae is troubling, especially in the immunosuppressed which make up a significant proportion of the population nowadays.

Conclusions

Arcanobacterium haemolyticum is a cause of significant morbidity, something that general physicians and infection specialists may want to consider in any patient giving a preceding history of sore throat. Although reported as penicillin sensitive, significant sequelae may occur despite appropriate therapy. Beware the arcane presentation!



Whipple's disease with extraintestinal features

Dr Alison Burgess

Public Health England, Bristol

Introduction

Whipple's disease is a rare multisystem disease caused by *Tropheryma whipplei*. The predominant clinical features are weight loss, diarrhoea and malabsorption, but arthralgia as an early extraintestinal symptom is well described. Cardiovascular and neurological manifestations are also known complications. We present a case report of Whipple's Disease with extraintestinal features.

Scientific findings

A 41-year-old Caucasian male presented to the hepatobiliary team having been referred by his general practitioner with an 18-month history of diarrhoea, abdominal distension, lethargy and one stone of weight loss. Over the preceding month his symptoms had become so debilitating he had taken sick-leave from his job as a chef. He had a five year history of seronegative spondyloarthritis, for which he took regular diclofenac, but was otherwise previously well.

Initial investigations revealed a haemoglobin of 8.8g/dL, with a mean cell volume of 71fL, albumin of 17g/L and co-reactive protein of 34mg/L. A tissue transglutaminase (TTG) was negative. An abdominal CT scan demonstrated mesenteric and paraaortic lymphadenopathy. A subsequent duodenal biopsy demonstrated periodic acid-Schiff (PAS) stain positive inclusions within histiocytes in the lamina propria, an appearance highly suggestive of Whipple's Disease. PCR performed on duodenal tissue was positive for the presence of *T. whipplei* DNA.

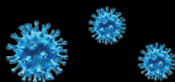
The patient was admitted electively for treatment and further investigation. A transthoracic echocardiogram revealed a 2cm tricuspid valve vegetation and severe tricuspid regurgitation for which he underwent tricuspid valve repair. An MRI of his brain demonstrated an incidental pineal cyst only. CSF was positive for *T. whipplei* DNA. He had no signs of CNS involvement. He was treated with a two week course of ceftriaxone, with a rapid improvement in gastrointestinal and musculoskeletal symptoms, this is being followed by 12 months of hydroxychloroquine and doxycycline.

Discussion

This case highlights several important points regarding the management of Whipple's Disease (WD). Firstly, symptoms of arthralgia precede gastrointestinal features in up to eighty percent of patients with WD, and the diagnosis should be considered in patients presenting with arthropathy alone. Evidence suggests that *T. whipplei* DNA can be detected in synovial fluid enabling earlier diagnosis in these patients. Secondly, it is important to recognise neurological involvement in WD as the prognosis is worse and the treatment is different when compared to non-neurological disease. Given that approximately fifty per cent of WD patients without neurological symptoms are PCR positive for *T. whipplei* in CSF, screening the central nervous system is recommended. Finally, endocarditis is a complication of WD that may be overlooked. Typically, patients do not fulfil Duke criteria as they are afebrile and the organism cannot be cultured outside reference laboratories. However, endocarditis should always be considered in Whipple's disease and an echocardiogram is recommended.

Conclusions

Whipple's disease (WD) is a rare multisystem disease with an incidence of less than 1 per 1 000 000 per annum. As in this case, the typical patient is a Caucasian male approximately 50 years-old with chronic digestive trouble and diarrhoea. However, the importance of extraintestinal manifestations should not be underestimated, both in terms of timely diagnosis and recognition of complications of the disease. Current management of WD is based on published expert opinion. Further research is required to create guidelines for the diagnosis, appropriate investigation and treatment of patients with this condition.



Cry me a fever

Dr Manreet Nijjar

University Hospital Southampton

Introduction

A 71-year old white British male with a history of gout, hypercholesterolaemia and paroxysmal atrial fibrillation for which he took warfarin, presented to hospital in June 2014.

He had travelled to Bulgaria with his wife staying in their villa in a rural area of Burgas Province near the Black Sea on the 26th May. On the 18th June he was bitten by a tick, which he removed that evening without difficulty. Five days earlier he had removed a tick from a cat and crushed it between his fingers. He became acutely unwell on 22nd June with fatigue, headache, fever, myalgia, loose stool, unsteadiness and two episodes of collapse. His symptoms worsened and he was admitted overnight to a private hospital in Bulgaria on the 25th June. He returned to the UK the following day and was admitted to his local University Teaching Hospital.

Scientific findings

Upon arrival he was febrile and had a petechial rash on his legs with no overt bleeding or bruising. He had bilateral crepitations on chest auscultation but no other focal signs were elicited on clinical examination. He was haemodynamically stable.

Full blood count revealed a thrombocytopenia with a nadir platelet count of $15 \times 10^9/L$ (norm: $150-400 \times 10^9/L$). His neutrophils were also low at $1.1 \times 10^9/L$ (norm: $2.0-7.5 \times 10^9/L$) falling to $0.6 \times 10^9/L$. Renal function was normal and CRP was elevated at 22 mg/L (norm: 0-7.5 mg/L). His alanine aminotransferase was raised at 64 units (U)/L (norm: 10-40 U/L).

Discussion

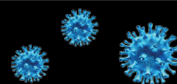
The patient was isolated in a side room and treated with broad-spectrum antibiotics including doxycycline to cover a possible rickettsial infection. The case was discussed with the Imported Fever Service and serum was sent to PHE Porton Down to screen for tick-borne infections including rickettsia, tick borne encephalitis and Crimean Congo Haemorrhagic Fever (CCHF). Serum collected on the 27th of June was PCR positive for CCHF. A sample sent four days later was PCR negative and demonstrated the production of CCHFV-specific antibodies.

The patient was discharged on the 9th July with normal blood parameters and made an uncomplicated recovery.

Conclusions

This represents the second confirmed case of CCHF imported into the UK and the only non-fatal case. The first fatal case was in 2012 in a man returning from Afghanistan with extensive haemorrhagic manifestations.

These two cases highlight the differences in clinical presentation and spectrum of severity associated with CCHF. As travel continues to increase clinicians need to have an increased awareness of the disease, its distribution and its presentation in order to prevent misdiagnoses and to reduce the potential for onward nosocomial transmission. Early discussion with the Imported Fever Service is useful to facilitate prompt identification of the pathogen.



A bite in Big Apple

Dr Melanie Pathiraja

Royal Berkshire NHS Foundation Trust, Reading

Introduction

Human granulocytic anaplasmosis is a tick-borne disease caused by *Anaplasma phagocytophilum* an obligate intracellular Gram negative bacteria. It has a wide variation in prevalence reported in humans depending on the geographic location with highest prevalence reported in the USA and a relatively lower prevalence reported in Europe. *Ixodus* ticks are the predominant vectors with *Ixodus scapularis* 'Deer tick' being the principal vector in the United states and *Ixodus ricinus* 'sheep tick' being the vector for western Europe. Diagnosis is made by demonstrating a four fold rise in the antibody titres using *Anaplasma* specific indirect immunofluorescence (IF) in a paired serum sample or PCR on whole blood during acute phase of infection. This is a first documentation in the UK of an imported case of human granulocytic anaplasmosis confirmed by both whole blood PCR and IF and a probable co-infection with *Borrelia burgdorferi*.

Scientific findings

An 80 year old male patient presented to Acute medical ward in June 2014 with a 7 day history of fever, malaise, rigors, myalgia, increasing confusion and falls. He lives in New York and was travelling through UK and Ireland when he developed symptoms 3 days after arrival. He did not recall any tick bites. Significant clinical findings included pyrexia of 39.1 °C, a pan-systolic murmur and a palpable left upper quadrant mass; other systemic examinations were normal. Peripheral biomarkers were normal (U&E, liver function tests) except for low platelet count of $72 \times 10^9/L$ and a CRP of 189mg/L. He was commenced on intravenous co-amoxiclav 1.2g 8 hourly after appropriate cultures.

Overnight he became acutely unwell and was admitted to 'High Monitoring Unit' with rigors, hypotension, hypoxia, oliguria, pancytopenia with a platelet count of $19 \times 10^9/L$, total WBC $3.7 \times 10^9/L$ and a rise in CRP (250mg/L). A maculopapular rash appeared on his chest. He was commenced on meropenam, clindamycin and doxycycline. CT scan confirmed the presence of 15.5cm splenomegally, bilateral consolidation, pleural effusions with no evidence of lymphadenopathy. Following day a whole blood sample was sent for 16sPCR, along with blood films for *Babesia*, serology for dengue and tick borne pathogens.

He made a remarkable and rapid recovery on empirical therapy and in 48 hours *Anaplasma* was detected on whole blood PCR which allowed targeted therapy with doxycycline and was discharged from hospital after 7 days. The result was confirmed with serology which also tested positive for *Borrelia burgdorferi* IgM raising the concern of co-infection.

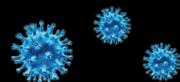
Discussion

Anaplasmosis was first recognised as a human disease in the United States in the mid-1990s but it has been identified as a cause of tick borne fever in sheep as far back as 1932 in Scotland. Since it became reportable in the US in 1999 incidence of human cases have shown a steady increase with most frequent cases being reported in 6 states including New York. There appears to be a significant difference in prevalence of human disease in US and Europe although the presence of pathogen in ticks (*Ixodus*) and the exposure to pathogens in the two regions appear similar. The difference may be due to a variety of reasons one of which may be under diagnosis of cases.

As with our patient most present in the summer months. There is a male preponderance (53%), and majority presents with fever (100%), malaise (47%), rigors (27%), myalgia (40%).

Rash, splenomegally, pneumonia are uncommon findings and a concurrent other tick borne infection should be considered especially with rash.

Estimated case fatality is <1%. Patients who are treated early recover quickly while those who are elderly, immunocompromised, with late diagnosis or may require prolonged hospital stay including intensive care treatment.



Whole blood sample for PCR is the most sensitive method of diagnosis in the first week of illness but rapidly reduce in sensitivity with treatment, hence early laboratory sampling may have facilitated detection in this case. Indirect immunofluorescence in paired serum samples still remain the Gold standard in most cases.

Conclusions

Anaplasma is a recently recognised tick-borne infection. High index of suspicion with early treatment pending investigation is required for better outcome. Our patient presented with rapidly progressing severe disease, having travelled from New York, with many differential diagnosis including bacterial sepsis/endocarditis/malignancy. 16s PCR provided a rapid diagnostic tool to identify the aetiology, narrow the treatment spectrum, prevent unnecessary diagnostic interventions.

While the title may have many inferences; technology such as above paving the pathway for better diagnostics, understanding of infectious pathology, and better management of patients may very well be in diagnostic microbiology 'The bite in Big Apple'.

Early experience of compassionate-use bedaquiline for treatment of XDR-TB in the UK: a case study

Dr Joe Lewis

Royal Liverpool University Hospital

Introduction

Extensively drug resistant tuberculosis (XDR-TB) is defined as TB resistant to rifampicin, isoniazid, at least one fluoroquinolone and at least one injectable antituberculous agent. It is associated with a high mortality and is rare in the UK.

Bedaquiline is a novel mycobacterial ATP synthase inhibitor, licensed in the UK in June 2014, that has shown improved rates of sputum culture conversion compared to placebo in MDR-TB in phase II trials. There are no published data on the use of bedaquiline in a UK setting, and very limited data on use in XDR-TB.

We present a case report of a patient in the UK with XDR-TB who is undergoing treatment with bedaquiline; we emphasize the early "lessons learned" in the use of this important new agent that will be useful for other centres managing similar patients elsewhere.

Scientific findings

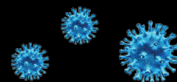
In January 2014, a 20 year-old HIV-negative Romanian lady was referred to our unit with smear-positive pulmonary TB; genotypic resistance testing showed XDR-TB. Bedaquiline was made available through a compassionate use programme and she was treated with a six drug regimen of bedaquiline, linezolid, pyrazinamide, cycloserine, azithromycin and PAS; she sputum culture converted 24 days later, 81 days after first starting first-line TB treatment (rifampicin-isoniazid-pyrazinamide-ethambutol).

Bedaquiline was largely well tolerated. Nausea was initially problematic, but settled with levopromazine. We noted a transient asymptomatic ECG QTc prolongation to 470ms and mild prolongation of prothrombin time secondary to drug-related factor VII deficiency; neither required intervention.

Discussion

XDR-TB is rare in the UK, with 26 cases reported to Public Health England between 1995 and 2012; however the incidence seems to be increasing, with 12/26 (46%) of the total UK cases to 2012 reported in the preceding three years. It has poor outcomes and a high mortality of over 70% in some studies. In addition, XDR regimens are toxic; over 70% of XDR-TB patients in Tomsk, Russia needed to change treatment regimen due to toxicity.

Bedaquiline has shown improved time to sputum culture conversion in MDR-TB in non-UK settings in phase II trials. It is recommended by the WHO for use in the treatment of MDR TB, but data on its use in XDR-TB and in the UK are limited. Time to sputum culture conversion for our patient was comparable to published



outcomes for bedaquiline use in MDR-TB in non-UK settings (83 days with bedaquiline vs 125 for placebo in addition to a five-drug background regimen).

However, safety concerns have been raised as a higher mortality rate was detected in patients taking bedaquiline as compared to placebo. A causal pattern was not identified and deaths were not thought to be due to the drug. Reported adverse events of bedaquiline in phase II trials include nausea, vomiting, arthralgia, hepatitis and QTc prolongation. Acquired factor VII deficiency has not been previously described with bedaquiline.

Conclusions

Bedaquiline was well tolerated as part of a six drug regimen for XDR-TB in the UK. Time to sputum culture conversion was comparable to published data on its use in MDR-TB in non-UK settings. Adverse events were mild and manageable and included nausea, QTc and prothrombin time prolongation.

XDR-TB outcomes are poor with high mortality, and treatment uses toxic treatments that cause significant adverse events. Novel agents are urgently needed. Based on our experience, bedaquiline as part of a tailored XDR-TB regimen can be safe and effective in the management of XDR-TB.

Pneumococcal puerperal sepsis without respiratory infection

Dr Kim Findlay-Cooper

Royal Devon & Exeter Hospital, Devon

Introduction

Puerperal sepsis remains a significant cause of mortality and morbidity, with beta haemolytic streptococci groups A and B predominating. We report 2 cases of *S. pneumoniae* puerperal sepsis due to an unusual serotype, the women admitted during the same week but with no discernible connection between them, geographical or personal. Neither woman had respiratory symptoms or had family members with any illness.

Scientific findings

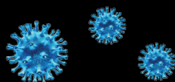
Patient one delivered by emergency caesarean section at 30 weeks due to pyrexia and foetal tachycardia, after 48 hours of ruptured membranes for which she was taking prophylactic erythromycin. A vaginal swab taken on admission grew *S. pneumoniae*, as did placental swabs at delivery 3 days later. Histology showed funisitis and chorioamnionitis, and although the baby was irritable, all cultures- including CSF- proved negative. He responded well to 2 weeks of empirical cefotaxime.

Patient two also delivered after prolonged rupture of membranes and treatment with prophylactic erythromycin, instigated after an HVS yielded *S. pneumoniae*. The baby was born one day later at 34 weeks gestation. Blood cultures from the baby and placental swabs grew pneumococci. Maternal blood cultures remained sterile, and histology revealed funisitis and chorioamnionitis. Mother and babe were treated empirically with cefotaxime and both responded well to treatment.

Both strains of pneumococcus were serotyped as type 16 F, a strain type not found in current vaccines

Discussion

The importance of early diagnosis and adequate therapy of puerperal sepsis was highlighted by the CMACE report, with a dramatic resurgence and increase in the incidence of maternal mortality due to *S. pyogenes*. Pneumococci are relatively uncommon causes of puerperal sepsis, especially via the vaginal route as compared to respiratory tract infection. In both women pneumococcal infection resulted in premature delivery, and in one baby proven septicaemia whilst the second baby was clinically unwell but cultures remained negative. Positive initial vaginal swabs taken on commencement of erythromycin, which may have mitigated the infection somewhat, and both isolates were sensitive to erythromycin. Neither mother was immunocompromised or HIV positive. Serotype 16F is relatively uncommon among invasive pneumococci, and there was no link between the two women although both were admitted to hospital on the same day that the HVS were taken



Conclusions

Prolonged ruptured membranes continue to pose a risk of infection and early delivery, and invasive pneumococcal infection need not be preceded by respiratory symptoms.

Parallel Session: Implantable cardiac electronic device infection

Overview

Dr Jonathan Sandoe

Associate Clinical Professor, University of Leeds

Dr Richard Watkin

Consultant Cardiologist, Heart of England NHS Foundation Trust, Birmingham

Use of implantable cardiac electronic devices (ICEDs) including permanent pacemakers (PPM), implantable cardiac defibrillators (ICD) and cardiac resynchronisation therapy devices (CRT) is increasing, with 40,000 implants in the UK in 2010. Infection affecting these devices is increasing in the USA and is likely to increase in the UK. Diagnosis of ICED infection can be difficult and the possibility of ICED infection is frequently overlooked, resulting in treatment delay. ICED infections present complex clinical problems not simply because a medical device is involved but also because these devices have both intravascular and extravascular components and infection may involve the generator, device leads, native cardiac structures and other cardiac implants alone or in combination. The diagnosis is bad for patients because mortality and morbidity are high and long periods of hospitalisation are usually required for antimicrobial therapy and device management.

The lack of appreciation of the scale of this problem and the lack of a standardised approach to the prevention and treatment of ICED infection, prompted the British Society for Antimicrobial Chemotherapy (BSAC) to establish a Working Party in collaboration with the key UK cardiology societies to develop guidelines with the aim of: 1) improving the quality of care provided to patients with ICEDs; 2) providing an educational resource for healthcare professionals; 3) encouraging a multidisciplinary approach to management of ICED infection; 4) promoting a standardised approach to the diagnosis, management, surveillance and prevention of ICED infection through pragmatic evidence-rated recommendations; 5) advising on future research and audit projects.

This session will: explore the pathogenesis and clinical presentation of ICED infection; describe the devices and how they are implanted; outline an approach to investigation of patients with suspected ICED infection and discuss ways of preventing ICED infection.

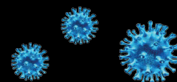
Parallel Session: Travel medicine

Surveillance of travel-related diseases

Joanne Freedman

Senior Scientist, Public Health England

The Travel and Migrant Health Section (TMHS) within Public Health England has a dedicated function of collation and analysis of surveillance data on illness in UK travellers and migrants to the UK. It is a cross cutting function which works closely with a range of surveillance systems to take a population based rather than a disease specific focus. There are strengths and weaknesses of surveillance systems used for travel-associated illness and these will be discussed with disease specific examples. With just under 60 million visits made abroad by UK residents in 2013 and 13% of the resident population being born abroad, it is evident that there are significant numbers of people at risk of infection acquired abroad, and surveillance data contributes to an evidence-based understanding of how the health of these groups can be protected and improved at both a national and local level.



Preparing the complex traveller

Lynda Bramham

Specialist Nurse, National Travel Health Network and Centre (NaTHNaC)

Data from the Office for National Statistics over the last 50 years shows a huge increase in the number of UK residents travelling abroad and visiting areas other than Europe and North America. Health care professionals are seeing increasing numbers of travellers with complex itineraries and health needs. Lynda will discuss the need for a careful risk assessment to maximise the impact of the pre travel advice and interventions. She will highlight some of the useful resources for health care professionals and include some of the traveller scenarios from the NaTHNaC advice line.

Emerging infectious diseases and the international traveller

Professor David Heymann

Professor of Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine

During the past 30 years, more than 35 new infection-causing organisms have been identified, ranging from new strains of influenza and hepatitis to viral haemorrhagic fevers and AIDS. Many, if not most of these emerging infectious agents are thought to have been transmitted to humans by animals, as in the case in the current outbreaks of Ebola in West Africa, where an animal infection breached the species barrier to infect a human; SARS in China, where a virus spread from live market animals to a human and then caused an epidemic of fatal lung disease; and avian influenza, which continues to sporadically infect humans from infected chickens since it was first identified in 1997.

Emerging infections are a risk to the traveller from contact with infected humans or infected animals and their excretions, or as a result of eating contaminated food, drinking contaminated water, being hospitalized in an environment where infections are present, or receiving an unsafe injection or blood transfusion.

At the same time the development and spread of drug resistance to infections such as tuberculosis, gonorrhoea, enteric and other common infections has further added to the problem, leading to the conclusion that an infectious disease in one country is the concern of all, including travellers to areas where they are present.

Parallel Session: Fungal infection

Best practice recommendations for the diagnosis of serious fungal diseases

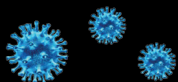
Dr Silke Schelenz

Senior Clinical Lecturer, Norwich Medical School

Silke Schelenz, Rosemary A Barnes, Richard C Barton, Joanne R Cleverley, Sebastian B Lucas, Christopher C Kibbler, David W Denning on behalf of the British Society for Medical Mycology

Members of the British Society for Medical Mycology working party have previously proposed and published standards of care for patients with invasive fungal infections (Lancet Infectious Diseases 2003). These standards have recently been reviewed and codified into best practice guidance to accommodate new evidence and information published in the field of fungal diagnostics. New recommendations have now been considered and adopted, to make a total of 43 key recommendations which include guidance on the role of microscopy for rapid diagnosis, fungal identification to species level and susceptibility testing. Other areas covered are the role of antigen detection for cryptococcal disease and invasive aspergillosis, combined with molecular (PCR) detection for aspergillosis as well as antibody detection for chronic and allergic aspergillosis. A focus has also been on considering histopathology reporting using a panel of special stains and seeking consultation advice. Lastly a best practice guidance on the utilization of imaging technology is provided with an emphasis of timely (<48 hours) and optimised imaging for suspected invasive fungal infection.

The best practice guidance is suitable for audit and should be adopted to ensure best diagnostic practice, and improved outcomes for patients.



Current issues in diagnosis and management of *Pneumocystis*

Professor Rob Miller

Consultant in Infection and Population Health, University College London

The opportunistic fungus *Pneumocystis jirovecii* is the cause of pneumonia (PCP) in HIV-infected and other immunocompromised patients. While there has been a reduction in HIV associated PCP among HIV-infected populations, it is increasingly recognised among medically-immunosuppressed persons. This presentation will focus on:

- 1) Identifying non-HIV infected immunosuppressed patients at risk of developing PCP.
- 2) Diagnostic tests - and their pitfalls - including conventional laboratory tests, molecular detection and serological assays (including LDH, AdoMet and beta-glucan).
- 3) Treatment of PCP - and troubleshooting when things go wrong.
- 4) Outcomes from ICU admission for severe HIV-associated PCP - including timing of starting antiretroviral therapy.
- 5) Novel treatment regimens.

Barnett Christie Lecture

The Barnett Christie Lecture was originally established in the early 1990s by the British Society for the Study of Infection, or BSSI, to honour the distinguished Scottish Infectious Diseases Physician, Dr Andrew Barnett Christie (1909 – 1991).

Barnett Christie was born in Aberdeen in Scotland UK. He attended Gordon's College and Aberdeen University, graduating MA in classics in 1930. After a short dalliance with law as a postgraduate, he ultimately decided that medicine was his true calling and graduated MBChB from Aberdeen University in 1935.

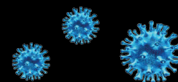


At that time many Scottish-trained physicians were moving south of the border to England to work in public health and infectious diseases, and Barnett Christie decided to follow this trend and specialise in this field of medicine. From 1937 to 1939 he worked in the Eastern Hospital, London, then served during World War II as medical superintendent at the Westcliff Hospital, Southend on Sea.

In 1946 Barnett Christie was appointed consultant and physician superintendent at Fazakerley Hospital, Liverpool, where he remained until he retired in 1974. In addition he was during this time also head of the department of infectious diseases at the University of Liverpool. It was shortly after Barnett Christie had started work in Liverpool that the United Kingdom's ground-breaking National Health Service, or NHS, came into being, in 1948.

In Barnett Christie's early years at Liverpool, many infectious diseases were only just beginning to come under control and doctors and nurses regularly had to contend with epidemics of conditions such as measles, whooping cough and poliomyelitis. Indeed the regional centre for the treatment of respiratory poliomyelitis was set up at Fazakerley Hospital under Barnett Christie's guidance. The unit served the area of Merseyside and North Wales and provided the most up to date and efficient means of prolonged artificial respiration for those adults and children paralysed by this dreadful infection.

With the gradual control of such epidemic diseases the clinical workload decreased and Barnett was able to devote more time to his writing. This culminated in the publication of his best-known work, the classic textbook "Infectious diseases: epidemiology and clinical practice" (1969). A single author volume of over 1,000 pages, with extensive references, it was an authoritative and beautifully written account of infectious diseases throughout the world. This magisterial work was Barnett Christie's outstanding life achievement, although he had been a writer since boyhood and his love of the craft lasted all his life.



Throughout his career Barnett Christie was a prolific contributor to journals and books on infectious diseases and public health matters. He wrote other textbooks, including one for nurses, "Infectious diseases", with chapters on sexually transmitted diseases, and also shared the authorship with his daughter of a book entitled "Food hygiene and food hazards for all who handle food".

After his retirement from Liverpool's Fazakerley Hospital in 1974, Barnett Christie remained extraordinarily busy. He continued to work in the healthcare field, applying his considerable experience and knowledge to problems all over the world.

He taught and lectured all over the world, notably as the first Justus Strom lecturer in Stockholm Sweden, the first Macfarlane Burnet lecturer in Australia, and the Sydney Watson Smith lecturer at the Royal College of Physicians of Edinburgh.

Barnett Christie's post-retirement career took him to Libya; in 1975 he was based in Tripoli at the Ministry of Health, and latterly he was professor of infectious diseases at Garyounis University in Benghazi in 1976. In addition, he carried out assignments on behalf the World Health Organisation and the British Council far and wide, including in Indonesia, the Eastern Mediterranean, Nigeria, Colombia and Peru.

Despite such an active and productive life he was a great family man, and he also some found time to engage in a plethora of hobbies and interests, including oil painting, bee-keeping, wine making, music, ballet and travelling. In fact this last interest produced yet another book, "Motoring and camping in Greece" (1965).

Both nationally and locally Barnett Christie was an active and valuable member of many societies. He was the first president of the British Society for the Study of Infection, and founder chairman of the North West Epidemiology Club.

As mentioned earlier, the BSSI founded a lectureship named in his honour, to encourage quality in the presentation of papers by younger members, and he was able to present the first award in person in Scotland in April 1991, the prize being a copy of his well-known book.

Eventually the BSSI transformed into the British Infection Society and, with an amalgamation with the Association of Medical Microbiologists, ultimately became the British Infection Association, or BIA.

The BIA honours the life and work of Andrew Barnett Christie by continuing the tradition of selecting through open competition a young clinical scientist of high quality to present a lecture about their own original work, the "Barnett Christie Lecture".

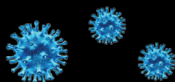
Whole genome sequencing in your lab – opportunity or distraction?

Dr David Eyre

Academic Clinical Lecturer, University of Oxford

Summary

Whole genome sequencing, WGS, provides a technique that potentially enables much of the work of the traditional microbiology laboratory to be undertaken in a single microorganism-independent step. Published work from the presenter (references underlined), complimented by other key studies, will be presented to demonstrate it is possible to perform species identification and to determine antimicrobial sensitivities within hours of positive culture. Further work presented will show the data also allows detection of important virulence determinants, and provides strain typing / relatedness data for local, national, and international surveillance and transmission studies. Benchtop sequencing allows this technology to be delivered at a scale and cost appropriate to routine hospital laboratories.



Aims

The aims of the talk are that the audience will understand:

- Key applications for WGS data, including species identification, antimicrobial sensitivity testing, detection of virulence elements, and local, national and international transmission studies and surveillance
- How WGS can improve our understanding of infectious disease, using healthcare-associated *Clostridium difficile* as an example
- How WGS data is generated, including timescales, costs, and training implications
- The need for validated high quality workflows to apply WGS to clinical care

Introduction

Motivating example – benchtop sequencing to investigate outbreaks of *Staphylococcus aureus* and *Clostridium difficile* (*BMJ Open* **2**:e001124). WGS used to both refute and support transmission together with epidemiological data. WGS possible in real time, at costs in keeping with other specialist laboratory investigations.

The technology

Summary of sequencing platforms, nature of data generated, and processing and storage requirements (e.g. *Nat Rev Microbiol* **10**:599–606).

Is it reliable?

Must be able to generate reproducible data. Demonstrated through sequencing the same isolate multiple times (e.g. in *C. difficile*, *N Eng J Med* **369**:1195-1205 and *Mycobacterium tuberculosis*, *Lancet Infect Dis* **13**:137–146), and obtaining the same result. Must understand how stable the sequenced genome is over time, e.g. in the same individual over time (e.g. in *C. difficile* and *M. tuberculosis*), over longer timescales in *C. difficile*, *Genome Biol* **13**:R118) and in experimental models of disease (*C. difficile* gut model, *PLOS One* **8**:e63540).

Species identification

Most simple application of WGS for species identification is to perform *in silico* 16S gene sequencing. However clearly much more information available from the whole genome, and this can be used in scenarios where 16S based approaches are not sufficient, e.g. identification of *Mycobacteria* (colleagues' on-going work will be presented).

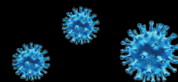
Antimicrobial sensitivity testing

Possible to predict phenotypic antimicrobial sensitivities from genomic data. Can match the performance required of a routine laboratory in terms of major and very major error rates. Examples will be presented using enterobacteriaceae (*J Antimicrob Chemother* **68**:2234-2244) and colleagues' work in *S. aureus* (*J Clin Microbiol* **52**:1182-91).

Local outbreak management

Examples provided of the use of WGS to refute or support transmission in local outbreaks, returning to example in introduction (*BMJ Open* **2**:e001124) and work from other researchers, *S. aureus* in neonatal units (*N Engl J Med* **366**:2267–75, *Lancet Infect Dis* **13**:130–6.), carbapenem resistant *Klebsiella pneumoniae* (*Sci Transl Med* **4**:148ra116). WGS also allows comparison of strains from across national outbreaks, and detection of international spread, an example will be presented an Australian *C. difficile* ribotype 244 outbreak with spread to the UK (*in review*).

The additional value that WGS adds over traditional typing methods will be discussed (*Expert Rev Anti Infect Ther* **11**:1193-1205), in particular a comparison of WGS and ribotyping and multilocus variable number tandem repeat analysis in *C. difficile* (*J Clin Microbiol* **51**:4141-4149). WGS can also be used to distinguish the cause of disease recurrence, i.e. to distinguish between re-infection and relapse of the original infection



(*J Infect Dis* **209**:1446-1451). WGS also allows for mixed infections to be detected and accounted for in transmission studies, without the need for labour-intensive independent typing of multiple colonies/samples (*PLoS Comput Biol* **9**:e1003059).

Better understanding *C. difficile*

Combining detailed epidemiological data on healthcare exposure with comprehensive WGS of isolates from all *C. difficile* infection cases in a defined geographical area has provided significant insights into the transmission of *C. difficile* (*N Eng J Med* **369**:1195-1205). The data demonstrate, that contrary to prior belief, only the minority of new cases of *C. difficile* infection are acquired from other cases. The strains causing infection are genetically diverse, such that multiple reservoirs for infection are likely, including asymptomatic patients (*PLoS One* **8**:e78445). WGS data collected to undertake transmission studies of this kind has also yielded significant biological insights, e.g. into recombinational switching of *C. difficile* surface proteins (*J Infect Dis* **207**:675-686) and the origins of the *C. difficile* toxin genes (*Genome Biol Evol* **6**:36-52).

Challenges and future directions

Currently, bacterial WGS mostly depends on prior culture. Development of culture-independent methods will improve turn around times and extend the use of WGS to fastidious organisms. Proteomic approaches based on MALDI-TOF offer a significant competitor to WGS, particularly with efforts to extend its use beyond identification to sensitivity testing and strain typing. As current WGS data must be processed before use, standards are required to make sure this is done reproducibly across organisations and different sequencing technologies. Huge volumes of data are generated, particularly with large-scale sequencing – computing power and storage may become particularly important resources for laboratories. It is likely that fast, accurate and cheap WGS will become increasingly used in routine clinical microbiology, where it could replace many complex current techniques with a single, more efficient workflow (e.g. *Nat Rev Genet* **13**:601–12).

Parallel Session: Ebola Virus Disease (EVD)

Overview

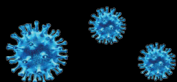
Dr Nick Beeching

Senior Lecturer in Tropical and Infectious Diseases, Liverpool School of Tropical Medicine

This short symposium includes three talks to contrast the working conditions and reality of managing Ebola in a resource poor setting, with those in the national clinical facilities at the Royal Free Hospital. Common themes and problems discussed with the Imported Fever Service will be reviewed.

Professor Bob Colebunders and Professor David Heymann will join the panel to discuss related issues with delegates following the 3 talks.

Professor Bob Colebunders will be delivering the keynote lecture later in the day.



Parallel Session: Approaches to the prevention and treatment of sexually transmitted infections – successes and challenges

Will gonorrhoea become an untreatable disease? Meeting the challenge of antimicrobial resistance

Dr Stephanie Chisholm

Molecular Epidemiology and Surveillance Section Head, Public Health England

Gonorrhoea is a sexually transmitted infection which if untreated causes serious reproductive tract morbidity. Most recent estimates from the World Health Organisation estimate 106 million new cases of gonorrhoea occur annually worldwide, and 29 291 new diagnoses were reported in England in 2013. Treatment is empirical, based on national treatment guidelines. However the causative organism, *Neisseria gonorrhoeae* has a remarkable propensity to develop antimicrobial resistance and this has repeatedly presented a challenge to the empirical approach to therapy. Until relatively recently, treatment of gonorrhoea for each antimicrobials used followed a similar cycle, namely a monotherapy was recommended and used widely until resistance and treatment failure emerged - at which point a new alternative monotherapy was recommended. This repeated cycle ultimately lead to diminishing treatment options. In the absence of new antimicrobials being available, there is now a real risk that gonorrhoea could become an untreatable infection. When third generation cephalosporins were introduced as treatment in the mid-2000s in many countries, it was recognised that these agents were amongst the last options for empirical therapy. Consequently when reports of cefixime resistance began to emerge, there was a renewed approach to antimicrobial stewardship; guidelines were revised before reports of treatment failure were widespread and recommended, for the first time, a dual therapy of ceftriaxone combined with azithromycin. This novel strategy should slow the development and dissemination of resistance, and there is evidence that levels of cephalosporin resistance are decreasing in Europe. However reports of resistance to ceftriaxone and high-level azithromycin resistance in the UK and elsewhere highlight the ongoing challenge in maintaining existing antimicrobials as effective treatment. Continued efforts to improve coverage, timeliness and representativeness of resistance surveillance, to improve diagnosis and management of gonorrhoea and to identify treatment failure and ensure effective treatment of refractive infection will all be essential in meeting this challenge.

The potential for HPV diseases to be eradicated by HPV immunisation

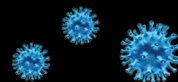
Professor Heather Cubie

Honorary Professor, University of Edinburgh

There are around 150 types of human papillomavirus (HPV) , most often separated into low and high risk (LR-HPV and HR-HPV) according to their ability to act as carcinogens. Currently, two licensed vaccines exist to limit spread of infection and development of disease [bivalent vaccine, Cervarix® and quadrivalent vaccine, Gardasil®]. Both target HPV 16 and 18, which are most frequently associated with cervical cancer, one of the world's most common cancers in women. Gardasil® also targets HPV 6 and 11, which are LR types most commonly associated with genital warts.

HPV infection is very common and usually self-limiting in both men and women. It is a highly epitheliotropic virus and requires close skin contact for spread. Long term persistence in the unusual environment of cervical epithelium and transformation zone is the real risk factor for progression to cancer. One could argue that the use of a 'cancer preventing vaccine' has enabled the association of HPV with sexual transmission to be contained and led to exceptionally high vaccine coverage (80-90%+) in a national school based programme for 11-12year old girls. In contrast, the potential to prevent genital warts, the most common STI in the UK opens the door to immunisation of both boys and girls. This difference in approach has led to fierce debate on how to deal with the increasing numbers of oropharyngeal, anal and other genital cancers associated with HR-HPV in both men and women.

One important factor in the choice of vaccine will be the relative importance of cancer prevention and STI limitation to an individual country's economic base and healthcare priorities. Another factor will be long term protection, both in terms of duration of neutralising antibodies over decades and in cross-protection



against other HR-HPV found in cervical cancers. A new nono-valent vaccine, V503 in the pipeline might address some of these issues, but it will take several years for efficacy in the field to be proved.

Given the political and financial will, the potential to eradicate HPV infection and disease exists. This talk will explore the difficulties and limitations in achieving such a goal.

The importance of rapid, point of care, diagnosis of bacterial STIs – including the core challenges and benefits of this approach

Dr Tariq Sadiq

Reader & Honorary Consultant in HIV/Sexual Health, St George's, University of London

Lack of accurate rapid diagnostics for STIs and antimicrobial resistance (AMR) threatens the ability to successfully treat patients empirically at diagnosis, which is a cornerstone of managing high risk, mobile sexually active populations. Failure to adequately treat some of these infections risks the emergence of serious reproductive and child health sequelae as well as increasing prevalence of infection.

Empirical therapy has becoming a particular problem for two infections, *Neisseria gonorrhoeae* and *Mycoplasma genitalium*. Clinical services, however, increasingly diagnose gonorrhoea only by nucleic acid amplification tests without culture and susceptibility testing and do not routinely test for *M. genitalium* at all. Modern, nanotechnology and microfluidic based approaches to concurrently genotypically testing for both infection and antimicrobial susceptibility may enable personalised therapy in both laboratory-based diagnosis and at point of care settings. Such approaches may enable rational prescribing, offer new strategies for clinically managing drug resistance and potentially have impact on the spread of AMR.

Scientific Free Papers

Phenotypic switching of mucoid *Pseudomonas aeruginosa* to small colony variants in CF patients potentiates biofilm formation and persistent infection

Dr Sharon Irvine

University of Glasgow

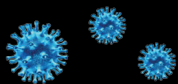
Introduction

Pseudomonas aeruginosa represents the major cause of morbidity and mortality in cystic fibrosis (CF) patients. Phenotypic variations occur during chronic colonisation, including conversion to mucoidy or the occurrence of small colony variants (SCVs). SCVs show increased resistance to antibiotics, enhanced biofilm formation, slow growth and increased cytotoxicity and their presence correlates with poor lung function and persistence. SCVs have been described for a wide range of bacterial genera and species and have been recovered from numerous clinical samples indicating an ability to form persistent infection. Large scale genome rearrangements have previously been described which result in enormous variation in bacterial phenotype.

The aims of this study were to characterise a small colony variant of *P. aeruginosa* obtained from a chronically colonised murine model initially inoculated with a clinical mucoid strain and to establish the mechanism behind this phenotypic switch.

Scientific findings

SCVs showed a stable phenotype with no reversion to mucoid NH. Analysis revealed distinct colony morphology, prolonged growth phase, altered antimicrobial susceptibility, an acquired ability to switch on production of the Type III secretion system, increased biofilm production and increased cytotoxicity to macrophages. Electron microscopy revealed a clear difference in biofilm architecture in the SCV compared to the mucoid parent strain. PFGE results failed to indicate any large-scale genetic rearrangements. Initial transcriptomic analysis suggests differential expression of approximately 600 genes. Initial Illumina



genomic analysis revealed a SNP within the *algU* gene. PacBio sequencing revealed a large scale genome rearrangement.

Discussion

In vivo 'switching' of the mucoid NH strain to the SCV results in significant phenotypic variation.

Conclusions

This study demonstrates clear 'in vivo' phenotypic switching of a mucoid *Pseudomonas aeruginosa* to a phenotypically distinct SCV. The increased pathogenic potential of this microorganism makes this clinically significant. Further transcriptomic, genomic and phenotypic work is currently under way to establish the mechanism behind this switch.

An evaluation of the maturity of antimicrobial stewardship in Scotland

Dr Clare Colligan

Scottish Antimicrobial Prescribing Group, Glasgow

Introduction

The Scottish Antimicrobial Prescribing Group (SAPG) was established in 2008 to lead and co-ordinate the delivery of the recommendations laid out in the Scottish Management of Antimicrobial Resistance Action Plan (ScotMARAP). Local Antimicrobial Management Teams (AMTs) have been supported through national guidance and recommendations to improve antimicrobial stewardship at board level and progress with key recommendations has been evaluated through on-line surveys to capture this information. With the recent refresh of the Scottish Management of Antimicrobial Resistance Action Plan (ScotMARAP) was recently refreshed in line with the new UK Antimicrobial Resistance Strategy and SAPG agreed to review the achievements of AMTs to date and identify ongoing challenges. A survey was developed utilising validated questions from published European studies adapted to the Scottish context along with questions specific to delivery of ScotMARAP and other SAPG initiatives.

Scientific findings

The survey was divided into four topic domains to explore in detail, how the stewardship agenda has matured within the boards. A Survey Monkey© on-line tool was used to allow AMTs to input data and SAPG to create a summary report. The tool was tested by two AMTs prior to broader distribution to identify any practical issues or ambiguity in questions. The survey has provided information about local implementation of stewardship within four domains which were used in previous European studies: Human resources, structure and mandate; Services and activities; Stewardship tools; Professional development. Nine out of 10 of the key validated indicators were reported against in this survey with good performance in all boards and 6 boards scored 9/9. Delivery of the recommendations from ScotMARAP 2008 has been demonstrated and the national programme has been further developed primarily through additional quality improvement interventions. As well as confirming the status of local stewardship it has identified important areas for further development.

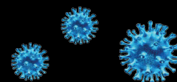
Discussion

Key results from the survey include:

All boards have an established AMT which has a core membership of Consultant Microbiologist, Antimicrobial Pharmacist and Infection Prevention and Control representative and the majority of AMTs are chaired by medical staff.

Responsibility for antimicrobial stewardship sits at corporate level in all boards.

Most boards carry out ad hoc compliance with guidance audits and eight boards have a planned programme of point prevalence surveys.



Antimicrobial ward rounds are carried out in 9/14 board areas and 10/14 boards have an out-patient intravenous antibiotic therapy (OPAT).

These findings provide SAPG with assurance that the stewardship programme has matured at national and local level during the past 6 years. It has also allowed us to 'benchmark' NHS boards to identify areas of good practice which can be shared amongst the stewardship community in Scotland. The output from the survey will inform SAPG strategic plans for 2015-18.

Conclusions

Antimicrobial Management Teams are well established in all boards with robust governance and collaboration with Infection Prevention and Control and Primary Care teams. A variety of stewardship activities and tools are utilised across all boards with many examples of good practice but further work is needed to standardise local surveillance of antimicrobial use and resistance to compliment the national surveillance programme. Local education programmes have been established but further work is required to increase mandating of training on stewardship and to support the role of nursing staff in contributing to stewardship within the multi-professional team.

Causes of mortality in 16 to 65 year olds in the two years after invasive pneumococcal disease

Dr Chloe Walsh

Hull & East Yorkshire Hospitals NHS Trust

Introduction

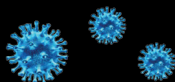
Invasive pneumococcal disease (IPD) remains an important cause of mortality despite vaccination. We previously showed an increase in mortality between 30 days (22%) and 1 year (37%) in an epidemiological study of 653 patients with IPD [Epidemiol Infect 2012;140:1252-66]; this occurred in both younger (16 to 65 years) and older adults. We therefore performed a retrospective cohort study of patients admitted to a university hospital with IPD in order to identify the early/late causes of mortality in younger adults.

Methods

Patients were identified from the database of our previous study. Consecutive patients with samples positive for *Streptococcus pneumoniae* from a normally sterile site (2007 to 2009) were included. Case notes/hospital computer systems were reviewed with demographic/clinical characteristics of patients and outcomes recorded. For patients who died within 2 years of IPD episode, death certificates were ascertained. Statistical analyses were performed using SPSS. Ethical approval was received prior to study commencement.

Scientific findings

207 patients were identified with a two-year mortality of 39%. 90 (43%) were aged 16 to 65 years of whom 19 (21%) died within two years (age range of deaths 29 to 64 years; 42% ≤50 years); 10 deaths (11%; 53% of deaths) occurred during initial hospital admission and 11 (12%; 58% of deaths) within 30 days of positive culture. Almost all deaths (95%) occurred within 1 year of the IPD episode. The primary causes of death, according to death certification, were: infection related 8 patients (42% of deaths), cancer 7 (37%) and other causes 4 (21%) [Other causes = 1 cerebrovascular accident, 1 alcoholic liver disease, 1 gastric ulcer, 1 COPD]. Of patients who died during admission, infection, alcohol and cancer were mentioned on death certificates (position 1a to 1c or 2) in 90%, 40% and 20%, respectively. In contrast, cancer was mentioned in 67% of post-discharge deaths (infection 11%, alcohol nil). Most patients who died (89%) in the two years following an episode of IPD had at least one important co-morbid illness identifiable on admission to hospital (versus 25% of survivors). The following variables were significantly ($p \leq 0.05$) associated with mortality within two years by univariate analyses: new confusion*, CCF, solid organ malignancy, alcoholism* and bacteraemia with no focus*. (* these variables were also significantly associated with death within 30 days).



Discussion

Our results highlight the important association between pre-existing co-morbidity and mortality following IPD, even in younger adult patients; almost all of those who died had at least one important co-morbid illness. Infection was implicated in a high proportion of deaths that occurred during hospital admission (mostly pneumonia; mentioned on 70% of death certificates), whereas a high proportion of patients who died after hospital discharge had a variety of cancers. We were unable to ascertain what proportion of younger adults with co-morbidity had received vaccination; in over 65 year olds, however, three-quarters had been vaccinated with most episodes (82%) due to serotypes covered by the 23-valent polysaccharide vaccine. There are little published data on the causes of late mortality specifically in adults following IPD. In community-acquired pneumonia (CAP), however, Mortensen et al (Arch Intern Med 2002;162:1059-64) previously showed most deaths within 30 days to be pneumonia related whereas most after were not. Also in CAP, Waterer et al (Am J Respir Crit Care Med 2004;169:910-914) showed high late mortality (34% with mean follow-up of 1058 days) in initial survivors with late mortality being statistically associated with various co-morbidities.

Conclusions

Following an episode of IPD, 1 in 5 younger adults die within two years with most deaths occurring within 1 year of the episode; early deaths often appeared to be infection related on a background of comorbidity, in particular alcoholism, whereas later deaths were mostly due to co-morbidity, in particular cancer. Physicians should ensure younger adults with co-morbidity are vaccinated according to national guidelines. The management/stability of co-morbidities in patients admitted with IPD should also be critically reviewed, but, given the nature of the co-morbidities, it is debatable as to whether intervention during admission would improve longer-term patient outcomes.

The diagnosis of tuberculosis in children in London: room for improvement?

Dr Tejshri Shah

Great Ormond Street Hospital, London

Introduction

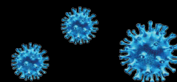
Twenty-seven tuberculosis (TB) guidelines, including those by the National Institute of Clinical Excellence (NICE), recommend that microbiological confirmation is attempted for patients with suspected TB. With 7.4% of *Mycobacterium tuberculosis* samples in the UK resistant to at least one first-line TB drug during 2013, the need for microbiological confirmation to perform drug susceptibility testing is pressing. Microbiological confirmation of TB can be difficult in children, as obtaining samples can be challenging and the sensitivity of testing is poor. Microbiological confirmation, however, remains the gold standard and for respiratory samples, a minimum of three samples are required.

The primary objective of our study was to determine the proportion of children treated for TB who had a microbiological diagnosis attempted. Secondary objectives explored the diagnostic process including characteristics associated with sampling, the number of samples taken, the yield of samples and the proportion of children commencing TB treatment with microbiological confirmation.

Scientific findings

Methods:

This was a retrospective analysis of data from ten London hospitals that provide paediatric TB care. All children (less than 16 years of age on the day of treatment initiation), who were started on treatment for TB disease from 1st January 2012 until 31st December 2013 were included. Data was collected from patient records, anonymised and entered onto a standardised data collection tool.



Results:

Of 194 children identified (median age 104 months; IQR: 40-160), 90 (46.4%) were boys, 110 (62.9%) were born in the UK and in 119 (61.4%) a source case was known. Pulmonary TB was diagnosed in 168 (86.6%) children. Severe disease had developed in 52 (26.8%).

136 (70.1%) underwent microbiological sampling. Sampling was associated with having severe disease (adjusted odds ratio: 7.19; 95% confidence interval: 2.08-24.9; $p=0.002$) but not with other characteristics: gender, ethnicity, age, type of TB, identification of a source case or concerns about drug resistance. Immunological testing (Tuberculin Skin Test or Interferon Gamma Release Assay) was undertaken 183 (94.3%) of children.

Seven children with pulmonary TB had a microbiological confirmation because more than one respiratory sample was analysed; this represented 11.5% (7/61) of all children with microbiologically confirmed TB.

Expectorated sputum had the highest yield at 52.5% across all three samples, with gastric aspirate (16%) and sputum induction (12.5%) having lower yields.

Overall, 61 (31%) of children initiated on TB treatment had microbiological confirmation of their disease.

Discussion

An important strength of this study is the cohort likely to be representative of children diagnosed with TB in London. Participating hospitals were a mixture of secondary and tertiary centres, with variable patient numbers and disease complexities, all over London with different catchment areas and diverse populations. An inherent limitation in the study is the retrospective nature of the data collection.

This study reveals that even in a relatively well-resourced setting, 30% of children did not have samples sent to attempt microbiological confirmation. Furthermore, it is possible that children treated for TB were more likely to have samples sent for microbiological evaluation than children initially evaluated and then felt not to have TB. Therefore, the overall proportion of child TB suspects for whom a microbiological sample was collected could have been even smaller. The data also suggests increasing reliance on immunological testing; tests which are not able to differentiate between TB infection and TB disease.

Conclusions

Many children with suspected TB in London are not having samples taken to try to confirm the diagnosis. This falls short of accepted recommendations and misses opportunities to identify drug resistance.

The role of whole genome sequencing in determining acquisition and transmission in simultaneous renal inpatient and community influenza A (H1N1)pdm09 outbreaks

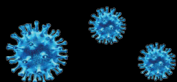
Dr Rebecca Houghton

Southampton General Hospital

Introduction

Influenza is a significant cause of seasonal morbidity and mortality in the UK each year. Rapid diagnosis of infection and isolation or cohorting of infected patients hold the key to prevention of onwards transmission and the development of outbreaks. Healthcare associated influenza outbreaks have been associated with significant mortality, particularly in at-risk groups and can be difficult to identify and control.

Current available molecular detection methods enable in-house rapid diagnostics to identify influenza in the acutely unwell patient but lack the ability to prove or refute acquisition and transmission within the healthcare setting. Whole genome sequencing of influenza viruses in outbreaks may provide sufficient resolution to identify transmission events and healthcare acquisitions, which might guide more appropriate allocation of resources and additionally identify those requiring prophylaxis and screening.



Scientific findings

We report the role of whole genome sequencing (WGS) in two simultaneous influenza A(H1N1)pdm09 virus outbreaks, affecting twenty two patients and staff on a renal transplant ward and a local community haemodialysis unit. The outbreaks occurred in mid to late February 2014, resulting in three deaths and over fifty patients requiring screening and consideration for prophylaxis.

Twenty two clinical samples from 21 patients were available and sent to the Respiratory Virus Unit (RVU), Public Health England, for whole genome sequencing. Of 21 samples collected from 21 patients and processed, sequence of the complete viral genome was obtained from 14 samples (6 inpatients, 8 outpatients), partial genome from 5 samples (3 inpatients and 2 outpatients) and no sequence data could be obtained from 2 specimens.

Analysis of the sequence of the genomes of the influenza A(H1N1)pdm09 viruses enabled us to identify that the two outbreaks were caused by two distinguishable influenza A(H1N1)pdm09 viruses, which varied genetically between the inpatient and outpatient groups but not significantly within them. In addition, all of the 16 A(H1N1)pdm09 neuraminidase gene sequences analysed from patients in both the inpatient and outpatient groups had the wild-type marker at amino acid 275, (H275), indicating that these viruses would be expected to be susceptible to the antiviral oseltamivir. We also identified two sporadic unlinked A(H3N2) viruses in the outpatient group which would have been included as part of the outbreak before sequencing data was available.

Discussion

Outbreak investigation in the healthcare setting requires diversion of resources, equipment and specialist input on a local and often regional level which is likely to impact on service provision of laboratory and clinical staff. Patients and staff may be put at risk, resulting in morbidity and mortality particularly in vulnerable individuals.

Rapid identification of potential transmission events and acquisitions is crucial to track the spread of infection and ensure appropriate control methods are implicated rapidly. Early knowledge of the susceptibility of viruses to antivirals, which may be gained through genotypic analysis, is important for guiding the use of appropriate treatment and prophylaxis.

Our data suggests that when available in real time, whole genome sequencing may be a useful adjunct to outbreak investigation involving Influenza, in conjunction with robust epidemiological data.

Conclusions

Whole genome sequencing provides greater resolution to the investigation of outbreaks attributable to Influenza where conventional methods are lacking. As WGS continues to become more readily available, faster and more affordable it may play a key role in aiding the investigation and management of complex outbreaks of influenza.

BSAC Bacteraemia Resistance Surveillance Update 2013

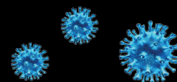
Dr Rosy Reynolds

North Bristol NHS Trust

Introduction

The BSAC Bacteraemia Resistance Surveillance Programme (www.bsacsurv.org) has monitored antimicrobial susceptibility in the major organisms causing bacteraemia in the UK and Ireland since 2001.

In 2013, 39 clinical laboratories collected 522 isolates of *Staphylococcus aureus*, 214 coagulase-negative staphylococci (CoNS), 235 *Streptococcus pneumoniae*, 207 other alpha- and non-haemolytic streptococci, 258 beta-haemolytic streptococci, 255 enterococci, 540 *Escherichia coli*, 267 *Klebsiella*, 246 Proteaceae, 208 *Enterobacter*, 154 *Serratia* and 242 *Pseudomonas*. Antimicrobial MICs were measured and interpreted by BSAC methods (www.bsac.org.uk).



Scientific findings

Gram-positive: MRSA fell from its peak of 48% of *S. aureus* in 2004 to stabilise close to 12% over the last three years (2011-2013). As always, resistance was much more prevalent in MRSA than MSSA for ciprofloxacin (90 vs 7%), erythromycin (66 vs 9%), fusidic acid (23 vs 10%) and trimethoprim (32 vs 11%). Similar to previous years, 71% of CoNS were methicillin resistant. All staphylococci were susceptible to linezolid and vancomycin. All *S. aureus* were susceptible to ceftobiprole, and >99% to teicoplanin and tigecycline, but 6, 15 and 7% of CoNS, respectively, were resistant (but not highly resistant) to these agents. *E. faecium* have increased gradually from 31% of enterococci in 2001 to 44% in 2013; in 2013, 33% were resistant to vancomycin and teicoplanin, 55% to gentamicin, and 100% to ampicillin and imipenem, but all were susceptible to linezolid and >98% susceptible to tigecycline. In contrast, >99% of *E. faecalis* were susceptible to all these agents except gentamicin (32% resistant). Resistance patterns for streptococci showed no clear trends over the last five years; 4% of *S. pneumoniae* were penicillin-intermediate (none resistant) in 2013, with similar prevalence of non-susceptibility to erythromycin and tetracycline.

Gram-negative: ESBL prevalence in *E. coli* rose from its trough level of around 6% in 2009-2010 to reach 12% in 2013, similar to 2012 and equal to its previous peak in 2006. Resistance to ciprofloxacin (21%) and gentamicin (10%) have fallen and risen with similar timing to ESBL. There were no clear recent trends in resistance among *Klebsiella* or *Enterobacter*. Among *Serratia*, non-susceptibility to ciprofloxacin (7%) and cefotaxime (12%) has steadied in the last three years after a long fall from peaks at 41% in 2003. The proportion of Proteaeae bacteraemias caused by *P. mirabilis* has increased steadily from 75% in 2001 to 90% in 2013, with no recent change in resistance. Colistin resistance was more prevalent in *Enterobacter* (6%) than *E. coli* (1%) or *Klebsiella* (<1%). Two isolates of Enterobacteriaceae were imipenem-resistant - one *E. cloacae* with OXA-48 and one *K. pneumoniae* with KPC enzymes. 96% of *Pseudomonas* were *P. aeruginosa*; they showed resistance similar to previous years at 6-9% for piperacillin-tazobactam, imipenem and ciprofloxacin, 2-3% for ceftazidime and gentamicin, and 0% for colistin.

Conclusions

The top two pathogens causing bacteraemia show opposite trends over the last 3 years. MRSA at 12% of *S. aureus* in 2012 and 2013 is at its lowest level in the 13 years of this surveillance, along with associated resistances, but resistance in *E. coli* has rebounded from its trough levels of 2009-2010 so that in 2013 12% were ESBL producers and 21% were ciprofloxacin-resistant.

Parallel Session: Infection control: addressing the human factors

Behaviour change for patient safety: examples from infection prevention

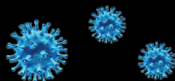
Dr Judith Dyson

Lecturer in Mental Health, University of Hull

The problems with implementing best practice are widely acknowledged. Interventions to change practice have had limited success. Two reasons have been identified for this: i) implementation strategies are not based on prospective assessment of barriers and levers to practice and ii) there is generally no theoretical basis informing the assessment of barriers and levers and the subsequent implementation strategies employed.

The Improvement Academy, embedded in the Yorkshire and Humber AHSN is working with internationally recognised behaviour change experts to apply a theoretical approach to implementation through: i) regular, regional workshops offering instruction on this approach, ii) a publically available behaviour change toolkit offering resources and examples for the adoption of this approach and iii) support for healthcare practitioners in clinical practice with applying these techniques to patient safety issues.

This presentation will offer a brief outline of the behaviour change techniques employed by the Academy and will demonstrate the feasibility and effectiveness of this approach by giving examples of its application in practice.



Dirt and disgust as key drivers in nurses' infection control behaviours

Dr Carole Jackson

Lecturer, Florence Nightingale School of Nursing and Midwifery, King's College London

Despite considerable work to provide clear policies and scientifically proven techniques to reduce infection transmission, beliefs and practices of healthcare workers do not always concur with scientific rationale. This paper presents one of the main findings of an interpretative qualitative study that asked the question 'Can nurses' infection control behaviours be explained?'. The study arose from an episode of observed practice which did not meet any recognised requirements for infection control.

The thematic analysis of 20 semi structured interviews identified that a clear distinction was made between infection and dirt. Fear of contact with dirt was a key driver in behaviour that initially appeared to be part of infection prevention policies, but was actually a form of self protection from patients, who at first encounter were considered as dirty. The need for protection was reduced as the patient became 'known' and a hierarchy of familiarity was determined from the data. From a scientific perspective some of the behaviours could be viewed as irrational however the rationale becomes clearer when the issue of protection from the unknown is acknowledged. Nurses respond to perceived threats and disgust plays as significant part in the response that dirt evokes. A fuller understanding of this emotion has the potential to improve educational programmes aimed at increasing compliance with infection prevention procedures.

Changing practice in the management of urethral catheters

Dr Jacqui Prieto

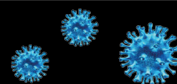
Associate Professor in Health Sciences, University of Southampton

Indwelling urinary catheters are the main cause of healthcare-associated urinary tract infection (UTI). Around 1 in 5 hospitalised patients undergoes bladder catheterisation with an indwelling device and overuse is a known problem. Reducing UTI is a high priority in the NHS yet the culture of overuse of catheters is often deeply ingrained and attempts to reduce use in acute care have had mixed success. Moreover, there is little evidence on when the benefits of indwelling urinary catheterisation outweigh the risks. Greater understanding of what influences clinicians' decisions to place urinary catheters is required to improve the effectiveness of strategies to reduce catheter-associated UTI.

This session will examine indications for catheter use in acute care and relate these to clinicians' beliefs about appropriate indications for use and the influence of local culture on practice. Drawing on the findings of a programme of research and quality improvement to reduce catheter-associated UTI, the speaker will illustrate the complex nature of decision-making about catheter use and the clinical and non-clinical factors that influence practice. Implications for practice and future research will be discussed.

Objectives:

- To highlight variations in published indications for catheter use
- To understand why clinicians decide to use indwelling urinary catheters
- To examine gaps in evidence and implications for practice



Parallel Session: Practical examples of implementing the UK 5 year Antimicrobial Resistance Strategy – 1 year on

Overview

Mr Mark Gilchrist

Consultant Pharmacist, Infection, Imperial College Healthcare NHS Trust, London

With the rise in the number of infections caused by antibiotic-resistant bacteria and a lack of new antibiotics being developed, AMR is a major clinical and public health issue that needs to be tackled. In September 2013, the integrated “UK Five year Antimicrobial Resistance (AMR) Strategy” was launched, aimed at tackling the UK antimicrobial agenda. The focus of the strategy was to promote best practice by ensuring the prudent use of antimicrobials, by developing research partnerships to enable new antimicrobials to come to market, to develop new technologies to allow quicker diagnosis and strengthen information resources to support healthcare professionals, patients, animal keepers and the public so that all understand the value and importance of antibiotics to society.¹

One year on, the focus of the strategy has been to put the “building blocks” in place around appropriate antimicrobial data surveillance and assess the effectiveness and impact of interventions in the longer term.² This session will look at these building blocks together with 3 out of the 7 key strategy areas. These 3 key areas include:

Key Area 2: To describe best practice in optimising antimicrobial prescribing (led by Scotland)

Key Area 3: To describe improvements in professional education, training and public engagement (led by England)

Key Area 5: To describe improvements in better access to and use of surveillance data (led by Wales)

The three speakers from Scotland, England and Wales will give a local and UK perspective to these areas.

1. UK Five Year Antimicrobial Resistance Strategy 2013 to 2018. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244058/20130902_UK_5_year_AMR_strategy.pdf
Accessed 2nd November 2014
2. UK five year AMR strategy - measuring success https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/322358/Outcome_measures.pdf Accessed 2nd November 2014

Parallel Session: Do law and ethics matter when it comes to infection?

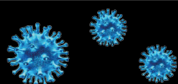
Legal issues

Dr Robert Hendry

Medical Director, Medical Protection Society

As the recent Ebola outbreak has highlighted, working with infectious diseases gives rise to a number of risks to healthcare workers. Where do the moral and legal duties lie? What are the legal and regulatory consequences if a patient comes to harm? What rights do healthcare workers have?

In this presentation we will discuss the legal and ethical duties doctors, other healthcare workers and institutions have towards patients with infectious diseases and their staff and the possible problems that can arise when things go wrong.



Ethics and infectious diseases

Dr Michael Millar

Consultant in Infection, Barts Health NHS Trust, London

Science is founded on reason as is philosophical ethics. The difference is that while science aims at understanding the natural world (human behaviour, nuclear physics, the laws of nature). The aim of ethics is to understand how we should live (together and as individuals) while taking account of our nature (matters of principle and value). Examples of ethical issues relevant to infectious disease include the tension between individual freedom and the responsibilities of institutions and states to control epidemic diseases, and the justice of the distribution of preventable deaths attributable to infection across the world.

Individual intuitions have many biases. The tools of philosophical ethics (theory, conceptual analysis, reflective deliberation) can challenge practices, attitudes, assumptions and intuitions. If we consider the term '(in)appropriate' which is so often used in the context of the use of antibiotics we can question many current antibiotic prescribing practices. We need reason if we are to advance the science of medicine and we need reason to decide how medical science should be applied.

Can regulation and accreditation play a part?

Professor Steve Green

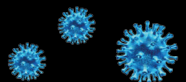
Consultant Physician, Sheffield Teaching Hospitals

With regard to infection, healthcare workers certainly need to be doing “the right thing” if hospitals and clinics are to be genuinely safe and fit for purpose. But, in reality could they actually be expected to do the right thing? Might healthcare workers do the right thing sometimes, but at other times do something in appropriate or inadequate, or even do nothing at all? Why might they not do the right thing? Can they be helped to do the right thing?

Ensuring that patients, the public, colleagues and themselves are all protected is vital in an appropriately functioning organisation, but accomplishing one of these aims should not be at the expense of another, and reconciling such conflicting needs can be difficult. External forces, such as the law, internal forces, such as personal ethical standpoints, and overlapping forces, such as financial considerations, are relevant.

Healthcare provider organisations, and the professionals providing services within them, may require help and support with taking this forwards. Such help and support may be either internal and external, and may include the provision of guidance, the setting of boundaries, and the independent assessment of standards of functioning. External help and support may come from national-level or even international-level sources.

Systems for best achieving this, for example through the use of regulation, accreditation, ISO certification, the Hawthorne Effect etc will be considered and discussed.



KEYNOTE LECTURE

Ebola Virus Disease (EVD) and other infectious disease outbreaks in Africa

Professor Robert Colebunders

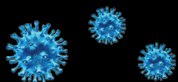
Emeritus Professor of Tropical Diseases, Institute of Tropical Medicine and

Emeritus Professor of Infectious Diseases, University of Antwerp, Belgium

The EVD epidemic began in Guinea during December 2013, but the WHO was only officially notified of the EVD outbreak in March 2014. On August 8, the WHO declared the epidemic to be a “public health emergency of international concern”. This West African outbreak of EVD is unlike any of the previous outbreaks. It is affecting virtually the entire territory of Guinea, Sierra Leone and Liberia, involving rural areas, major urban centers, and capital cities; and has evolved into a major humanitarian crisis. On the positive side this epidemic has boosted EVD research enormously. Hopefully this will very soon result in the availability of a rapid, easy to perform EDV diagnostic test, an effective vaccine and antiviral treatment.

Outbreaks of Ebola and Marburg virus diseases have recently increased in frequency in Africa. This increase is partially caused by a combination of improved surveillance and laboratory capacity, but probably also because of increased contact between humans and the natural reservoir of the viruses. A similar phenomenon may also lead to epidemics with other pathogens. Currently there is an increase in monkeypox prevalence in the Congolese rainforest (reservoir unknown, potentially squirrels or bats) with already cases of monkeypox reported in Kisangani, the capital of the Orientale Province, DRC. While the world is focusing on EVD in West Africa, other ongoing epidemics also need to be investigated such as the nodding syndrome epidemic in South Sudan, a type of mysterious epilepsy associated with mental retardation and affecting 1 in 6 children in certain villages in the West Equatoria state.

Lesson learned: The world is becoming one village, and it is of great importance to deal with all health problems in this village, including the health of animals (one health), for the benefit of us all.



SCIENTIFIC PROGRAMME

WEDNESDAY 26TH NOVEMBER

MAIN AUDITORIUM

08:00 - 09:30 **Lessons in Microbiology & Infection Control**

Supported by HIS/IPS

Chairs: Dr Carol Pellowe, *Senior Lecturer Infection Control, Florence Nightingale School of Nursing & Midwifery, London* and Dr David Enoch, *Consultant Microbiologist, Cambridge University Hospitals*

Characterising vascular graft infections (VGI): the creation of a standardised diagnostic and management algorithm

Dr Timothy Miles Rawson, *London*

Real world evaluation of the introduction of fidaxomicin on the management of *Clostridium difficile* infection (CDI) in NHS secondary care Trusts in England

Dr Deepa Nayar, *Durham*

Decontamination of a hospital room occupied by a VHF positive patient - lessons learned

Dr Laura Cottom, *Glasgow*

Reducing *Staphylococcus aureus* infections in renal dialysis patients

Dr Sophie Collier, *London*

Successful control of an outbreak of *Klebsiella pneumoniae* carbapenemase (KPC) producing Enterobacteriaceae carrying the pKpQIL-D2 plasmid in an NHS Liver Transplant Unit

Dr Nicola Young, *Leeds*

Hospital waste-water: a reservoir for carbapenemase producing Enterobacteriaceae unrelated to clinical isolates

Miss Leila White, *Preston*

***Staphylococcus aureus* carriage in a Renal Haemodialysis Unit**

Dr Gill Jones, *Brighton*

Outpatient Parenteral Antimicrobial Therapy (OPAT) - a systematic review of models of care

Dr Carolyn Murray, *Leeds*

Public health management of group A streptococcal infection in mother-baby pairs; a case series review

Dr Simon Howard, *Newcastle*

09:30 - 10:45 **Plenary Session**

Antibiotic Trilogy - Genes, Capsules and Enzymes

Supported by BSAC

Chair: Dr Rosy Reynolds, *BSAC Resistance Surveillance Co-ordinator, North Bristol NHS Trust*

Gene sequencing and prediction of antibiotic resistance

Dr Robin Howe

Consultant Microbiologist, Public Health Wales, Cardiff

Vaccines, serotypes and resistance in *Streptococcus pneumoniae*

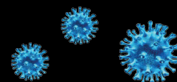
Professor David Livermore

Professor of Medical Microbiology, University of East Anglia, Norwich

Emerging resistance in Enterobacteriaceae

Professor Peter Hawkey

Professor of Clinical & Public Health Bacteriology, University of Birmingham



10:45 - 11:15 **COFFEE, Trade Exhibition & Poster Viewing**

10:45 - 11:15 **Poster Walk**

Diagnostics

Dr David Enoch

Consultant Microbiologist, Cambridge University Hospitals

MAIN AUDITORIUM

11:15 - 12:15 **J.D. Willams Lecture**

Supported by BIA

Chair: Professor Steve Green, *Consultant Physician, Sheffield Teaching Hospitals*

On definitions: when is an infection not an infection?

Professor Jon Cohen

Emeritus Professor of Infectious Diseases, Brighton & Sussex Medical School

12:15 - 13:15 **Scientific Free Papers**

Chairs: Professor Robert Read, *Professor of Infectious Diseases, University of Southampton* and
Professor Tom Rogers, *Professor of Clinical Microbiology, St James's Hospital, Dublin*

Evaluating the direct hospital costs of infection with *Klebsiella pneumoniae* carbapenemase producing Enterobacteriaceae

Dr Louise Sweeney, *Manchester*

Impact of a smartphone app on attitudes and behaviours in antimicrobial prescribing

Dr Gabriele Pollara, *London*

Early and real world experience of dolutegravir use in treatment naive and treatment experienced patients with HIV infection in Glasgow

Dr Gillian Fraser, *Glasgow*

Influenza A in southern Vietnam: clinical features, virological subtypes and heterotypic antibody response in a prospective observation study

Dr Stacy Todd, *Liverpool*

***Helicobacter pylori vacA* gene polymorphisms and their association with premalignant pathology in a UK population**

Dr Joanna Stephens, *Nottingham*

PARV4 infection and co-infection in mothers and children in South Africa

Dr Philippa Matthews, *Oxford*

13:15 - 14:00 **LUNCH, Trade Exhibition & Poster Viewing**

13:15 - 13:35 **Poster Walk**

Mycology

Dr David Partridge

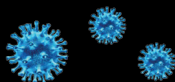
Consultant Microbiologist, Sheffield Teaching Hospitals

13:35 - 14:00 **Poster Walk**

Travel and tropical

Dr Nick Beeching

Senior Lecturer in Tropical and Infectious Diseases, Liverpool School of Tropical Medicine



13:15 - 14:00 **Satellite Symposium**

Organised and supported by ICNet International

**Using technology to support Antimicrobial Stewardship
A Canadian perspective as a working model for implementation**

Anna Lee, *Antimicrobial Pharmacist, Canada*

Antimicrobial Stewardship

- How do you know which IT solution provides the best fit for your organisation?
- How can technology help in daily clinical practice to improve the quality of patient care?

An exciting international educational exchange of ideas and experience on how technology can contribute to antimicrobial stewardship, especially in the era of increasing antimicrobial resistance

MAIN AUDITORIUM

14:00 - 15:15 **Plenary Session**

Supported by BIA

Innate Immunity

Chairs: Professor David Dockrell, *Professor of Infectious Diseases, University of Sheffield* and Professor Tom Evans, *Professor of Molecular Microbiology, University of Glasgow*

Innate immunity in the lung during bacterial infection

Professor Joseph Mizgerd

Professor of Medicine, Microbiology and Biochemistry, Boston University School of Medicine, USA

Innate immunity: C-type lectins and anti-fungal host defense

Professor Gordon D. Brown

Professor of Immunology, University of Aberdeen

MAIN AUDITORIUM

15:15 - 16:15 **Parallel Society-Supported Session**

Supported by BPAIIG

Paediatric infection

Chair: Dr Sanjay Patel, *Consultant in Paediatric Infectious Diseases, Southampton Children's Hospital*

Surveillance and bundles to prevent HAI in paediatrics

Dr Stéphane Paulus

Consultant in Paediatric ID, Alder Hey Children's Hospital, Liverpool

Where are we at with paediatric antimicrobial stewardship activities across Europe?

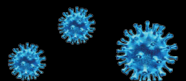
Dr Julia Bielicki

Lecturer in Infection and Immunity, St George's, University of London

Is paediatric OPAT finally emerging from the shadow of adult OPAT?

Dr Sanjay Patel

Consultant in Paediatric Infectious Diseases, Southampton Children's Hospital



QUEEN'S SUITE - ROOM 1

15:15 - 16:15 **Parallel Society-Supported Session**

From joint training to joint practice: how are the UK's Microbiology and Infectious Diseases services responding to the challenge

Dr Neil Jenkins

Consultant in Infection and Tropical Medicine, Heart of England NHS Trust, Birmingham

Dr Ed Moran

Consultant in Infectious Diseases, Heartlands Hospital, Birmingham

Dr Thushan De Silva

Academic Clinical Lecturer in Infectious Diseases & Microbiology, Sheffield Teaching Hospitals

QUEEN'S SUITE - ROOM 2

15:15 - 16:15 **Satellite Symposium**

Organised and supported by Alere

Rapid CRP testing to improve infection management and Antimicrobial Stewardship

Chair: Professor Jonathan Cooke, *Visiting Professor, Centre for Infection Prevention and Management, Imperial College London*

How point of care rapid diagnostics can enable Antimicrobial Stewardship

Professor Jonathan Cooke

Visiting Professor, Centre for Infection Prevention and Management, Imperial College London

The clinical utility of point of care CRP testing in paediatric emergency medicine

Dr Ruud Nijman

Research Fellow in Paediatrics, St Mary's Hospital, London

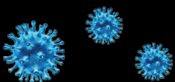
MAIN AUDITORIUM

16:15 **Formal Closing Ceremony**

Dr Peter Moss, *British Infection Association President* and

Professor Steve Green, *Chairman of Organising Committee*

16:30 **Depart**



Lessons in Microbiology & Infection Control

Characterising vascular graft infections (VGI): the creation of a standardised diagnostic and management algorithm

Dr Timothy Miles Rawson

Northwick Park Hospital, London

Background

A paucity of evidence surrounding the diagnosis and management of vascular graft infections (VGI) is hindering the development of clear, multidisciplinary, diagnostic and management pathways.

Method

Paper and electronic records were used to extract and analyse biochemical and microbiological laboratory results, antimicrobial therapy and surgical intervention characteristics as well as outcomes from diagnosis to present for all VGI patients managed over a five year period. An expert panel then created a standardised diagnostic and management algorithm which can be audited to assess its effectiveness in clinical practice.

Results

Fourteen aortic and 17 were peripheral VGI were managed in this period. Median age at diagnosis was 80 (52-91) years. Median follow up time was 16 months. Mortality rates were 50% (7) for aortic and 18% (3) for peripheral VGI. Microbial cultures were positive in 68% (21) of VGI cases. 23% were polymicrobial. *Pseudomonas* (n=4) and *Staphylococcal* species (n=6) were the most common causative organisms and associated with more radical surgical intervention and worse outcomes. Audit of our algorithm demonstrated that there was poor compliance with microbiological investigations during diagnosis, only 65% of patients received multidisciplinary management and there is wide heterogeneity in choice of medical and surgical intervention delivered.

Discussion

We developed a standardised diagnostic and management algorithm for VGI, based on local experience, to promote early suspicion of VGI and timely clinical, microbiological and radiological investigation. Diagnosis initiates immediate MDT management with appropriate medical and surgical intervention based on investigation results or evidence guided empirical treatment strategies.

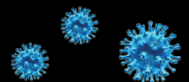
Real world evaluation of the introduction of fidaxomicin on the management of *Clostridium difficile* infection (CDI) in NHS secondary care Trusts in England

Dr Deepa Nayar

County Durham & Darlington NHS Foundation Trust

Introduction

CDI in the UK remains a priority with 13,361 reported cases between April 2013-March 2014. In July 2012 fidaxomicin (FDX), the first in a new class of macrocyclic antibiotics, was launched for the treatment of adults with CDI. The National Institute of Health and Clinical Excellence (NICE) recommend that when deciding on a treatment for CDI, the decision maker should consider the medical need, potential benefits, risks and costs. The aim of this evaluation was to collect robust real world data to understand the cost-effectiveness of fidaxomicin when introduced in routine practice, in varying positions in the treatment pathway.



Scientific findings

The series of local service evaluations were conducted between September 2013 and April 2014 in 5 UK centres who introduced fidaxomicin between July and December 2012. Following governance approval in each Trust, data was collected retrospectively from medical notes and hospital systems on CDI episodes occurring 12 months before (Pre-FDX) and after the introduction of fidaxomicin (post-FDX). Patients were treated before the availability of fidaxomicin with either vancomycin or metronidazole. All in-patients aged ≥ 18 yrs with primary CDI (diarrhoea with the presence of toxin A or B without a previous CDI in the past 3 months) were included. Recurrence was defined as re-emergence of symptoms anytime within 3 months. Laboratory confirmed recurrences were included in all centres and clinical recurrences in 2 centres. The dataset included; patient characteristics, CDI severity, date of onset and resolution, resource use/cost utilisation and CDI treatments.

Group A (n=425) pre-FDX (mean age=77, 27.1%=severe CDI)

Group B (n=105) post-FDX, received FDX first-line (mean age=76, 58.3%=severe CDI)

Group C (n=27) post-FDX, received FDX after initial treatment failure with vancomycin/metronidazole (mean age=81, 63.2%=severe CDI)

Group D (n=220) post-FDX, FDX not initiated (mean age=76, 32.4%=severe CDI)

In 88% of episodes, antibiotics were given for underlying co-morbidities in the 2 months prior.

28 day mortality was: A=23.3%, B=7.6%, C=3.7%, D=15.0%.

Recurrence rates were: A=10.6%, B=2.8%, C=16.3%, D=8.1%.

Of those with a first recurrence, 23.8% had a second recurrence in group A compared to 6.7% in group B&C combined.

Overall, the median length of stay associated with a recurrence was 16 days.

Discussion

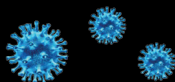
Fidaxomicin was used in the most severe patients in these centres. There was a 74% relative reduction in recurrence rate when used first-line (group A=10.6% v B=2.8%, $p=0.0048$). The overall recurrence rates in all groups were lower than published literature as only in-patient toxin confirmed recurrences were included in 3 centres.

The high mortality rate across all groups highlights the vulnerability of CDI patients and the need to treat infections quickly and effectively. Where fidaxomicin was used as first line treatment there was a lower 28 day mortality rate compared to other treatments (group A=23.3% v B=7.6%, $p=0.0001$).

Conclusions

This evaluation shows that whilst fidaxomicin was used at various stages of treatment and in different types of patients, when used first-line it is associated with a significant reduction in recurrence rates (following both primary episodes and subsequent recurrences) and 28-day mortality.

These results suggest the real world potential for fidaxomicin to deliver better care by improving outcomes in this vulnerable group of patients. Furthermore, this evaluation will provide CDI recurrence associated resource utilisation data that can be used to calculate the true cost-effectiveness of fidaxomicin as a first line treatment of CDI.



Decontamination of a hospital room occupied by a VHF positive patient - lessons learned

Dr Laura Cottom

Glasgow Royal Infirmary

Introduction

Viral haemorrhagic fevers are caused by four types of RNS virus with most outbreaks occurring in Africa. The increased permeability caused by the viruses invariably leads to haemorrhagic complications in the patient and thus they represent a major challenge to infection control teams.

Crimean-Congo Haemorrhagic Fever (CCHF) is caused by infection with the tick-borne *Nairovirus*, belonging to the *Bunyaviridae* family. Transmission to humans occurs either through direct contact with the blood/tissue from an infected animal or from a tick bite. We discuss the case of a patient with confirmed CCHF and the challenges faced by the infection control team when it came to decontamination of the patient's room. Despite following UK Department of Health guidance on the management of VHF patients we faced many unanswered questions and challenges along the way. It is hoped our experience will benefit others if faced with the same scenario.

Scientific findings

A 38 year old male was admitted to our Infectious Diseases Unit in October 2012 after becoming unwell on a flight to Glasgow from Afghanistan via Dubai. He presented with myalgia, haematemesis, haemoptysis, cough and headache. Retrieved from his phone were pictures of him standing next to a butchered calf whilst in Afghanistan. He subsequently tested positive for CCHF. After initial management locally he was transferred to the High Security Infectious disease unit in London. Following his discharge from the local unit our infection control team was tasked with advising on how to decontaminate the patient's room.

Discussion

Fumigation of the patient's room was undertaken using hydrogen peroxide mist by Bioquell. Prior to fumigation the room and all items within it were cleaned with 10,000ppm chlorine. Certain items which had been in direct contact with the patient e.g. BP monitors and probes were incinerated. Following fumigation a 2nd clean was performed before any equipment or furnishings were put back into use. The patient's mattress was wiped down with chlorine and following fumigation it was double wrapped with mattress incineration bags. It was then removed and disposed of whole at a local incinerator.

Conclusions

Numerous challenges were met along the way. Negative biological indicators are required after fumigation and unfortunately this process required 2 attempts. Due to an inability to isolate the ventilation our entire suite of negative pressure rooms was out of commission for 2 weeks. We were fortunate to find a large incinerator locally, otherwise we were faced with having to saw up the patient's mattress into small enough pieces, a high risk procedure. Whilst current guidance recommends fumigation of a patient's room there is no detail on how to do so and the issues which might arise as a result.

Reducing *Staphylococcus aureus* infections in renal dialysis patients

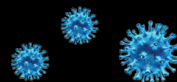
Dr Sophie Collier

Royal Free London NHS Foundation Trust

Introduction

Over the last 6 years, a care bundle has been introduced throughout the renal dialysis units to reduce *Staphylococcus aureus* (SA) infection rates. SA remains a formidable pathogen in renal patients where SA bacteraemias (SAB) have a 20% mortality rate and a 30% complication rate.

During the last 4 years, the rates of SAB have been prospectively collected and feedback to the units throughout the Royal Free London NHS Trust. The rates of SAB have fallen from 0.12 to 0.07 per 1000 dialysis days.



The Renal Association guidelines recommend the annual SAB rate should be less than 2.5 episodes per 100 HD patients and less than 1.0 for MRSA over 2 years. The annual SAB rate has fallen from 3.8 episodes in 2010 to 2.5 in 2013. MRSA rates remain below the recommended figure and were 0.7 episodes per 100 HD patients over 2012 and 2013.

Scientific findings

The following care bundle has been introduced.

In 2008, a 3 monthly rolling programme was introduced to screen all patients for nasal carriage of SA and decolonise if positive with a five day course of mupirocin and chlorhexidine. Audit data has shown that the average percentage of patients being screened has increased from 70% to over 95%. Mupirocin resistance rates are monitored every 6 months. They have ranged from 4.5% to 7.1% with no evidence of an increasing trend.

Native dialysis access rates have increased from 64% to 78%.

The exit site score is checked every dialysis session according to the MRVICTOR score and antibiotics started if the score is 2 or above. Patients routinely have a chlorhexidine impregnated dressing at the exit site for the first 6 months. High risk patients, who have had a previous episode of SAB, or those repeatedly positive on nasal screens, are urgently referred for alternative access if they dialyse via a line. They have exit site mupirocin thrice weekly while waiting for a fistula.

In 2010 the buttonhole technique was introduced as the first line method for accessing fistulae. This was associated with a rise in SAB. It was noted that the risk of SAB in patients on buttonhole was similar to those using a tunnelled line. Despite the introduction of strict aseptic technique when creating and using the buttonhole the infection risk did not decrease. Buttonhole is now used on a very limited number of patients training for self care.

Discussion

Prevention and management of SAB amongst renal dialysis patients remains a significant problem. At our trust we also have a SAB policy in place for the clinical management of these patients who are seen by an infection specialist during their admission. Infected lines are removed and patients received a minimum of 2 weeks IV antibiotics for simple SAB and longer if necessary for complicated infections. In 2013, the complication rate was 20% and the 30 day mortality 5% in dialysis patients.

Conclusions

Bringing down SA infection rates in renal patients needs a care bundle approach. As detailed above a number of interventions surrounding line and fistula care have been introduced as well as a SA decolonisation programme. Alongside this programme the unit specific rates are fed back at a local and trustwide level every 6 months.

Successful control of an outbreak of *Klebsiella pneumoniae* carbapenemase (KPC) producing Enterobacteriaceae carrying the pKpQIL-D2 plasmid in an NHS Liver Transplant Unit

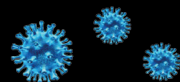
Dr Nicola Young

Leeds Teaching Hospitals NHS Trust

Introduction

Over the past decade the global incidence of infections caused by KPC producing bacteria has increased. Uncontrolled KPC outbreaks in the UK have resulted in these organisms becoming endemic in some regions. We present the first report of the successful control of an outbreak of KPC producing Enterobacteriaceae in an NHS Trust.

Leeds Teaching Hospitals (LTH) comprises two large teaching hospitals (>2000 beds) including a 32 bed liver unit (UK liver transplant centre). In 2011, screening for carbapenemase producing organisms (CPOs) was commenced in LTH for high risk patients. This included all admissions to the liver unit, many of whom



were transferred from regions outside Leeds, including areas 'high risk' for KPCs such as the North West. Previous instances of KPC producing organisms were rare in LTH and included only sporadic cases admitted from 'high risk' regions. No previous KPC transmission was known to have occurred in Leeds.

Scientific findings

An outbreak was declared on 25/10/2013 following reference laboratory confirmation of five KPC producing *Klebsiella pneumoniae*. The outbreak definition was: 'any patient attending the liver unit with a KPC producing *Klebsiella pneumoniae* in a clinical specimen/rectal swab'. A multi-faceted infection control strategy was immediately implemented. An enhanced screening programme (using rectal swabs) assessed liver unit patients weekly and on admission and discharge.

Swabs were cultured using extended spectrum beta-lactamase (ESBL) selective chromogenic agar. Enterobacteriaceae with reduced susceptibility to ertapenem (EUCAST) were identified (Maldi-TOF) and investigated using the Modified Hodge Test, discs for MBL/KPC confirmation (Rosco) and ertapenem minimum inhibitory concentration (MIC). If CPO production could not be excluded, isolates were sent to the reference laboratory (ARMRL) for variable number tandem-repeat analysis (VNTR) and polymerase chain reaction (PCR) for carbapenemase resistance genes. A recently developed PCR for pKpQIL-D2 plasmids helped to confirm/refute epidemiologically linked cases.

19 liver patients had KPC producing organisms (1/6/13 - 1/6/14), all were positive for the blaKPC gene. 14 cases met the outbreak definition; 4 had clinical infection (2 died) and 10 were colonised.

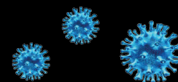
The outbreak infection control strategy targeted six main areas:

1. Hand hygiene (including mobile handwash stations)
2. Case isolation, cohorting by risk and contact precautions (supported by daily infection prevention team input)
3. Enhanced CPO screening
4. Written and verbal education for staff, patients and visitors
5. Environmental cleaning (including hydrogen peroxide vaporisation)
6. Interruption of admissions from 'high risk' regions

Good communication with the liver unit, trust and local healthcare providers was prioritised.

Discussion

1. Two KPC producing isolates with different phenotypic antibiotic susceptibility profiles were identified 3 months prior to this outbreak and were thought to be unrelated (both patients were from 'high risk' regions). These cases were later found to be linked by the pKpQIL-D2 plasmid. This phenomenon prevented early detection of the outbreak.
2. VNTR typing results demonstrated that the Leeds outbreak was related to a KPC strain previously seen in the North West region, but it was not their predominant strain.
3. Positive CPO screens occurred several months after patient's contact with potential donors, some with multiple negative screens in the interim. This suggests long term KPC carriage and supports the need for multiple screens to confirm status.
4. Colonised patients outnumbered clinical cases (3:1). This had significant implications for infection control and demonstrates the need for a thorough screening programme. Clinicians were informed that antibiotic prescribing for all colonised/infected patients required microbiology input.
5. This outbreak led to sustained changes in clinical practice including transfer of liver transplant assessments to the outpatient setting, CPO screening for patients awaiting transplant, strict algorithms for admission, screening and isolation on the liver unit, routine admission and discharge CPO screening on the unit and carbapenem sparing strategies.



6. Laboratory procedures have been modified to ensure rapid identification of a CPO outbreak in the future.
7. Chlorhexidine bathing has previously been reported as a method to reduce KPC transmission. However, chlorhexidine susceptibility testing of these isolates showed this was not appropriate for this outbreak.

Conclusions

This outbreak demonstrates the challenges posed by a mobile inter-genus KPC producing plasmid (pKpQIL-D2) in an NHS liver transplant unit and the difficulties in identifying linked cases using routine microbiological methods.

We recommend a tailored and intensive infection control strategy to combat outbreaks of KPC producing organisms with a focus on enhanced screening, intensive support of ward staff and an systematic approach to patient admission, cohorting and source isolation. Hydrogen peroxide vaporisation and restriction of admissions from high-risk areas are also likely to have contributed to the successful control of this outbreak.

Hospital waste-water: a reservoir for carbapenemase producing Enterobacteriaceae unrelated to clinical isolates

Miss Leila White

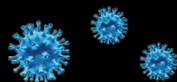
Lancashire Teaching Hospitals NHS Trust, Preston

Introduction

The emergence of carbapenemase-producing Enterobacteriaceae (CPE) is a concern for hospitals across the UK. Isolation of an organism with carbapenem resistance from an infected site may require the use of toxic antibiotics, and poses a cross infection hazard to other vulnerable patients. Current Public Health England guidelines recommends that hospitals undertake risk factor based patient isolation and faecal screening for CPE on admission to hospital. Asymptomatic carriers lacking any risk factors would remain undetected but would be excreting CPEs into the hospital waste-water. Testing waste-water could therefore offer a supplement to testing a small number of selected patient's samples and reassurance that unrecognised CPE carriers are not being missed. In this study waste-water from the Royal Preston Hospital (RPH), a centre without an endemic CPE problem was examined. RPH is in the North-west of England, an area where Enterobacteriaceae expressing the *Klebsiella pneumoniae* carbapenemase (KPC) CPE have become relatively frequent.

Scientific findings

Waste-water screening for carbapenem resistant Enterobacteriaceae (CRE) was undertaken using two culture methods: chromID® CARBA agar (Biomerieux) and chromID®CPS agar (Biomerieux) plus an ertapenem (Mast Diagnostics) antibiotic disc. Sampling was facilitated by the introduction of a tap into the pipework beneath one ward block. Fifty five CREs were recovered from sixteen waste-water samples taken twice weekly over a period of two months. Isolates included *Klebsiella* (21), *Citrobacter* (13) and *Enterobacter* spp. (21). Combination disc testing for the presence of a carbapenemase yielded unreliable results with twenty two indicating a carbapenemase, seven testing as indeterminate and twenty six producing a result that indicated no carbapenemase. Seventeen suspected carbapenemase-producing isolates were sent to Public Health England's Antimicrobial Resistance and Healthcare Associated Infections (AMRHA) Reference Unit for confirmation. Four *Citrobacter freundii* and two *Enterobacter cloacae* complex tested positive for New Delhi Metallo-beta-lactamase (NDM-1) genes which confirmed the initial combination disc testing results of a metallo-beta-lactamase (MBL). The remaining six *Klebsiella oxytoca* (four preliminarily identified as KPC and two as AmpC) and five *Enterobacter cloacae* complex (three preliminarily identified as KPC, one AmpC and one no mechanism identified) were grossly carbapenem resistant after MIC testing yet negative for the common carbapenemase genes tested using PCR at AMRHA. Next generation sequencing of three of these eleven negative isolates identified the Guiana Extended Spectrum non-metallo-carbapenemase (GES-5) gene. GES-5 was subsequently identified through PCR and sequencing in the remaining negative isolates.



Discussion

There was a large unexpected presence of carbapenemase resistant organisms in the waste water of the hospital. It was also surprising to discover a lack of KPC carrying organisms given their relatively high incidence in the North West of England. The presence of GES-5 or NDM-1 carbapenemases in organisms from the waste-water of the hospital highlights the issue of environmental sources being a reservoir for resistance genes. GES-5 carbapenemase has not previously been reported in Enterobacteriaceae in the UK and had not been previously isolated from clinical or screening specimens at RPH. While Enterobacteriaceae with NDM production had been recovered previously at RPH, none had been detected recently, specifically not during waste-water sampling. This demonstrates the absence of a link between clinical specimens and waste-water samples specifically within RPH. There is also uncertainty as to whether an isolate with GES-5 can be detected reliably using routine confirmation methods both in routine laboratories and the reference units. The screening PCR method used at AMRHAI does not include GES-5 genes and routine combination disc tests used in some laboratories do not cover GES-5 producers. This may suggest levels of GES-5 are under reported, although AMRHAI have had no previous isolates with gross carbapenem resistance in the absence of one of the common carbapenemase genes. Hospital waste-water is not routinely tested so levels of GES-5 in isolates from this source are unknown.

Conclusions

CPEs, predominantly *Klebsiella* and *Enterobacter* spp, were recovered from waste-water regularly over the two-month sampling period. NDM-1 or GES-5 enzymes were identified, the latter being identified for the first time among waste-water isolates in the UK. Screening highly carbapenem-resistant Enterobacteriaceae for blaGES genes should be considered if more prevalent carbapenemase genes are not detected. A carbapenemase gene has been found in all the resistant isolates detected. The lack of correlation with clinical isolates limits the role of this approach for CPE surveillance. Hospital waste-water appears to offer a biological niche for CPEs which remains of uncertain clinical significance.

Staphylococcus aureus carriage in a Renal Haemodialysis Unit

Dr Gill Jones

Royal Sussex County Hospital, Brighton

Introduction

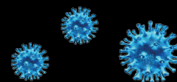
Staphylococcus aureus is a cause of significant morbidity and mortality in haemodialysis patients. The requirement for regular venous access for haemodialysis either via central venous catheters or arteriovenous fistulas places these patients at risk of bloodstream infection. Carriage of *S. aureus* predisposes to invasive disease. This study sought to describe *S. aureus* carriage and disease in a renal haemodialysis population. Patients undergoing haemodialysis in Brighton are screened every 6 months for meticillin resistant *S. aureus* carriage. Approximately 160 patients attend regularly for haemodialysis. We aimed to define rates of colonisation with MSSA and MRSA. Invasive *S. aureus* bacteraemia isolates were also collected. Over an eighteen month period we collected 107 carriage strains and 44 bloodstream isolates. 12 patients had paired invasive and colonisation isolates. Carriage and disease isolates were compared using antibiotic susceptibility profiles; selected organisms were whole genome sequenced (WGS) using the IlluminaMiSeq desktop sequencer.

Scientific findings

The nasal carriage rate in our population was 19.51%. We found 18 different antibiotic susceptibility profiles. The predominant profile was MSSA resistant to penicillin.

For 6 patients we performed whole genome sequencing on paired invasive (bloodstream) and screening isolates.

Patient A's screening (August 2013) and bacteraemia (September 2013) isolates differed in their phenotypic antibiotic susceptibility profile, however no differences were found on gene profiling, there were no single nucleotide variants (SNVs) across the mapped genome.



Patient B's screening (February 2013) and invasive (June 2013) isolates had identical antibiotic susceptibility profiles and varied by a single SNV.

Patient C's screening (August 2012, February 2013) and invasive (December 2013) isolates had matching antibiograms. SNVs are shown in table 2.

Patient D's screening (August 2013) and invasive (April 2014) isolates had different antibiograms, but no differences were found on resistance gene profiling. The isolates were found to differ by 6 single nucleotide variants (SNVs) (table 2).

Patient E's had two screening isolates (August 2012) with identical antibiograms and a bacteraemia isolate in May 2013 which differed. On genetic profiling, the bacteraemia isolate was a different MLST type with a different resistance gene profile.

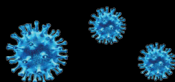
Patient C had four genes affected by SNVs: *pcrA*, *rpiA*, *gntP* and a member of the *araC* family. Patient D also had four genes affected by SNVs: *sarX*, *murB*, *rnhC* and *bioD*. Both *sarX* and *araC* are involved in regulation of virulence genes in *S. aureus*. In *S. epidermidis* *sarX* is implicated in biofilm phenotype.

Discussion

Patient	Carriage	Bacteraemia	Genetic profile	
A	Aug 13 Ren117	Sep 13 SAB10768	No differences	
B	Feb 13 Ren76	June 13 SAB10516, SAB10517	Single SNV between bacteraemia isolates (prophage transcription repressor)	
C	Aug 12 Ren38	Feb 13 Ren64	Dec 13 SAB11106	See below
D	Aug 13 Ren114	Apr 14 SAB11525, SAB11526	See below	
E	Aug 12 Ren02, Ren05 (both ST22)	May 13 SAB10414 (ST 45)	Bacteraemia isolate >40,000 SNVs distant; bacteremia genotype predicts susceptible to erythromycin, trimethoprim and ciprofloxacin	

Table 1. Isolates

	SNV Position	Isolate 1	Isolate 2	Isolate 3	Gene	Function
Patient C		Nasal swab (1)	Nasal swab (2)	Blood culture		
	676027	A	G	G	intergenic region	-
	726936	A	A	G	<i>araC</i> family	transcriptional regulator
	1175141	T	T	C	intergenic region	-
	1181525	C	C	A	intergenic region	-
	1945613	A	G	G	intergenic region	-
	2089175	C	A	A	<i>pcrA</i>	DNA helicase
	2492220	G	G	A	<i>rpiA</i>	ribose-5-phosphate isomerase A
	2664511	C	A	A	<i>gntP</i>	gluconate permease
	2890357	A	A	G	intergenic region	-



	SNV Position	Isolate 1	Isolate 2	Isolate 3	Gene	Function
Patient D		Nasal swab	Blood culture (1)	Blood culture (2)		
	727574	C	T	T	<i>sarX</i>	transcriptional regulator
	830022	A	G	G	<i>murB</i>	Acetylenolpyruvoylglucosaminereductase
	1160217	G	A	A	<i>rnhC</i>	ribonuclease
	1459847	C	T	T	intergenic region	-
	2591572	G	A	A	<i>bioD</i>	dethiobiotinsynthetase
	2872110	T	C	C	intergenic region	-

Table 2. Description of SNVs

Conclusions

Antibiotic susceptibility profiling can provide a starting point for inferring strain similarity, however it lacks resolution and may wrongly exclude isolates due to gain/loss of mobile elements. WGS can investigate relatedness between phenotypically indistinguishable organisms.

For patient D the strains differed by 6 SNVs, inferring the strains are closely related despite differing phenotypic antibiograms. Point mutations, particularly those resulting in premature stop codons in transcriptional regulators, have previously been associated with the transition from carriage to disease. Further work is needed to determine whether the mutations found in this group are found in larger studies of carriage and invasive isolates.

Outpatient Parenteral Antimicrobial Therapy (OPAT) - a systematic review of models of care

Dr Carolyn Murray

University of Leeds

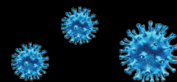
Introduction

OPAT services have been developed across the UK both in the NHS and private sectors, in response to local pressures and health-care staff initiatives. However, the full potential of OPAT has not yet been realised in the UK as there is patchy implementation and significant variation in services geographically. This has resulted in considerable variation in care pathways experienced by patients. There are significant gaps in our understanding of the cost-effectiveness of different intravenous (IV) antibiotic service models. While there is an extensive literature on OPAT-related topics, there are no published systematic reviews to date. The aim of this review was to evaluate existing evidence in relation to the efficacy, safety, effectiveness and cost effectiveness of these different service models.

Scientific findings

Objectives: Specific research questions were: 1) What is the most clinically effective model of delivering IV antibiotics in the community? 2) What is the most cost-effective model of delivering IV antibiotics in the community? 3) What is the most appropriate model for delivering IV antibiotics in the community in terms of patient-safety? 4) Is community delivery of IV antibiotics acceptable to patients and healthcare providers?

Methods: We searched the usual bibliographic databases (e.g. Medline, EMBASE, Cochrane etc) from 1993 to April 2013. Exclusion criteria included children, and papers which aggregated outcomes for all patient groups and non IV antibiotics and those with no description of the OPAT service. All other papers were considered for inclusion with no IV antibiotic administration methods or language restrictions. Titles and abstracts were screened (quality checked by second reviewer) and full text versions of potential papers were obtained for detailed review.



Findings: The search strategy identified 6,162 papers of which 470 met the inclusion criteria and were subject to detailed review. An additional 17 papers were identified from references. The final analysis included 110 papers. The majority were set in the UK, Europe and North America often with relatively small sample sizes. There were 12 RCTs none of which reported the trial methodology. Only 19 studies included a usual care comparator (hospital in-patient) when evaluating safety and effectiveness. Synthesised studies revealed mixed results for cure/improvement, however, when OPAT models are considered individually, out-patient attendance is least and Specialist Nurse is most effective.

Discussion

The scarcity of studies which report their methods and results so that they can be assessed, interpreted and implemented by clinicians and decision makers introduces uncertainty into our understanding of which, if any, OPAT model is both effective and cost effective and meets with patient's expectations. OPAT services have the potential to generate significant cost savings for the NHS and deliver greater patient satisfaction. This review highlights the gaps in the evidence which the NHS needs to base decisions regarding the design, supply and commissioning of such services and upon which national guidance developers can base recommendations for best practice. The optimal delivery of OPAT services may mean offering patients a choice between several models concurrently which has consequences for future planning and resourcing. Decisions will need to be made who will fund such services as usually this falls under the remit of secondary care with any cost savings accruing to their budgets. This potentially results in a failure to engage fully with primary care who may perceive few advantages to the patient while giving greater clinical responsibility to GPs. Where CCGs have opted to commission OPAT services they are working without a supporting robust evidence-base.

Conclusions

There is a paucity of information upon which the NHS can base decisions regarding the design, supply and commissioning of such services and upon which national guidance developers can base recommendations for best practice. There is clearly a need for further research to address significant gaps in knowledge about the cost-effectiveness of different IV antibiotic services; identify which services patients prefer and which aspects of the services are most important to them. This would help identify the optimal configuration of services in terms of value for money and patient preference as well as future research priorities.

Public health management of group A streptococcal infection in mother-baby pairs; a case series review

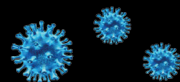
Dr Simon Howard

Public Health England Centre North East, Newcastle upon Tyne

Introduction

Group A streptococci (GAS) are causative organisms in a large and increasing proportion of puerperal sepsis deaths in the UK. GAS are less commonly associated with neonatal sepsis, though GAS remains an important consideration in neonatal sepsis. As a result, guidelines advise that, in addition to the standard health protection response, both the mother and baby should be treated with antibiotics if either develops an invasive GAS (iGAS) infection in the 28 days following birth.

However, management of such cases appears to vary widely in clinical practice: there are variations in interpretation of microbiological results, in management of mothers and babies, in the notification of cases, and, hence, in the public health actions taken. Some of this variation may be attributable to differences in interpretation of guidelines. It is not known whether the variation in practice results in a variation in clinical outcome.



Scientific findings

Between 1 September 2012 and 31 August 2014, 24 cases of GAS infection in women who had given birth in the preceding 28 days were reported to the North East Health Protection team (HPT). Health Protection Team notes for these cases were reviewed. Each case had GAS isolated from only one site: a blood culture (n=11), a high vaginal swab (n=11), a low vaginal swab (n=1), or a wound (n=1).

In 19 cases (79%), both mother and baby had received a course of antibiotics. However, in at least 2 of these cases, the antibiotic regimen chosen for the baby was not one of those recommended in the national guidance, therefore suggesting that antibiotic therapy was inadequate in at least 7 cases (29%).

Among the 19 cases where antibiotics were prescribed, the hospital treating the mother agreed to provide a prescription for the baby in 14 cases (74%); in at least 3 of these, this was only agreed following intervention from a Consultant in Health Protection or a Consultant Microbiologist. Antibiotics were prescribed by a GP in the 5 remaining cases.

In 3 cases (13%), neither mother nor baby was prescribed antibiotics, the rationale being that both were well. In 2 cases (8%), while the mother was unwell and treated, paediatricians assessed the babies and chose not to prescribe antibiotics, the rationale being that the baby was clinically well.

Discussion

There are a number of factors which may explain the varied practice we describe.

While both mother and baby require antimicrobial therapy, it is likely that they will not be under the care of the same clinical team: an unwell mother is likely to be under the care of obstetrics, while her baby may be under the care of paediatricians, or, if clinically well, perhaps not in any clinician's immediate care. The national guidance does not confer responsibility on any one clinical team to ensure that the other part of the 'mother-baby pair' is treated in the event of GAS being isolated.

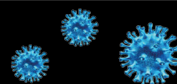
There is a degree of confusion as how sample results should be interpreted, particularly in the case of a high vaginal swab (HVS). GAS is an uncommon yet not pathological part of the vaginal flora, so it is not clear that GAS isolated from HVS can be considered invasive. In our study sample, all 5 cases where either mother or baby received no antibiotics were cases where GAS was isolated from a vaginal swab rather than an unambiguously sterile site.

Awareness of the guidance appears to be poor. Documentation frequently recorded a lack of knowledge of the protocol among front line staff, or confusion with other protocols. It is not clear why some clinicians chose to deviate from the recommended antibiotic courses, but this too may be explained by poor familiarity with the guidance.

Conclusions

These findings suggest a number of lessons for clinicians and Health Protection Teams. In particular, improved awareness of the GAS guidance for puerperal cases and clarification of the roles and responsibilities for the clinical teams may increase the likelihood of adherence to the guidance. A regional protocol may meet these needs.

The sample in this study is too small and follow-up too short to draw conclusions about variations in outcome which may result from variations in practice. Further research in this area would be welcome, as it may guide clinical interpretation of GAS isolates from non-sterile sites such as HVS.



Plenary Session: Antibiotic TrilogY - Genes, Capsules and Enzymes

Gene sequencing and prediction of antibiotic resistance

Dr Robin Howe

Consultant Microbiologist, Public Health Wales, Cardiff

Vaccines, serotypes and resistance in *Streptococcus pneumoniae*

Professor David Livermore

Professor of Medical Microbiology, University of East Anglia, Norwich

Modern 7- and 13-valent pneumococcal conjugate vaccines (PCV7, deployed since 2006 in the UK, then PCV13 from 2010) have dramatically disrupted the aetiology of invasive pneumococcal disease. Specifically, they have reduced the incidence of bacteraemias due to vaccine serotypes both in vaccinated children and unvaccinated adults, who are protected by herd immunity. One vaccine type –serotype 14– previously accounted for 60-70% of macrolide resistant pneumococcal bacteraemia in the UK but is now rare. Penicillin resistance was always rare in the UK but was associated with other PCV7-targeted serotypes (6B, 9V, 19G and 23F), which likewise are now much diminished in prevalence.

New serotypes are, however, rising to fill the gap. These include 7F and 19A – which are targeted by PCV13, and which consequently may have now peaked; also 8 and 15A, which are targeted by neither formulation. Serotype 15A and 19A isolates are commonly multiresistant, and their rise is also apparent among non-bloodstream pneumococci sent to Public Health England for resistance investigation, with serotype 15A accounting for 30% of such isolates by 2013. More generally the national and international reductions in resistance among invasive isolates have not been paralleled by such reductions among respiratory and isolates, where resistance is rising slowly.

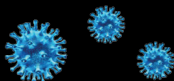
Emerging resistance in Enterobacteriaceae

Professor Peter Hawkey

Professor of Clinical & Public Health Bacteriology, University of Birmingham

J.D. Williams Lecture

The J.D. Williams lecture was established by the Association of Medical Microbiologists to commemorate the memory of Professor J.D. Williams (1931 - 2005) who was Professor of Microbiology at the London Hospital Medical College from 1974 to 1996. He was recognised internationally as an authority on antibiotics. However, he is principally remembered for his vision to turn microbiology from a dry academic specialty confined to the laboratory to an important medical specialty which married laboratory and clinical skills. While others shared his vision, only he had the drive to turn it into reality, and he achieved this through the foundation of three microbiological societies: The British Society for Antimicrobial Chemotherapy, The Hospital Infection Society and The Association of Medical Microbiologists, which together had formed the original Federation of Infection Societies. The Association of Medical Microbiologists has now merged with the British Infection Society to form the British Infection Association that continues to sponsor this lecture by inviting specialists in infection who have made a substantial contribution to the specialty over the course of their career. There can be no doubt that he would have been delighted by the journey that microbiology has been taking in the UK.



On definitions: when is an infection not an infection?

Professor Jon Cohen

Emeritus Professor of Infectious Diseases, Brighton & Sussex Medical School

Robert Koch (1843 – 1910) is often regarded as the father of modern microbiology. In his famous “postulates” he set out what he regarded as the criteria which needed to be satisfied in order for a microorganism to be confidently identified as the cause of a particular disease. As such he was part of a movement that recognised that precise and accurate definitions would be the cornerstone of scientific advancement, and indeed that proved to be the case. Today, we accept implicitly for example that accurate case definition is the basis of epidemiology. But despite our wish for precision and accuracy, definitions can sometimes be elusive. In this lecture I will first take a specific example – that of sepsis – to discuss how the tension between the need for a pragmatic clinical diagnosis and a specific epidemiological definition can lead to problems, and then go on to make some more general observations about the validity of Koch’s principles in a world in which infections are diagnosed based on molecular probes in the absence of a cultivable organism. Even more challenging is the recognition that micro-organisms are clearly implicated in diseases which we certainly do not conventionally think of as infections. But the corollary is even more interesting: what evidence do we need to prove that a disease of uncertain pathogenesis is caused by a micro-organism?

Sequencing reveals that UK 15A pneumococci are heterogeneous, with the multiresistant (EryR, ClinR, TetR and penI) representative generally identified as ST63 or its single or double-locus variants whereas ST58, 73, 3811, and 6733 predominate among fully susceptible 15A isolates. It has been postulated that resistant serotype 15A isolates represent serotype transformation of resistant 19F ST63 lineages, but this seems unlikely, as few resistant 19F isolates belong to ST63.

Scientific Free Papers

Evaluating the direct hospital costs of infection with *Klebsiella pneumoniae* carbapenemase producing Enterobacteriaceae

Dr Louise Sweeney

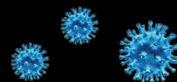
Manchester Royal Infirmary

Introduction

Carbapenemase producing Enterobacteriaceae (CPE) are a global threat to public health due to multi-drug resistance including Carbapenems. To date a large proportion of isolates identified in the UK have been from the Greater Manchester area with *Klebsiella pneumoniae* carbapenemases (KPC) the predominant enzyme type. We undertook an analysis of the direct hospital costs and healthcare resource utilization associated for 60 episodes of CPE bacteraemia from 2010 to 2014. Length of patient stay, patient hospital setting, antibiotic treatments and associated healthcare resource costs such as diagnostic tests and ventilation were retrospectively extracted into a database. The costs of treatment in hospital were calculated using NHS reference costs from 2013. The health economic cost model reports the overall costs, cost per patient and healthcare resource utilization during the infected period. This is the first comprehensive assessment of the costs of KPC bacteraemia in a health care setting in the UK.

Scientific findings

The overall cost of care and treatment of patients with KPC bacteraemia between 2010 & 2014 is calculated at £882,034, with an average cost per patient of £14,694. Healthcare resource utilisation costs contributed more than the treatment costs. Patients with KPC bacteraemia had an average stay of 82 days, of which their infection accounted for 15 days, and HDU/ITU stay of 2 days. A quarter of bacteraemias occurred on or required supportive treatment on a high dependency unit. The mean cost of antibiotic treatment per patient was £775.



Discussion

A large proportion of KPC bacteraemias occurred in inpatients with complex medical or surgical problems, for whom a prolonged hospital stay might be anticipated. Given the complexity of these patients and their treatments it is unclear whether the development of a KPC bacteraemia resulted in additional bed days, or whether these would have been accrued anyway by development of infection due to another less resistant organism.

Conclusions

This is the first evaluation of the direct hospital costs of KPC bacteraemia to be undertaken in the United Kingdom. Further research in the form of a matched case control study is required.

Impact of a smartphone app on attitudes and behaviours in antimicrobial prescribing

Dr Gabriele Pollara

University College London Hospitals

Introduction

The rising prevalence of antimicrobial resistance has placed great emphasis on judicious prescribing of the currently available antimicrobials. Hospitals have traditionally attempted to guide initial prescribing choices by issuing antimicrobial pocket guides. Our Trust has taken advantage of the near-ubiquity of smartphone use amongst staff by switching from using such a pocket guide to making the most common Trust specific antimicrobial prescribing guidelines available on the smartphone app Microguide (Horizon Strategic Partners, available on both iOS and Android).

We performed 2 structured cross-sectional studies before and after introduction of the smartphone app in order to investigate the impact of the app on antimicrobial prescribing behaviour. We hypothesised that the app would improve access to hospital antimicrobial guidelines, and that the ease of access of this information would aid application at the bedside, disrupting some established cultural practices in antimicrobial prescribing.

Scientific findings

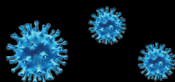
The UCLH app was accessed over 1100 times / month by UCL staff. The response rates were 78% for the pre-app questionnaire (116 responses from 149 distributed questionnaires) and 79% for the post-app questionnaire (146 responses from 185 distributed questionnaires). Both questionnaires sampled a wide cross-section of doctors within the hospital across a range of specialties with similar levels of expertise. Predictably, the app was accessed most frequently by the more junior members of the clinical team ($p < 0.01$). Over 90% of respondents to both questionnaires regularly carried phones compatible with the smartphone app.

Questionnaire respondents indicated that the app guided antimicrobial prescribing more frequently than both hospital intranet guidance ($p = 0.01$) and the pocket guide that it replaced ($p < 0.01$). Increased use of the app was associated with agreeing the app was useful, easy to navigate and relevant ($p < 0.01$).

Increased use of the app improved awareness of antimicrobial stewardship (OR 6.8 (95% C.I. 2.1 - 21.7), $p < 0.01$) and it encouraged challenging inappropriate prescribing by others (OR 3.8 (95% C.I. 1.5 - 9.7), $p < 0.01$). Use of the app was not limited by concerns about using it on ward rounds or at the patient bedside. However, the perceived impact of seniors' pre-conceived preferences on antimicrobial prescribing restricted use of the app (OR 0.2 (95% C.I. 0.07 - 0.87), $p = 0.03$).

Discussion

Routine smartphone app use in the clinical setting is a nascent field and our study makes several novel findings. Smartphone apps that are well designed and perceived to increase clinical value are accepted and used more frequently than other sources that offer the same information. Crucially, immediacy of access empowered users to address inappropriate prescribing by their colleagues, challenging the social norms of



antimicrobial prescribing in hospitals. Identification that seniors' prescribing preferences limited application of the app content highlights the importance of educating not just end-users, but also all clinicians whose prescribing decisions may be impacted by the introduction of similar apps in other clinical areas.

Conclusions

Our study provides an insight into the use of smartphones to improve antimicrobial stewardship, demonstrating that a well-designed and accepted smartphone app can increase awareness of the importance of antimicrobial stewardship and influence prescribing behaviours. In particular, it may assist in challenging the collusion of inappropriate antimicrobial prescribing, by empowering users to challenge incorrect prescribing decisions. Future work will require a direct assessment of the use of the app on prescribing as well as barriers to its use at both individual and institutional levels.

Early and real world experience of dolutegravir use in treatment naïve and treatment experienced patients with HIV infection in Glasgow

Dr Gillian Fraser

Brownlee Centre, Gartnavel General Hospital, Glasgow

Introduction

Dolutegravir has been shown to be superior to darunavir/ritonavir and efavirenz based regimens in achieving a viral load <50 copies/ml at 48 weeks and being better tolerated. It also had greater efficacy in patients with a history of at least 2 class resistance when compared to raltegravir. In Scotland, dolutegravir was given SMC and local approval for treatment of HIV infection in combination with other antiretroviral medication in June 2014.

Clinical trials, however, do not always reflect real life experiences. In order to reflect on our initial experiences and prescribing practices of dolutegravir, we conducted a retrospective case note review of patients who were started on dolutegravir from 16th June until 1st September 2014.

Scientific findings

Sixty-four patients were started on dolutegravir during this 11 week period. Fifteen were treatment naïve and forty-nine were switched.

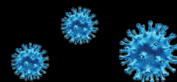
Fifty percent (15/30) of all the treatment naïve patients starting ARVs during this time period were started on dolutegravir as the third agent. Ten were given truvada and five kivexa as the NRTI backbone combination. (HLA status of these patients is to follow.) Reasons for choosing dolutegravir as a first line agent were given in seven patients. Four clinicians stated they wished to avoid the potential for drug interactions, two wanted to avoid meal restrictions and the risk of efavirenz side effects and two clinicians also stated that the good side effect profile was a factor in their decision making.

Twenty-four switches were a direct swap from raltegravir to dolutegravir.

The most common documented reason for switching (19/49) was to change to a once daily regimen. Reduction in pill burden (6/49) and to reduced PI side effects (6/49) were the second most common reasons.

Thirty patients have returned for a four week review after starting or switching to dolutegravir. Sixteen out of thirty (53%) have either no documented side effects or "no side effects" reported. The other fourteen reported at least one side effect with nausea (4, 13%) and diarrhea (4, 13%) emerging as the most commonly reported side effects.

Thirty-four had an undetectable viral load (<40 copies/ml) before switching, eleven of these have had a four week viral load test and all have maintained an undetectable viral load.



Discussion

Since dolutegravir has been given prescribing approval it has become the most popular first line third agent in treatment naive patients in our cohort. Where documented, concerns about current and potential future drug interactions have emerged as the most common reason for choosing dolutegravir.

There is no evidence favouring either truvada or kivexa with dolutegravir but it appears in Glasgow that we are using more truvada.

We hypothesise that the inconvenience of performing and then trying to locate the HLA B*5701 result may be a barrier to prescribing kivexa.

The cohort size is small so we cannot draw any definite conclusions on the significance of the side effects reported, however in the FLAMINGO, SINGLE and SAILING trials, diarrhea, nausea and headache were reported similarly as the most common side effects.

The twice daily dosing of raltegravir has been a concern for clinicians and the fact so many were directly switched to dolutegravir is not surprising.

Providing a convenient regimen with a low pill burden and good tolerability remains a priority for clinicians in this cohort and is the motivation behind the majority of switches. However, the cost implications and future pharmacy planning of this emerging trend will have to be considered as dolutegravir is significantly more expensive than generic efavirenz.

Conclusions

Dolutegravir is proving popular in Glasgow with HIV physicians confident to prescribe it as a first-line alternative to efavirenz, raltegravir or protease inhibitors. With a once-daily integrase inhibitor available it is also clear that doctors are keen to simplify regimens wherever possible. Our “real world” side effect data is so far consistent with the published trials.

However, more time is needed to assess the long-term viral load suppression and tolerability.

Influenza A in southern Vietnam: clinical features, virological subtypes and heterotypic antibody response in a prospective observation study

Dr Stacy Todd

Liverpool School of Tropical Medicine

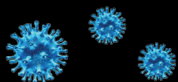
Introduction

Repeat infection with influenza occurs because of continual viral evolution and subsequent escape from existing human immune defences. However, the serological response to current and previously circulating influenza subtypes has been poorly characterised, particularly with regard to cross reactivity between strains. Understanding how this effects susceptibility to repeat infection and the impact that this has on influenza transmission dynamics is important for planning control interventions.

Our approach combines serological measurement at the population level with detailed information from individuals presenting with clinical disease analysed using modern statistical and dynamical modelling techniques. A prospective, observational study of patients with influenza-like-illness (ILI) in Ho Chi Minh City, Vietnam has been running since August 2013. Influenza A & B PCR and antibody testing to a panel of 11 human and 5 avian strains is performed. A subset of subjects are followed up clinically and serologically for up to 7 months.

Scientific findings

665 ILI patients were recruited between August 2013 & September 2014. Of these, 217 and 87 subjects had Influenza A and B respectively. There was a peak of influenza A/H3N2 activity between April and June 2014 where up to 60% of ILI cases had virologically confirmed influenza. This was followed by a secondary influenza B peak in July and August which was associated with fewer ILI cases presenting at outpatient



clinics per week but again a high PCR positivity (62%). 2 cases of mixed H1N1/pdm and H3N2 were identified. Individuals presenting on the first day of illness and with lower respiratory symptoms were more likely to have influenza as an aetiology of their symptoms. Individuals with confirmed influenza also reported a higher rate of prior antibiotic use (54% vs 45%, $p = 0.0003$). Previous influenza vaccination was reported in only 2.1% of patients with lower rates of influenza detected in this small group (23% vs 46.6%, p value 0.029).

30 day antibody response was consistent with virological subtyping in subjects who had PCR confirmed influenza. These individuals had the largest increase in the most recent homo-subtypic strain. Significant titre rises in non-contemporaneous homo-subtypic strains and smaller rises in hetero-subtypic strains were also detected. These changes were seen in all individuals not just those who were alive at the time of circulation of historic strains. Waning of this broad increase in antibody titre occurred at different rates over the follow-up period.

Discussion

Well characterised annual epidemics in winter months are seen in both northern and southern temperate regions. However, spread in tropical regions is less predictable. Year round transmission of influenza occurs in Vietnam with complex subtype dynamics including co-circulating strains and asynchronous peaks of single subtypes. Existing surveillance is focused primarily on hospital settings. Results from this study demonstrated a higher rate of ILI PCR positivity than expected, emphasising the importance of community sites in influenza surveillance in low and middle income settings.

Global circulation of influenza is thought to be driven by interaction between temperate and tropical zones, with East and South-East Asia likely to play a major role in influenza evolution and persistence. Serological surveys have been used in the post-2009 pandemic period to give better estimates of population attack rates but increasingly population level immunity is being investigated using these techniques to give insight into fundamental questions regarding influenza transmission but also more practical application of vaccination schedule planning and pre-pandemic preparedness. By using a panel of influenza strains measured by a novel microarray technique, we aim to give a more detailed analysis of this than would be offered by measuring titres to only the contemporaneous strain. The results of this clinical study will be vital to the interpretation of our associated population sera bank of over 50,000 samples. Together these studies will add to the understanding of cross protection offered by previous influenza infection and the impact of this on transmission dynamics in tropical SE Asia.

Conclusions

Influenza in southern Vietnam has complex transmission dynamics including periods of intense influenza activity. Understanding the impact of individual and population immunity on these dynamics will be explored using this and an associated population level dataset over the next 12 months.

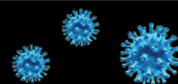
Helicobacter pylori vacA gene polymorphisms and their association with premalignant pathology in a UK population

Dr Joanna Stephens

University Hospitals of Nottingham NHS Trust, University of Nottingham

Introduction

Helicobacter pylori is the most important modifiable risk factor for the development of gastric adenocarcinoma, the second leading cause of cancer-associated death worldwide. Although *H. pylori* colonises approximately half the world's population, disease occurs in only 10-15% of those infected. We do not yet fully understand the mechanisms of disease development, or why it occurs in some individuals but not others. Recent research has focused on the virulence factor vacuolating cytotoxin A (VacA) and its association with disease, particularly *vacA* gene polymorphisms. It has been shown that colonisation with strains expressing the i1 type of *vacA* (rather than i2 type) is associated with a significantly higher risk of gastric adenocarcinoma and premalignant pathology, such as intestinal metaplasia (IM). The aim of this



project was to identify polymorphisms in the *vacA* i region of strains isolated from patients, that were highly associated with presence of IM in the gastric mucosa.

Scientific findings

Gastric biopsies were donated by patients attending the Queen's Medical Centre, Nottingham, for routine upper GI endoscopy. Samples were collected, with informed written consent and ethics approval, for isolation of *H. pylori* and histopathology analysis. The *vacA* i region has three main areas of diversity, known as clusters A, B and C. Strains were PCR-typed on the basis of cluster C, and patients infected with i1-type strains selected. Haematoxylin and eosin-stained tissue sections were scored for severity of inflammation and pre-malignant pathology by an experienced histopathologist who was unaware of other data. Of the 44 patients selected, 17 had IM.

A 1 kb region of the *vacA* gene, including the i region and surrounding nucleotides, was PCR-amplified and sequenced for all 44 infecting strains. Sequences were aligned and interrogated for polymorphisms using MegAlign software. Twenty-one polymorphisms were identified in total, thirteen of which were within the i region.

Clusters B and C have been shown to have the greatest influence on toxin activity. This study found that twelve strains previously PCR-genotyped as i1 had an i2-like cluster B sequence.

Only one polymorphism, which was outside of the i region, was found to be highly associated with the presence of IM. Of 31 isolates expressing a histidine or a glutamine at position 295 in the protein, IM was present in biopsies from 16 of those patients. In contrast, of 13 isolates with a lysine or arginine at position 295, IM was present in only one (Fisher's exact test $p=0.007$).

Discussion

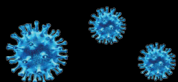
Two of the i region gene polymorphisms identified have previously been reported as possible markers for *H. pylori* strains of East Asian origin. The current study found these to be present in 25% and 37% of the Nottingham isolates however, showing that they are more common than previously thought.

A quarter of the strains contained inconsistent i1/i2 type sequences in clusters B and C, and therefore were surprisingly common. Strains with these hybrid i region alleles have been described as i3 type in previously published literature, and we have previously shown by site-directed mutagenesis that they encode a toxin with an intermediate vacuolating activity between that of VacA i1 and i2 types. Here we report that there was no significant association with presence of IM in patients infected with i3 type strains compared with i1 type strains.

The discovery that amino acid differences at position 295 are strongly linked with the presence of pre-malignant pathology in the gastric mucosa is novel. We are now constructing panels of isogenic mutants in order to compare the functional activity of these forms of VacA. We plan to compare their ability to induce vacuolation in epithelial cells and inhibit T-cell activation *in vitro*, and in future we will investigate their ability to induce IM in a mouse model of *H. pylori* infection.

Conclusions

The ultimate aim of an investigation such as this is to aid the clinician in the stratification of *H. pylori*-infected patients into risk groups, to allow for closer follow-up of those at greater risk of developing gastric adenocarcinoma. Further work is required to determine if the identified polymorphisms will ultimately contribute to this risk stratification and whether they could form the basis for a diagnostic test.



PARV4 infection and co-infection in mothers and children in South Africa

Dr Philippa Matthews

University of Oxford

Introduction

PARV4 is a parvovirus that was first identified in 2005 from the blood of an injecting drug user. It has now been well characterized in Western cohorts, where it is almost exclusively found in individuals with risk factors for blood-borne viruses (BBVs), and is strongly associated with Hepatitis C (HCV) and HIV infection. The epidemiology is strikingly different in Africa, where rates of PARV4 IgG are 20-40% irrespective of risk factors for – or the presence of – other BBVs.

The clinical consequences of PARV4 remain uncertain. A small number of studies have associated it with a variety of syndromes, including increased rate of progression to AIDS. Virological and immunological data suggest the virus may persist in a chronic latent form, with the potential for subsequent reactivation and long-term sequelae. Characterising PARV4 in Africa is crucial given its endemicity: in particular, transmission routes and clinical impact remain to be elucidated.

Scientific findings

We set out to study a cohort of mothers and children in Kimberley, South Africa, in order to characterize the epidemiology of PARV4 in this setting, and to investigate the impact of coinfection with HIV. We investigated a total of 157 individuals recruited via paediatric HIV clinics, as follows: HIV-infected children (n=90), HIV-infected mothers (n=43), and HIV-negative siblings (n=24). We used ELISA to detect IgG antibodies to PARV4 and to determine HBsAg status.

We detected PARV4 IgG in 58/157 of these individuals (37%). There was an increase in IgG seroprevalence with age ($R^2=0.59$, $p=0.025$, linear regression), suggesting ongoing transmission events that start in early childhood and continue among adolescents and young adults.

There was no concordance in PARV4 IgG status between mothers and children, and PARV4 IgG was not enriched in either HIV or HBV-infected individuals. There was no effect of PARV4 IgG on either CD4+ T cell count or viral load in HIV-infected adults or children.

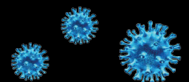
Discussion

We have found that PARV4 is highly endemic in this South African cohort, in keeping with other studies undertaken in Southern Africa. The routes of transmission are unknown, but our data support the hypothesis that non-parenteral transmission is likely, as there is no clustering between mothers and their children, and no relationship with other endemic blood-borne viruses (HBV and HIV). Different genotypes of PARV4 circulate in Northern vs. Southern hemispheres, and it is possible that small differences in viral sequence account for different routes of transmission between Western and African cohorts.

Given that African populations with a high seroprevalence of PARV4 overlap directly with the geographical epicentre of the HIV pandemic, scrutiny for any possible interaction between these chronic infections is important. Although we did not identify any effect of PARV4 infection on HIV viral load or CD4+ T cell count, the numbers studied here are small and future studies are warranted.

Conclusions

The results of this study, and others in different locations across Sub-Saharan Africa, suggest that around 1/3 of Africa's 1.1 billion people may be PARV4 IgG positive. Our study supports the view that there is widespread circulation in the general population and that transmission is likely to be non-parenteral and independent of other BBVs. Our data suggest that there is no impact of PARV4 on HIV disease progression, but larger studies are needed to scrutinize this relationship more closely, and to determine other possible disease associations.



Plenary Session: Innate Immunity

Innate immunity in the lung during bacterial infection

Professor Joseph Mizgerd

Professor of Medicine, Microbiology and Biochemistry, Boston University School of Medicine, USA

Pneumonia is a persistent and pervasive public health concern, with greater biomedical prioritization demanded. Overcoming respiratory infection requires a combination of immune resistance to eliminate microbes and tissue resilience to prevent organ injury. Cellular and molecular contributions to resistance and resilience against microbes in the lung are becoming better defined. The transcription factor NF- κ B has distinct roles in epithelial cells and macrophages in coordinating immune responses and antibacterial resistance in the lung. Ongoing studies reveal that pneumococcus activation of macrophage NF- κ B is complex and contextualized, involves resilience as well as resistance pathways, and is pivotal to pneumonia outcome.

Innate immunity: C-type lectins and anti-fungal host defense

Professor Gordon D. Brown

Professor of Immunology, University of Aberdeen

The last few decades has seen a tremendous increase in our understanding of the mechanisms underlying the development of protective anti-fungal immunity. Key among these discoveries is the identification of pattern recognition receptors (or PRRs) expressed by immune cells which recognise conserved fungal components, such as beta-glucans and mannans. Recognition of these structures by PRRs, particularly by members of the C-type lectin receptor (CLR) family, triggers intracellular signalling cascades that initiate a variety of cellular and inflammatory responses, and induce the development of pathogen specific adaptive immunity. We now understand that innate recognition by CLRs is essential for the development of protective immunity to these pathogens. In this presentation, I will cover the key developments in our understanding of the function and roles of these receptors in the context of anti-fungal immunity, highlighting recent achievements.

Parallel Session: Paediatric Infection

Surveillance and bundles to prevent HAI in paediatrics

Dr Stéphane Paulus

Consultant in Paediatric Infectious Diseases, Alder Hey Children's Hospital, Liverpool

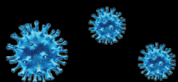
Surveillance for Healthcare Acquired Infections (HAI) in paediatrics is essential to monitor quality of care and enable prompt and efficient response to outbreaks. Priority should be given to establish rates of Central line Associated Bloodstream Infections (CLABSI) and Surgical Site Infections (SSI). Other important surveillance programmes should be considered for Ventilator Associated Pneumonia (VAP), viral HAI (rotavirus, flu and RSV), and resistant organisms such as Extended Spectrum β -Lactamase producing organisms (ESBL) and Carbapenem Resistant Enterobacteriaceae (CRE), especially in the high intensity setting. The introduction of care bundles to reduce HAI have now shown benefit in the paediatric setting, in and out of the intensive care setting. During this session, various care bundle components will be discussed and latest paediatric literature on the topic reviewed.

Where are we at with paediatric antimicrobial stewardship activities across Europe?

Dr Julia Bielicki

Lecturer in Infection and Immunity, St George's, University of London

Children are not small adults, and this is true in antimicrobial stewardship (AS) as much as in other areas of medical practice. Although the tenets and principles of AS remain the same, there are particular challenges in the neonatal and paediatric population. Diagnostic approaches are often more complex as signs and



symptoms of infection are non-specific and obtaining appropriate microbiological samples can be difficult. The epidemiology of infection differs from that of adults and evidence regarding efficacy, dosing and duration of antimicrobial therapy in children is sparse. Neonatal and paediatric surveillance data that is relevant to healthcare providers caring for children is generally lacking. More recently exciting collaborative projects have provided a platform for the development of paediatric AS activities in the European context. Data from these projects, including the Antibiotic Resistance and Prescribing in European Children (ARPEC) project will be presented and the potential for an expansion of European paediatric AS activities discussed.

Is paediatric OPAT finally emerging from the shadow of adult OPAT?

Dr Sanjay Patel

Consultant in Paediatric Infectious Diseases, Southampton Children's Hospital

Although the origins of OPAT lie firmly within paediatrics, with Rucker and Harrison introducing the concept of home intravenous antibiotics for children with cystic fibrosis in 1974, recent advances have focused on adult practice. Children are currently being ambulated on intravenous antibiotic antibiotics from paediatric units across the country, but robust clinical governance mechanisms and systems for outcome monitoring are often lacking. Through a joint initiative between BSAC and the British paediatric allergy, immunity and infection group (BPAIIG), good practice recommendations have recently been developed to highlight good clinical practice and governance within p-OPAT services. To support these principles, BSAC has recently introduced a paediatric patient management system (PMS) to allow prospective data to be collected on all p-OPAT patients, along with a p-OPAT registry to enable benchmarking between units. These initiatives have provided a foundation for the safe introduction of p-OPAT services across the UK. P-OPAT is finally emerging from the shadow of its big brother!

Parallel Session

From joint training to joint practice: how are the UK's Microbiology and Infectious Diseases services responding to the challenge

Dr Neil Jenkins

Consultant in Infection and Tropical Medicine, Heart of England NHS Trust, Birmingham

Dr Ed Moran

Consultant in Infectious Diseases, Heartlands Hospital, Birmingham

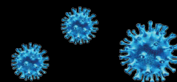
Dr Thushan De Silva

Academic Clinical Lecturer in Infectious Diseases & Microbiology, Sheffield Teaching Hospitals

Clinical and laboratory infection services in the NHS are changing. Trainees are now faced with a number of different career paths following CCT and the new combined infection training scheme aims to prepare the next generation of trainees for this new landscape. This session will present the findings of two surveys conducted earlier this year among those employed in infection specialties.

The first, of recent infection CCT holders, asks to what extent those with CCTs in more than one specialty are taking up consultant posts crossing both disciplines. Are ID/GIM holders employed in acute medical units developing infection services in hospitals that did not previously have them? What proportion of time do medical microbiology/virology CCT holders spend on clinical, infection control and laboratory duties?

The second looks at how the UK's infection departments are preparing for the changes and the expectations of the new joint trainees. Microbiology and infectious disease departments from over 80 hospitals across the UK responded and the feedback will inform what promises to be a stimulating discussion on both the challenges and opportunities ahead.



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Dificlir[™] (fidaxomicin) Prescribing Information

Presentation: Dificlir[™] tablets contain 200 mg fidaxomicin. **Indication:** The treatment of *Clostridium difficile* infections (CDI) also known as *C. difficile*-associated diarrhoea (CDAD) in adults. Consideration should be given to official guidelines on the appropriate use of antibacterial agents. **Posology and method of administration:** *Adults and elderly* (≥ 65 years of age): The recommended dose is one 200 mg tablet to be administered twice daily (once every 12 hours) for 10 days and can be taken with or without food. *Paediatrics:* The safety and efficacy of fidaxomicin in children aged below 18 years has not yet been established. **Renal impairment:** No dose adjustment is considered necessary. Use with caution in patients with severe renal impairment. **Hepatic impairment:** No dose adjustment is considered necessary. Use with caution in patients with moderate to severe hepatic impairment. **Contraindications:** Hypersensitivity to the active substance or to any of the excipients. **Warnings and Precautions:** Hypersensitivity reactions including severe angioedema have been reported. If a severe allergic reaction occurs during treatment with Dificlir, the medicinal product should be discontinued and appropriate measures taken. Some patients with hypersensitivity reactions reported a history of allergy to macrolides. Fidaxomicin should be used with caution in patients with a known macrolides allergy. Due to limited clinical data, fidaxomicin should be used with caution in patients with severe renal impairment or moderate to severe hepatic impairment. Fidaxomicin should also be used with caution in patients with pseudomembranous colitis, fulminant or life threatening CDI. No data is available in patients with concomitant inflammatory bowel disease, caution should be used in these patients due to a risk of enhanced absorption and a potential risk for systemic adverse reactions. Co-administration of potent P-glycoprotein inhibitors such as cyclosporine,

ketoconazole, erythromycin, clarithromycin, verapamil, dronedarone and amiodarone is not recommended. **Drug interactions:** Fidaxomicin is a substrate of P-gp and may be a mild to moderate inhibitor of intestinal P-gp. Co-administration of potent inhibitors of P-gp, such as cyclosporine, ketoconazole, erythromycin, clarithromycin, verapamil, dronedarone and amiodarone are not recommended. Fidaxomicin does not have a clinically significant effect on the exposure of rosuvastatin however an increase in the rate of absorption of rosuvastatin cannot be excluded. Fidaxomicin had a small but not clinically relevant effect on digoxin exposure. However, a larger effect on P-gp substrates with lower bioavailability, more sensitive to intestinal P-gp inhibition, such as dabigatran etexilat, cannot be excluded. **Undesirable effects:** **Common** ($\geq 1/100$ to $< 1/10$): vomiting, nausea, constipation. **Uncommon** ($\geq 1/1,000$ to $< 1/100$): rash, pruritus, decreased appetite, dizziness, headache, dysgeusia, abdominal distension, flatulence, dry mouth, increased alanine aminotransferase. Consult SmPC for complete information on side effects. **Packs and Cost:** 200 mg tablet x 20 £1,350.00. **Legal Classification:** POM. **Marketing authorisation number:** EU/1/11/733/001-004 **Date of Preparation of PI:** July 2014. **Further information available from:** Astellas Pharma Ltd, 2000 Hillwood Drive, Chertsey, KT16 0RS. **For Medical Information phone: 0800 783 5018**

Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard. Adverse events should also be reported to Astellas Pharma Ltd. Please contact 0800 783 5018

REFERENCES:

1. Data on file, DIF14036UK(2), Astellas Pharma Ltd.

Date of preparation: November 2014
DIF14054UKa

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INTERACTIVE POSTER WALKS

We are inviting delegates to take part in the interactive poster sessions where selected presenters will have the opportunity to discuss their research with fellow delegates, in a relaxed atmosphere.

All accepted posters will be on view for the 3 days of the conference. If you have specific questions the poster presenters have been asked to stand by their posters during the sessions outlined below

We hope that this will create the opportunity for delegates to network and develop new collaborations.

Monday 24th November

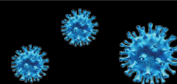
- 13:30 – 14:00 **Viral hepatitis**
Led by Dr Peter Moss
Consultant Physician, Hull & East Yorkshire Hospitals
- 14:00 – 14:30 **HIV**
Led by Dr Alastair Miller
Deputy Medical Director, Joint Royal Colleges of Physicians Training Board
- 16:15 – 16:40 **Clinical lessons**
Led by Dr Paul McWhinney
*Consultant in Infectious Diseases, Bradford Teaching Hospitals and
Professor David Laloo
Dean of Clinical Sciences and International Public Health,
Liverpool School of Tropical Medicine*

Tuesday 25th November

- 10:45 – 11:15 **General bacteriology and general virology**
Led by Professor Tom Rogers
Professor of Clinical Microbiology, St James's Hospital, Dublin
- 13:15 – 13:45 **Public Health and epidemiology**
Led by Professor David Goldberg
Consultant Epidemiologist, Public Health Scotland
- 13:45 – 14:15 **Antibiotics and resistance issues**
Led by Dr Albert Mifsud
*Consultant Microbiologist, Public Health England and
Professor David Laloo
Dean of Clinical Sciences and International Public Health,
Liverpool School of Tropical Medicine*
- 15:30 – 16:00 **TB and other mycobacteria**
Led by Dr Derek Sloan
Consultant Physician, Liverpool School of Tropical Medicine

Wednesday 26th November

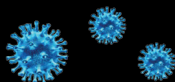
- 10:45 – 11:15 **Diagnostics**
Led by Dr David Enoch
Consultant Microbiologist, Cambridge University Hospitals
- 13:15 – 13:35 **Mycology**
Led Dr David Partridge
Consultant Microbiologist, Sheffield Teaching Hospitals
- 13:35 – 14:00 **Travel and tropical**
Led by Dr Nick Beeching
*Senior Lecturer in Tropical and Infectious Diseases, Liverpool School of
Tropical Medicine*



POSTER LIST

Diagnostics

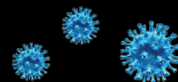
Poster No.	Title	Lead Author
0001	Do we need a turnaround time target for the microscopy of sterile body fluids?	Dr Giuseppe Bignardi Sunderland
0002	The utility of <i>Aspergillus fumigatus</i> IgG testing in chronic pulmonary aspergillosis	Dr Mihye Lee Bournemouth
0003	Pro-adrenomodulin evaluation on UK patients presenting with sepsis or severe sepsis	Dr Matthew Dryden Winchester
0004	Rapid identification of pathogens directly from urine by MALDI-TOF	Miss Katarzyna Schmidt Norwich
0005	Procalcitonin in the elderly, experience in a District General Hospital	Dr Francesca Eddy Bristol
0006	Investigation of bacterial meningitis in north Glasgow Hospitals: a full cycle audit	Dr Ashutosh Deshpande Glasgow
0007	Comparison of self-collected meatal swabs with urine specimens for the diagnosis of <i>Chlamydia trachomatis</i> and <i>Neisseria gonorrhoeae</i> in men	Ms Lisa Berry Coventry
0008	Evaluation of automated molecular assays for the detection of norovirus infection in hospital inpatients	Dr Kathrine McAulay Reading
0009	An audit of adherence with NICE guidance on laboratory testing in children with suspected bacterial meningitis	Dr Paul Robertson Glasgow
0010	Evaluation of the novel <i>artus C. difficile</i> QS-RGQ and VanR QS-RGQ assays for the laboratory diagnosis of <i>Clostridium difficile</i> infection (CDI) and vancomycin-resistant enterococci (VRE) screening	Dr Paul Robertson Glasgow
0011	An audit of the quality of microbiological diagnostic sampling of patients admitted to intensive care with suspected infection	Dr Kirsti Morris Leeds
0012	A comparison of two diagnostic techniques for the identification of <i>Staphylococcus aureus</i> in haemodialysis patients	Dr Mercedes Lucas London
0013	Comparative analysis of bacterial culture and RT-PCR in the diagnosis of bacterial meningitis	Dr Laura Cottom Glasgow
0014	Review of the diagnostic value of procalcitonin in a cardiothoracic ICU	Dr Laura Cottom Glasgow
0015	Sampling in prosthetic joint infections - an audit of recent practice	Dr Michael Riste Birmingham
0016	A 9 month prospective study investigating the aetiology and management of patients presenting with meningoencephalitis at a South London hospital	Dr Tehmina Bharucha London
0017	An evaluation of the QIAGEN <i>artus Aspergillus</i> diff. PCR assay for detection of <i>Aspergillus</i> DNA in serum samples from patients with haematological malignancies	Dr Christopher Holmes Leicester
0018	Evaluation of the clinical utility of the Alere I influenza A and B assay, a point of care test for diagnosis of influenza in the Intensive Care setting	Dr Natasha Jesudason Glasgow
0019	Microbiology diagnostics and antibiotic treatment in diabetic foot infection in a teaching hospital	Miss Danielle Lowry Birmingham



Poster No.	Title	Lead Author
0020	CSF lymphocytosis; distribution of diagnoses and viral PCR trends in an ethnically-diverse inpatient population	Dr Adam Dale Basingstoke
0021	Comparison of EntericBio® real-time polymerase chain reaction (PCR) with traditional culture methods used to detect enteric pathogens commonly associated with gastrointestinal infections	Mrs Michelle Watson Birmingham
0022	The study on genotyping of <i>Trichomonas vaginalis</i> in symptomatic women referred to Imam Ali Clinic Shahre-kord by PCR-RFLP technique (2012)	Dr Bahman Khalilidehkordi Iran

Public Health and epidemiology

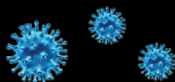
Poster No.	Title	Lead Author
0023	From kitchen cuts to infected guts – outbreak of <i>Clostridium perfringens</i> in a care home	Dr Peter Acheson Newcastle
0024	Comparison of behavioural interventions in limiting spread of pandemic influenza infection --- an extended review of current literature	Dr Shazia Saanan Cardiff
0025	Role of socioeconomic risk factors in the epidemiology of infective endocarditis - a prospective cohort study	Dr Abdul Muhith Brighton
0026	Physician perceptions of the burden of <i>Clostridium difficile</i> infection in the UK and the impact of recurrence	Mr David Bradshaw Chertsey
0027	Increased risk of swine influenza infection in pig industry workers: systematic review	Dr David Ishola London
0028	The electronic Clinical Infection Database (eCID): an integrated infectious diseases database for multidisciplinary teams	Dr Gabriele Pollara London
0029	Influenza vaccination uptake across northern hemisphere sites participating in FLU 003 Plus between 2010-2014 (Respiratory Virus Hospitalisation Study, INSIGHT Protocol No. 003)	Mr Adam Cursley London
0030	Multi locus variable number of tandem repeat analysis (MLVA) of <i>Salmonella</i> Enteritidis by the PulseNet 7 loci method	Mr Mark Maguire Galway
0031	Molecular detection of <i>Shigella</i> spp. impacts on apparent epidemiology and reference laboratory workload	Dr Niall De Lappe Galway
0032	Antibiotic guardian: developing a national pledge campaign for European Antibiotics Awareness Day	Dr Diane Ashiru-Oredope London
0033	How effective are we at identifying serious clusters of invasive pneumococcal disease? A cluster report	Dr Kaye Chapman Newcastle
0034	Would the use of a sepsis identification pathway at triage increase admissions from the Emergency Department? A retrospective analysis of 1672 attendances to a large, inner-city hospital in the UK	Dr Matthew Saunders Liverpool
0035	An audit of hospital admissions during the 2013/14 influenza season	Dr Donall Forde Birmingham
0036	Risk factors for parasite infection in an Ethiopian population	Dr Kishan Gandhi Birmingham
0037	A surviving sepsis campaign in a District General Hospital: achievements, limitations and future directions	Dr Madeleine Malina London



Poster No.	Title	Lead Author
0038	The problem with Statistical Process Control charts; how an outbreak of PVL-MRSA on a burns unit almost went undetected	Dr Laura Cottom Glasgow
0039	Timeliness of <i>Salmonella</i> reporting in Scotland	Prof John Coia Glasgow
0040	Reducing blood culture contamination rates using a targeted e-learning tool	Dr Alexandra Bramley Macclesfield
0041	An outbreak of ESBL-producing <i>Klebsiella pneumoniae</i> following elective orthopaedic hip replacement surgery	Dr Tranpriti Saluja Birmingham
0042	Microbiology of peritonsillar abscess aspirates: a retrospective audit of the past two years in a teaching hospital	Miss Annie Bartlett Plymouth
0043	Epidemiology of antimicrobial resistance in an oncology centre in eastern India	Dr Sanjay Bhattacharya India
0044	A resurgence of <i>Clostridium difficile</i> PCR ribotype 027 in London?	Miss Michelle Cairns London

General bacteriology and general virology

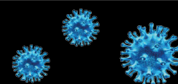
Poster No.	Title	Lead Author
0045	An unusual case of polyarthritis	Dr Marco Lee Leeds
0046	A clinical evaluation of Thermo Scientific™ A.R.I.A. Medium™	Miss Jessica Screen Basingstoke
0047	Management of medication related osteonecrosis of the jaw (MRONJ); a microbiologist's perspective	Dr Huma Changez Glasgow
0048	<i>Campylobacter</i> bacteraemia; clinical presentation and the role of antibiotics in management	Dr Francesca Eddy Bristol
0049	The importance of the <i>Streptococcus milleri</i> group in complicated sinusitis in children - confirmation from a paediatric case series of sinogenic intracranial abscesses over a 5-year period	Mr Anant Patel Cambridge
0050	Laboratory detection of CPE in Belfast Health and Social Care Trust	Dr Katie Fong Belfast
0051	B20: Investigation of intravascular cannulae and associated specimens	Mrs Ijeoma Ezeajugh London
0052	Characterisation of invasive <i>Staphylococcus aureus</i> isolates collected as part of the UK BSI-FOO study	Dr G Aida Hidalgo-Arroyo Bristol
0053	Infective discitis - 55 cases in Brighton, 2009 – 2014	Dr Joseph Donovan Brighton
0054	<i>Proteus</i> infections and imaging for stone in District General Hospital practice	Dr Chris Chang Southend
0055	A virtual case note review of the outcomes and quality of <i>Staphylococcus aureus</i> bacteraemia management	Dr Paul Robertson Glasgow
0056	Urinary tract infection in adults - an audit of diagnosis and treatment	Dr Matthew Saunders Liverpool
0057	Do English NHS Microbiology laboratories follow NICE UTI guidelines for children and offer adequate services for their diagnosis and referral?	Dr Clodna McNulty Gloucester



Poster No.	Title	Lead Author
0058	An outbreak of parainfluenza virus type 3 (PIV-3) in a Special Care Baby Unit	Dr Ursula Altmeyer <i>Glasgow</i>
0059	A pragmatic approach to reduce meropenem/gentamicin usage in haematology	Dr Zack Fang <i>Oldham</i>
0060	Challenges in the assessment and management of <i>Clostridium difficile</i> infection in the profoundly immunosuppressed: an appraisal of carriage and infection in Haematology Inpatients, University College Hospital	Dr Eliza Gil <i>London</i>
0061	Optimal screening of healthcare workers in context of a MRSA outbreak on the neonatal unit	Dr David Orr <i>Preston</i>
0062	A 2 year audit of carbapenemase producing organism (CPO) screening in a large teaching hospital NHS trust	Dr Jessica Martin <i>Leeds</i>
0063	Documentation quality of critical microbiology results and accompanying telephone advice in patient clinical notes at North Bristol NHS Trust: a prospective audit	Dr Julia Vasant <i>Bristol</i>
0064	Development of an integrated patient centred service OHPAT at the R.V.I., Newcastle-upon-Tyne (2013/14)	Mr Mrinal Thakur <i>Newcastle</i>
0065	Haematological malignancies and bacteraemia: using the electronic clinical infection database (eICID) to inform clinical practice	Dr Gabriele Pollara <i>London</i>
0066	Introduction of primary urine tubes at Public Health England Birmingham: a quality improvement exercise	Dr Abid Hussain <i>Birmingham</i>
0067	Outbreak of H3N2 influenza in a vaccinated inpatient cohort	Dr Bozena Poller <i>Sheffield</i>
0068	INSIGHT: Oseltamivir use in the FLU 003 Plus (Respiratory Virus Hospitalisation Study, INSIGHT Protocol No. 003)	Dr Sarah Pett <i>London</i>
0069	A phase III multicentre randomized controlled trial to assess the role of intravenous dexamethasone in the treatment of Herpes simplex encephalitis in adults (The DEX ENCEPH study)	Dr Sylviane Defres <i>Liverpool</i>
0070	Adherence to local antibiotic prophylaxis guidelines for elective colorectal and general surgery procedures at St Mary's Hospital, London	Dr Stephanie Rich <i>London</i>
0071	Outcomes of outpatient parenteral antimicrobial therapy for osteomyelitis at Cambridge University Hospital	Miss Venetia D'Arcy <i>Cambridge</i>
0072	Diagnosis of infective endocarditis in blood stream infections - the role of echocardiography (TTE versus TOE)	Dr Gayathri Nayar <i>Bristol</i>

Viral hepatitis

Poster No.	Title	Lead Author
0073	Hepatitis delta in Scotland - epidemiology and patient characteristics	Dr Celia Jackson <i>Glasgow</i>
0074	Hepatitis C in a Teaching Hospital Trust: translating diagnosis into treatment	Dr Philippa Matthews <i>Oxford</i>
0075	Latent TB screening in a viral hepatitis clinic at Birmingham Heartlands Hospital	Dr Katherine Clay <i>Birmingham</i>



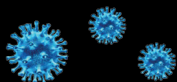
Poster No.	Title	Lead Author
0076	Audit of management of hepatitis B in pregnancy in Cardiff and Vale 2008-2013	Dr Brendan Healy <i>Cardiff</i>
0077	Spontaneous clearance of chronic hepatitis C virus infection in a Scottish cohort	Dr Prasanna Partha Sarathy <i>Glasgow</i>
0078	Prevalence of chronic hepatitis E in HIV and HSCT patients	Dr Natasha Jesudason <i>Glasgow</i>
0079	'HCV treatment in a real world setting'. Audit of hepatitis C virus genotype 1 treatment and outcomes at University Hospitals of Leicester (UHL) 2012-2014	Dr Katharine Cartwright <i>Sheffield</i>
0080	A rash diagnosis of hepatitis	Dr Rosemary Fok <i>Exeter</i>

TB and other mycobacteria

Poster No.	Title	Lead Author
0081	Development and evaluation of detection of mycobacterial species by PCR on BD MAX™ system	Dr Lasantha Ratnayake <i>Leeds</i>
0082	A study of multi drug resistant <i>Mycobacterium tuberculosis</i> at a national accredited Tuberculosis Laboratory, India	Dr Molly Madan <i>India</i>
0083	Genotypic evaluation of rifampicin resistance of <i>Mycobacterium tuberculosis</i> by line probe assay and DNA sequencing	Dr Molly Madan <i>India</i>
0084	Abdominal tuberculosis: a retrospective analysis of thirty-one cases	Mr George Jowsey <i>Newcastle</i>
0085	A multi-perspective exploration of tuberculosis contact screening attendance among adults at a large district hospital: a nested project within the PREDICT TB study	Dr Jennifer Roe <i>London</i>
0086	Are there earlier opportunities to diagnose and treat tuberculosis within the UK?	Dr Alice Binbay <i>Leeds</i>
0087	Hepatotoxicity rates in treatment of latent TB infection	Dr Michael Riste <i>Birmingham</i>
0088	Audit of NICE guidelines for diagnosing and treating extra-pulmonary tuberculosis	Dr Michael Riste <i>Birmingham</i>

Travel and tropical

Poster No.	Title	Lead Author
0089	Ultrasound assessment of urinary tract pathology associated with urogenital schistosomiasis: a community survey and 14 year follow up	Dr Kate McMonnies <i>Liverpool</i>
0090	Malaria in Brighton - destination, diagnosis and treatment. A five year analysis	Dr Joseph Donovan <i>Brighton</i>
0091	UK military infectious diseases patients treated at Birmingham Heartlands Hospital, 2005-2014	Dr Daniel Burns <i>Birmingham</i>
0092	Measuring urine morbidity markers using point-of-care tests in a <i>Schistosoma haematobium</i> endemic setting: visually versus machine-read dipstick detection of haematuria	Mr Andrew Blanshard <i>Liverpool</i>



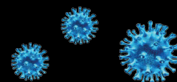
Poster No.	Title	Lead Author
0093	Long term malaria prevention in British expatriates	Dr Jane Cunningham Sheffield
0094	The Imported Fever Service: an advisory and specialist diagnostic service for unexplained travel-related fevers for routine and outbreak use	Dr Caoimhe Nic Fhogartaigh London
0095	<i>Brucella melitensis</i> : it still catches us out!	Dr Huma Changez Glasgow
0096	A study of vaccine uptake and barriers within a Travel Health Clinic	Dr James Meiring Sheffield

Mycology

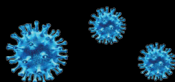
Poster No.	Title	Lead Author
0097	B39: Investigation of dermatological specimens for superficial mycoses	Mrs Ijeoma Ezeajughi London
0098	Sharing and developing a consensus approach to antifungal stewardship in London - a proof of concept	Mr Charles Parkinson London
0099	Isolation of <i>Aspergillus fumigatus</i> from sputum samples of cystic fibrosis patients: comparison between potato-dextrose agar and Sabouraud-dextrose agar	Dr Sook Fong Sharon Koo Leicester
0100	A pseudo-outbreak of <i>Fusarium oxysporum</i> associated with bronchoscopy	Dr Edward Barton Bristol

Antibiotics and resistance issues

Poster No.	Title	Lead Author
0101	Impact of a pharmacy to microbiology paper based referral system as an antimicrobial stewardship strategy	Dr Lasantha Ratnayake Leeds
0102	The rapid identification and confirmation of carbapenemase-resistant Enterobacteriaceae (CRE) using Brilliance™ CRE Agar and Sensititre™ Gram negative plates (GN4F)	Miss Jessica Screen Basingstoke
0103	Development of a decision aid for management of <i>Clostridium difficile</i> infection (CDI) in Care Homes	Dr Jacqueline Sneddon Glasgow
0104	Improving empirical prescribing in Medical Admissions Units using an antimicrobial prescribing quality indicator	Dr Jacqueline Sneddon Glasgow
0105	Improving patient outcomes through development of an innovative informatics programme	Dr Jacqueline Sneddon Glasgow
0106	Development of a national quality indicator to support reduction of total use of antimicrobials	Dr Jacqueline Sneddon Glasgow
0107	Development of a national education programme for Antimicrobial Pharmacists	Dr Jacqueline Sneddon Glasgow
0108	Carbapenem prescribing in Scotland: a paradox	Dr Ashutosh Deshpande Glasgow
0109	Antimicrobial stewardship in a busy district general hospital: how good are we at getting it right at the front door?	Dr John Boyes Gloucestershire



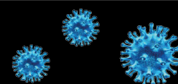
Poster No.	Title	Lead Author
0110	Carbapenemases: How effective is surveillance screening? An observational approach	Dr Darryl Braganza Menezes <i>Stoke-on-Trent</i>
0111	Sensitivity of urinary ESBL producing Gram negative isolates to pivmecillinam	Dr Jane Cunningham <i>Sheffield</i>
0112	The Antimicrobial Stewardship ward rounds in Edinburgh - an analysis of 12 months of data	Dr Rebecca Sutherland <i>Edinburgh</i>
0113	Lessons learnt from experiences of treating cellulitis in OPAT	Miss Jessie Zhang <i>Cambridge</i>
0114	BSAC Respiratory Resistance Surveillance Update 2012/13	Dr Rosy Reynolds <i>Bristol</i>
0115	Clinical outcomes and predictors of mortality following bacteraemia with KPC-producing Enterobacteriaceae in a large teaching hospital in the UK: a retrospective case review	Dr Louise Sweeney <i>Manchester</i>
0116	Case series demonstrating the use of temocillin as a carbapenem-sparing agent	Ms Orla Geoghegan <i>London</i>
0117	Are the BSAC zone sizes right? An analysis of co-amoxiclav resistance reporting of Enterobacteriaceae isolated from blood culture	Dr Bethan Stoddart <i>Lincolnshire</i>
0118	MRSA screening within United Lincolnshire Hospitals - analysis of the impact of the 2014 DH MRSA screening recommendations	Dr Bethan Stoddart <i>Lincolnshire</i>
0119	Linezolid-resistant Enterococcus faecium causing bilateral femoral shafts osteomyelitis	Dr Heather Hilliard <i>Hull</i>
0120	Evaluating the implementation of the national antimicrobial stewardship guidance: Start Smart then Focus	Dr Diane Ashiru-Oredope <i>London</i>
0121	Developing the English Surveillance Programme for Antimicrobial Utilisation and Resistance (ESPAUR) - one year on	Dr Diane Ashiru-Oredope <i>London</i>
0122	Antibiotic susceptibility of urinary tract isolates in patients with ureteral stent associated urinary tract infection	Dr Laura Cottom <i>Glasgow</i>
0123	The <i>in vitro</i> antibacterial activity of engineered honey (Surgihoney™) against important biofilm-forming burn wound pathogens	Dr Matthew Dryden <i>Winchester</i>
0124	Antimicrobial Stewardship: targeted education for nursing staff	Ms Denise Rosembert <i>Cambridge</i>
0125	An exploration of nursing practice in relation to the administration of intramuscular injection in the treatment of gonorrhoea	Mrs Caroline Donnelly <i>Glasgow</i>
0126	Outpatient Parenteral Antimicrobial Therapy (OPAT) across West Yorkshire - variation in service provision, clinical practice and models of care	Dr Jane Minton <i>Leeds</i>
0127	Does a dedicated antimicrobial prescribing chart reduce antimicrobial consumption?	Miss Samantha Lippett <i>Brighton</i>
0128	The use and abuse of antibiotics by the general public	Dr Clodna McNulty <i>Gloucester</i>
0129	The prevalence of UTIs amongst women in England, and their impact on daily lives	Dr Clodna McNulty <i>Gloucester</i>
0130	Development of a patient leaflet to be used in consultations to improve appropriate antibiotic prescribing in primary care	Dr Clodna McNulty <i>Gloucester</i>



Poster No.	Title	Lead Author
0131	Stopping, changing and oral switch of antibiotics on infection ward rounds is associated with inflammatory marker improvement in a UK teaching hospital	Mr Jonathan Peters <i>Southampton</i>
0132	Using a commercial database to measure antibiotic consumption in English NHS hospitals: a tool for antimicrobial stewardship	Ms Laura Whitney <i>London</i>
0133	A 12-month retrospective review of fidaxomicin use in patients with <i>Clostridium difficile</i> infection admitted to a District General Hospital	Dr Peter Yew <i>Belgast</i>
0134	A clinical approach to reduce <i>Clostridium difficile</i> infection in haematology patients	Dr Zack Fang <i>Oldham</i>
0135	Innovative strategies to improve junior doctors' empirical antibiotic prescribing	Dr Ana-Catarina Pinho-Gomes <i>Reading</i>
0136	Assessment and management interventions targeting <i>Clostridium difficile</i> infection, University College London Hospitals	Dr Mariyam Mirfenderesky <i>London</i>
0137	Antimicrobial prescribing for acute infections in an ENT department: results of an audit and development of local guidelines	Miss Annie Bartlett <i>Plymouth</i>
0138	An audit of interventions made on multi-disciplinary antimicrobial ward rounds	Mrs Gabriella Booth <i>Merthyr Tydfil</i>
0139	Daptomycin treatment for Gram-positive infections: results of clinical experience in the United Kingdom	Dr Armando Gonzalez-Ruiz <i>Dartford</i>
0140	Audit of antibiotic prophylaxis in surgery at Kingston Hospital	Dr Kendra McGrath <i>Kingston upon Thames</i>

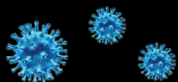
HIV

Poster No.	Title	Lead Author
0141	Audit results of testing for latent TB in the HIV cohort presenting to Sheffield Teaching Hospitals NHS Foundation Trust	Dr Fotinie Ntziora <i>Sheffield</i>
0142	Highly sensitive C-reactive protein and CD4/CD8 ratio are independently associated with reduced bone mineral density in people living with HIV infection	Miss Rebecca Marlor <i>Sheffield</i>
0143	HIV testing in Acute Medicine - missed opportunities	Dr Elen Vink <i>Edinburgh</i>
0144	Managing HIV in Timor-Leste: cohort review and programmatic challenges	Dr Charlotte Hall <i>Hull</i>
0145	Audit of patients that are inappropriately labelled 'High Risk' with regards to blood borne viruses	Dr Brendan Healy <i>Cardiff</i>
0146	Audit of Junior Doctors understanding of labelling of 'High Risk' samples	Dr Brendan Healy <i>Cardiff</i>
0147	The application of guidance regarding the confidentiality of HIV positive patient information by General Practices in Wales	Dr Brendan Healy <i>Cardiff</i>
0148	Late diagnoses in HIV- review of cases in a London HIV centre. Are lessons being learnt?	Dr Charles Williams <i>London</i>
0149	A diagnostic dilemma: HIV 'elite controller'	Dr Sook Fong Sharon Koo <i>Leicester</i>
0150	Evaluation of the QIAGEN Artus QS-RGQ assay for HIV-1 RNA quantitation	Dr Paul Grant <i>London</i>

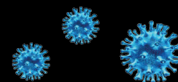


Clinical lessons

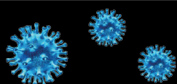
Poster No.	Title	Lead Author
0151	Sometimes it is a zebra	Dr Catherine Molyneux <i>Middlesborough</i>
0152	A thorny problem: blistering cellulitis due to <i>Nocardia brasiliensis</i>	Dr Catherine Molyneux <i>Middlesborough</i>
0153	Two cases of <i>Legionella pneumophila</i> non-serogroup 1 in patients undergoing extra corporeal membrane oxygenation for severe respiratory failure	Dr Stephanie Thomas <i>Manchester</i>
0154	Septicaemia due to <i>Mycoplasma hominis</i> in a patient undergoing extra corporeal membrane oxygenation for acute respiratory distress syndrome secondary to H1N1 influenza A infection	Dr Stephanie Thomas <i>Manchester</i>
0155	Chronic mould exposure as a risk factor for severe community acquired pneumonia in a patient requiring extra corporeal membrane oxygenation	Dr Stephanie Thomas <i>Manchester</i>
0156	A case of daptomycin and linezolid resistance in vancomycin resistant enterococcus (VRE) in a patient with polyglucosan body myopathy	Dr Lakshmpriya Mohankumar <i>Dudley</i>
0157	Listeria endophthalmitis in an elderly patient on anti-TNF α therapy for rheumatoid arthritis	Dr Ursula Altmeyer <i>Glasgow</i>
0158	<i>Salmonella</i> pyomyositis of the pectoral muscle – an unusual presenting complaint of a patient with hairy cell leukaemia	Dr Ursula Altmeyer <i>Glasgow</i>
0159	HIV encephalopathy - dilemmas in disclosure	Dr May Yung Tiet <i>Birmingham</i>
0160	Pneumococcal bacteraemia with septic arthritis heralds an underlying haematological diagnosis	Dr Christopher Ramsey <i>Bristol</i>
0161	Finding a needle in a haystack	Dr Ana-Catarina Pinho-Gomes <i>Reading</i>
0162	A mixed and mouldy bag	Dr Eliza Gil <i>London</i>
0163	A case report of bilateral endogenous endophthalmitis due to <i>Rhodotorula crocea</i> diagnosed by 18s PCR	Dr Katherine Watson <i>Newcastle</i>
0164	A case report of multi-drug resistant <i>Bacteroides fragilis</i> bacteraemia occurring in a patient with a rare myofibrotic bladder tumour	Dr Katherine Watson <i>Newcastle</i>
0165	Cutaneous larvae migrans acquired in the United Kingdom	Dr Katy Baple <i>Guildford</i>
0166	Two cases of <i>Nocardia farcinica</i> detected by 16S rRNA sequencing	Dr Ashutosh Deshpande <i>Glasgow</i>
0167	A case of non-typhoidal Salmonella bacteraemia following bariatric surgery	Dr Alex Howard <i>Liverpool</i>
0168	Two cases of MRSA bacteraemia secondary to acute parotitis	Dr Veena Raviprakash <i>Middlesborough</i>
0169	A resilient case of <i>Lactobacillus casei</i> endocarditis and discitis	Dr Veena Raviprakash <i>Middlesborough</i>
0170	Discordant phenotypic and genotypic resistance testing in tuberculosis: 4 cases from the West Midlands	Dr Daniel Burns <i>Birmingham</i>



Poster No.	Title	Lead Author
0171	A case of Group B <i>Streptococcus</i> endocarditis following a transvaginal ultrasound scan: could there be a link?	Dr Louis Peters London
0172	Acute disseminated encephalomyelitis (ADEM) in two siblings associated with familial herpetic gingivostomatitis	Dr George Orendi Stoke-on-Trent
0173	Intraventricular antibiotic treatment of a postneurosurgical multiresistant <i>Pseudomonas aeruginosa</i> (MRPA) ventriculitis causing multiloculated hydrocephalus in an adult patient	Dr Ivan Pelegrin Barcelona
0174	Recurrent polymicrobial bacteraemia with <i>Chryseomonas indologenes</i> and <i>Stenotrophomonas maltophilia</i> amongst other organisms in immunocompetent host	Dr Thomas Whitfield Manchester
0175	<i>Mycobacterium malmoeense</i> and <i>Staphylococcus aureus</i> causing infection of prosthetic hip joint and ileac abscess in a patient on anti-tumour necrosis factor α therapy	Dr Clinton Lowe Manchester
0176	One more dance with St Vitus	Dr Carlene Rowson Sheffield
0177	Unusual infections in Critical Care patients at a North London Hospital	Dr Christopher Holt London
0178	Culture negative mitral and aortic valve endocarditis due to <i>Tropheryma whipplei</i> without other systemic involvement: a case report	Dr Sook Fong Sharon Koo Leicester
0179	Temocillin for the treatment of bacteraemic sepsis caused by <i>Klebsiella pneumoniae</i> carbapenemase (KPC)-producing Enterobacteriaceae	Dr Zoie Aiken Manchester
0180	<i>Anaerobiospirillum succiniproducens</i> : a very rare cause of bacteraemia	Dr Harish Reddy Newcastle
0181	A case of disseminated histoplasmosis and immune reconstitution inflammatory syndrome in a patient with HIV	Dr Hannah Cheung Birmingham
0182	Disseminated <i>Exophiala dermatitidis</i> infection in a lung transplant patient: a case report	Dr Eve Hamilton Newcastle
0183	A non-fatal case of hantavirus cardiopulmonary syndrome imported into the UK from Panama, June 2014	Dr Megan Jenkins Bristol
0184	A nail in the armour: a case of tetanus despite adequate immunisation	Dr Samuel O'Neill Slough
0185	O-vary hazardous mass	Dr Bethan Walsh Nottingham
0186	A case of an interesting pair of amoebics	Dr Gabriel Wallis London
0187	"Ewe must make the correct diagnosis"; a case of <i>Chlamydomphila abortus</i> pneumonia	Dr Michael Ankcorn Sheffield
0188	Early identification of <i>Mycoplasma hominis</i> bacteraemia during puerperal fever, using Matrix Assisted Laser Desorption Ionisation - Time of Flight (MALDI-TOF)	Dr Vino Srirathan Oldham
0189	Necrotising fasciitis caused by <i>Haemophilus influenzae</i> in a healthy adult	Dr Jason Biswas London
0190	Humeral osteomyelitis in a Caucasian male caused by <i>Salmonella brandenburg</i> from Angola	Dr Jason Biswas London
0191	Prevention of <i>Trypanosoma cruzi</i> transmission from a renal transplant	Dr Damian Mawer Leeds



Poster No.	Title	Lead Author
0192	Bilateral adrenal haemorrhages secondary to Lemierre syndrome: a unique case report	Miss Annie Bartlett <i>Plymouth</i>
0193	Review of HIV testing across medical specialties in a DGH	Dr James Meiring <i>Sheffield</i>
0194	A case of Group B <i>Streptococcus</i> in an infected infra-renal aneurysm of the abdominal aorta associated with osteomyelitis of the sternoclavicular joint	Dr Anne-Marie Shanks <i>Inverness</i>
0195	<i>Globicatella sulfidifaciens</i> post op CNS infection and bacteraemia - case report	Dr Manjusha Narayanan <i>Newcastle</i>
0196	Heart of darkness: an interesting case of endocarditis	Dr Joby Cole <i>Sheffield</i>
0197	Invasive meningococcal disease: a spectrum of clinical presentations without concomitant meningitis	Dr Nicola Hardman <i>Leeds</i>
0198	First reported case of <i>Fusobacterium necrophorum</i> infection in a prosthetic joint	Dr Barbara Weinhardt <i>Glasgow</i>
0199	Diagnosis of infective endocarditis in 21 st Century	Dr Philip Williams <i>Bristol</i>
0200	An unusual case of disseminated <i>Mycobacterium tuberculosis</i>	Dr Natalie Beveridge <i>Cardiff</i>



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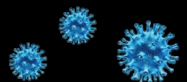
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Alere is the world's leading provider of near patient diagnostics. Our smart platforms and services provide healthcare practitioners, wherever they are, with seamless, real-time access to accurate and actionable diagnostic information, supporting robust clinical decision-making and accelerating care pathways.

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The Test Target Treat™ initiative from Alere empowers healthcare professionals to make targeted treatment decisions sooner with rapid diagnostics – reducing inappropriate antimicrobial use and the spread of resistance.

To learn more, visit Alere at Stand H19.

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Astellas is a global pharmaceutical company dedicated to improving the health of people around the world. Committed to research in anti-infective care, Astellas is focusing on saving the lives of critically ill patients with systemic fungal infections, as well as patients with *Clostridium difficile* infection.

Astellas key contacts

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Email: kiran.amliwala@astellas.com

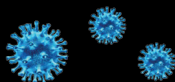
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Astellas Pharma Ltd, 2000 Hillwood Drive, Chertsey, Surrey KT16 0RS



BD is a leading global medical technology company that develops, manufactures and sells medical devices, instrument systems and reagents. The Company is dedicated to improving people's health throughout the world. BD is focused on improving drug delivery, enhancing the quality and speed of diagnosing infectious diseases and cancers, and advancing research, discovery and production of new drugs and vaccines. BD's capabilities are instrumental in combating many of the world's most pressing diseases.





The British Infection Association, formed in 2009, has over 1400 members from across the spectrum of clinical and laboratory infection specialists.

The Association exists to promote the science and practice of medicine in relation to infection, and provides support for all infection specialists whether in the field of clinical practice, laboratory medicine, public health, research or education.



BioConnections, an established distributor of products for clinical, veterinary, industrial and pharmaceutical microbiology labs.

Isolation of your microbe can be achieved with both traditional and chromogenic culture media, screening of both your aerobic and anaerobic isolates can then be undertaken using our range of bench reagents. Further identification of your isolates continues with Diatabs for biochemical profiling and you can finish with serological confirmation of your isolates with our large range of antisera.

With increased awareness of antibiotic resistance our Neo-Sensitabs kits facilitate the rapid detection and phenotypic confirmation of Antimicrobial Resistance Mechanisms (ARMs) such as Extended Spectrum Beta Lactamases (ESBLs) and *Klebsiella pneumoniae* Carbanemases (KPCs).



Bristol-Myers Squibb is a global biopharmaceutical company whose mission is to discover, develop and deliver innovative medicines that help patients prevail over serious diseases. For more information you can visit www.b-ms.co.uk.

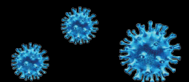


The MALDI Biotyper identifies microorganisms using MALDI-TOF (Matrix Assisted Laser Desorption Ionization-Time of Flight) Mass Spectrometry to determine the unique molecular fingerprint of an organism.

The characteristic spectrum pattern of this molecular fingerprint is used to reliably and accurately identify a particular microorganism by matching thousands of reference spectra of microorganism strains. But there's more. The outstanding capabilities of the system go well beyond microbial identification and Bruker is working on continuous innovation bringing MALDI Biotyper into new fields of application such as functional resistance testing.

There is nothing easier. The MALDI Biotyper workflow has been designed to be as robust and easy to perform as possible. Only a few simple steps are required to generate high quality microorganism identifications. No experience with mass spectrometry is required. Our dedicated MBT Compass microbiology software automates the process of acquiring the mass spectrum and spectra-matching, providing high fidelity identification results.

Coupled with extensive libraries covering environmental and clinical isolates provides extremely broad coverage of microorganisms found in Food, Pharmaceutical and Water industries, the MALDI Biotyper is a revolution for the microbiology field.





At the forefront of the antimicrobial chemotherapy field, the BSAC is an inter-professional organisation with over 40 years of experience and achievement in antibiotic education, research and leadership. Dedicated to saving lives through appropriate use and development of antibiotics now and in the future the Society communicates effectively about antibiotics and antibiotic usage via workshops, professional guidelines, and initiatives such as Antibiotic Action, UK OPAT Initiative, National Point Prevalence Survey System, Massive Open Online Course on Antimicrobial Stewardship and publication of the Journal of Antimicrobial Chemotherapy (JAC), which with an Impact Factor of 5.439 is among the foremost international journals in antimicrobial research.

Contact: Tracey Guise, CEO, BSAC

T: 0121 236 1988 | E: tguisse@bsac.org.uk

W: www.bsac.org.uk | www.antibiotic-action.com | www.e-opat.com | www.antimicrobial-stewardship-mooc | www.bsacsurv.org | www.appg-on-antibiotics.com

We look forward to welcoming you at the BSAC stand at the entrance to the exhibition hall.



The Clinigen Group is a specialty global pharmaceutical company headquartered in the UK, with offices in the US and Japan. The Group, dedicated to delivering 'the right drug, to the right patient at the right time', has three operating businesses; Specialty Pharmaceuticals (Clinigen SP), Clinical Trials Supply (Clinigen CTS), and Global Access Programs (Clinigen GAP). Clinigen SP is focused on acquiring its own intellectual property in licensed, niche, hospital-only critical care medicines, increasing the value of these medicines by developing new formulations and indications, then registering and marketing them in defined global markets.

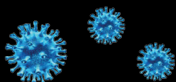
For more information, please visit www.clinigengroup.com.



Cubist is a biopharmaceutical company focused on the research, development and commercialisation of pharmaceutical products that address unmet medical needs. Cubist has a growing commitment to global public health through its leadership in the R&D of antibiotics to treat serious and life-threatening infections caused by a broad range of increasingly resistant bacteria. Cubist is investing about \$400M USD in 2014 on antibacterial R&D and approximately three out of every four Cubist employees are focused on the research, development, commercialisation and support of antibiotics. Cubist is expanding globally, with significant investments in the UK in infrastructure, people and education commencing in 2014.



Eumedica is an independent pharmaceutical company specialising in the production and distribution of niche hospital products. We aim to ensure development and continuity of care for patients with serious, even rare diseases. Eumedica currently operates in several therapeutic areas including the infectiology, haematology, anaesthesiology, obstetrics, gastro-enterology and psychiatry.





Forest Laboratories UK Ltd, (a subsidiary of Actavis PLC)

On July 1, 2014, Actavis (NYSE:ACT) completed the acquisition of Forest Laboratories, creating one of the world's fastest-growing specialty pharmaceutical companies with annual revenues of more than \$15 billion anticipated for 2015. The combination creates a Company with size and scale, a balanced offering of strong brands and generics, a focus on strategic, lower-risk drug development and a generic DNA, focused on cost efficiency across the expanded organization.

The new Actavis markets a broad portfolio of branded and generic pharmaceuticals and develops innovative medicines for patients suffering from diseases principally in the central nervous system, gastroenterology, women's health, urology, cardiovascular, respiratory and anti-infective therapeutic categories.

Tel: 01322 421 800

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Advancing Therapeutics, Improving Lives: Gilead Sciences, Inc. is a research-based biopharmaceutical company that discovers, develops and commercializes innovative medicines in areas of unmet medical need. We strive to transform and simplify care for people with life-threatening illnesses around the world. Gilead's portfolio of products and pipeline of investigational drugs includes treatments for HIV/AIDS, liver diseases, serious respiratory and cardiovascular conditions, cancer and inflammation.

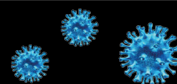
Our portfolio of marketed products includes a number of category firsts, including the first complete treatment regimens for HIV infection available in a once-daily single pill and the first oral antiretroviral pill available to reduce the risk of acquiring HIV infection in certain high-risk adults.

Strength through Partnership: Collaborations of all kinds – with partners in science, academia, business and local communities – are central to our work. Partnerships enhance our ability to develop innovative medicines and deliver them to people as efficiently as possible.

Growing Worldwide Reach: Gilead was founded in 1987 in Foster City, California. Over the past 25 years, we have grown to become one of the world's largest biopharmaceutical companies, with approximately 6,000 employees across five continents.



The **Healthcare Infection Society** is a membership organisation for professionals and trainees working in the field of healthcare-associated infections. It is also a registered charity with aims to foster scientific interest in the prevention and control of hospital and other healthcare-associated infections by sharing knowledge and disseminating information on the latest developments in this crucial area. Details about its activities and membership benefits, including access to *The Journal of Hospital Infection* can be found at www.his.org.





ICNet is a clinical surveillance software suite that aggregates data from existing clinical information systems to create an integrated platform, monitoring relevant data and correlating patients' specific conditions & treatments. Customised alerts provide timely, actionable information. Sophisticated data analysis tools create reports and automates mandatory data submission. ABX Alert monitors medications, providing antimicrobial stewardship, anti-coagulation therapy monitoring, outbreak management & ADE reports, for better allergy alarms, infection prevention, cost analysis and enhanced patient safety. For further information, please contact info@icnetplc.com / www.icnetplc.com.



Infection Prevention Society (Stand H3)

Tel: 01506 811077
Email: ips@fitwise.co.uk
Website: www.ips.uk.net

The vision of the Infection Prevention Society is that no person is harmed by a preventable infection. The mission is to inform, promote and sustain expert infection prevention policy and practice in the pursuit of patient or service user and staff safety wherever care is delivered. Membership includes individuals employed in health or social care with a demonstrable interest in the field of infection prevention and control, corporate members, institutional members, associate members, retired members and student members.



LEO Pharma helps people achieve healthy skin. By offering care solutions to patients in more than 100 countries globally, LEO Pharma supports people in managing their skin conditions.

Founded in 1908 and owned by the LEO Foundation, the healthcare company has devoted decades of R&D to delivering products and solutions to people with skin conditions.

Within dermatology LEO delivers solutions for actinic keratosis, psoriasis, eczema and skin infections. LEO Pharma also provides treatments for thrombosis (blood clotting).

LEO Pharma UK/Ireland is also committed delivering high quality patient care through partnerships and the provision of comprehensive patient support and educational resources.

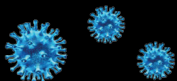


Today's MSD is a global healthcare leader who is working to help the world be well.

Through our medicines, vaccines, biologic therapies, and consumer and animal products, we collaborate with human and animal health professionals across the UK and in more than 140 countries to deliver innovative health solutions.

Beyond this, we have a commitment to increasing access to healthcare through far-reaching programmes that donate and deliver our products to people who need them.

For more information, please go to www.msd-uk.co.uk.





The Nordic Group is privately-owned, fast-growing, fully-integrated, pan-European Pharmaceutical group with a strong emphasis on quality product and services that cater to the special needs of each client and patient. The Nordic Group originated in 1995 with the establishment of the first Nordic organisation in Scandinavia. Today the Nordic group focuses in two specialised segments of the pharmaceutical market: Marketing and sales of Speciality pharmaceuticals; Specialised Pharmaceutical Services which focus on Product Development, Manufacturing, Supply logistics and Regulatory activities. The Nordic Pharma companies are Marketing and Sales structures within the Nordic Group and are dedicated to hospital and specialist markets. Our vision is to establish a pan-European speciality pharmaceutical group and to provide the highest quality international pharmaceutical products and services to our customers, partners and patients.



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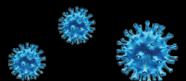
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- Histopathology
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- Chemical Pathology
- Haematology
- Infectious Diseases
- Immunology
- Microbiology

Pathology Group is an official supplier to all three national frameworks: LLP, HTE and CCS. This gives us access to numerous contracts, including exclusive Tier 1's. We are currently working in partnership with hospitals, laboratories and private services through-out the UK.

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At Pfizer, we apply science and our global resources to improve health and well-being at every stage of life. We strive to set the standard for quality, safety and value in the discovery, development and manufacturing of medicines. Every day, Pfizer colleagues work to advance wellness, prevention, treatments and cures that challenge the most feared diseases of our time. As one of the world's premier innovative biopharmaceutical companies, we also collaborate with health care providers, governments and local communities to support and expand access to reliable, affordable health care around the world. For more than 150 years, Pfizer has worked to make a difference for all who rely on us.



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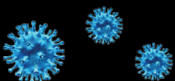
For further info call 079 641 497 99 / Email info@r-ds.co.uk



R-Biopharm AG is a German based company specialising in developing and manufacture of test solutions for clinical diagnostics. Products are available for the determination of hospital acquired infections and enteric pathogens. Organisms detected include, MRSA, Clostridium difficile, Influenza and Norovirus. Our kits range from easy to use point of care tests to leading edge molecular multiplex assays. Our immunoassays offer low cost screening solutions and molecular assays offer speedy diagnostics for enhanced patient management. All of our products are cE IVD marked and fully validated for clinical diagnostics.



The Society for General Microbiology (SGM) is a membership organisation for scientists who work in all areas of microbiology. It is the largest learned microbiological society in Europe with a worldwide membership based in universities, industry, hospitals, research institutes and schools. The SGM publishes key academic journals in microbiology and virology, organises international scientific conferences and provides an international forum for communication among microbiologists and supports their professional development. The Society promotes the understanding of microbiology to a diverse range of stakeholders, including policy-makers, students, teachers, journalists and the wider public, through a comprehensive framework of communication activities and resources.





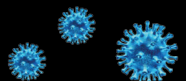
The Royal Society of Medicine is one of the largest providers of continuing medical education in the UK. Each year the RSM organises over 400 CPD accredited conferences and events spanning 60+ medical specialties and areas of interest including clinical immunology & allergy, sexual health and epidemiology & public health.

Membership of the RSM is open to all working in or with an interest in healthcare. Members can access 3,500+ e-journals; view lectures and earn online CPD; attend RSM meetings at discounted rates; access the RSM's world class library, and enjoy exclusive members' only club facilities.

Find out more: www.rsm.ac.uk/join



ViiV Healthcare aims to take a deeper and broader interest in HIV/AIDS than any company has done before and takes a new approach to deliver effective and new HIV medicines, as well as support communities affected by HIV. For more information on the company, its management, portfolio, pipeline, and commitment, please visit www.viivhealthcare.com.



FIS 2014 COLLABORATING SOCIETIES



British Infection Association

British Infection Association
www.britishinfection.org



British HIV Association
www.bhiva.org



**The British Society for
Antimicrobial Chemotherapy**
www.bsac.org.uk



Society for General Microbiology
www.sgm.ac.uk



Healthcare Infection Society
www.his.org.uk



Infection Prevention Society
www.ips.uk.net



British Society for Medical Mycology
www.bsmmm.org



**United Kingdom Clinical Pharmacy
Association Pharmacy Infection Network**
www.ukcpa.net



**British Paediatric Allergy
Immunity & Infection Group**
www.bpaiig.org



**National Travel Health Network
and Centre**
www.nathnac.org



Welsh Microbiological Association
www.wma.wales.nhs.uk



The Children's HIV Association
www.chiva.org.uk

