

RCPE Symposium – Infectious Diseases

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Introduction

The Infectious Diseases symposium explored the varied nature of the specialty through a programme featuring global issues, such as antimicrobial resistance and Ebola virus disease, as well as examples of local outbreaks and clinical best practice.

Session 1: ‘Youth is a dream, a form of chemical madness’ – F Scott Fitzgerald

The opening session demonstrated the role of health services as sentinels for underlying health issues within the communities they serve. Donald Inverarity (Consultant Microbiologist, Royal Infirmary, Edinburgh) revealed how a shift in injecting practices away from heroin towards novel psychoactive substances (NPS) in Edinburgh led to a wave of invasive *Staphylococcus aureus* and *Streptococcus pyogenes* infections.¹ Increased injecting frequency associated with NPS, as well as different methods of drug preparation, such as the absence of a heating step, appeared to cause a severe clinical phenotype.

Whilst novel patterns of drug use were causing issues in Edinburgh, health services 40 miles to the west were experiencing an outbreak reminiscent of Edinburgh in the early 1980s. Dr Erica Peters (Consultant in Infectious Diseases, Queen Elizabeth University Hospital, Glasgow) discussed an ongoing outbreak of HIV in people who inject drugs in Glasgow. The outbreak is associated with deprivation and homelessness, suggesting harm-reduction programmes were not reaching this vulnerable population.² Dr Peters highlighted the challenges in engaging with this group and discussed strategies to overcome barriers to treatment, including outreach of services and linking antiretroviral dispensing to opiate replacement therapy.

Dr Laura Jones (Consultant Paediatrician, Royal Hospital for Sick Children, Edinburgh) closed the first session by discussing the challenges faced by young people transitioning between paediatric and adult HIV services. Children with HIV have a limited capacity to reconstitute their CD4 count, so it is crucial that treatment is initiated and optimised in childhood. However, achieving stability on antiretrovirals in adolescence is often disrupted by substance misuse, mental health problems and social issues. Dr Jones showed that despite these hurdles, rewarding and fruitful partnerships can be formed with young patients.

Session 2: ‘It is not difficult to make microbes resistant to penicillin...’ – Alexander Fleming Nobel Laureate Lecture 1945

Tim Rawson (Clinical Research Fellow, Imperial College, London) presented work on changing antimicrobial prescribing behaviour. Whilst 30–60% of patients receive an antibiotic during their hospital admission, the bulk of prescribing is not performed by infection specialists and is often inappropriate. Can technology help improve prescribing behaviour? The integration of data from electronic records with artificial intelligence (AI) and rapid diagnostics presents an opportunity. Such systems have been demonstrated to reduce inappropriate antibiotic use. Despite media scare stories Dr Rawson reassured the audience that rather than replacing clinicians, AI will be integrated into physician-delivered care as a tool to provide enhanced evidence-based practice. As IT systems are updated to meet the demands of 21st-century medicine, AI may be coming to a hospital near you soon!

The Dr Ella Pringle Lecture was delivered by Professor Ramanan Laxminarayan (Director, Centre for Disease

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Dynamics, Economics and Policy, Washington DC, USA), who presented evidence for the rise of antimicrobial resistance (AMR) worldwide, summarising the extent of the problem by stating 'it's gone from a problem in a few isolated cases to everybody's problem'.³ Resistant pathogens are influencing clinical outcomes, with increased mortality in neonatal sepsis, reduced efficacy of surgical prophylaxis and the spread of almost untreatable sexually transmitted infections.⁴ As economies develop, increasing global antibiotic consumption in both healthcare and agriculture will intensify the selection pressure on microbes to develop and maintain AMR. Are new antibiotics the answer? Only partly, as if current practice is continued resistance will develop rapidly against new agents brought into an environment where resistance levels are already high. Investment in surveillance, antimicrobial stewardship, and a coordinated global response are crucial to addressing the problem, whilst public health interventions preventing the use of antibiotics, such as sanitation, housing and vaccines, should be strengthened.

Session 3: 'There is no cure that does not have its price' – Kenyan Proverb

Sir Michael Jacobs (Consultant in Infectious Diseases, Royal Free Hospital, London) provided a fascinating insight into the management of the three imported UK cases of Ebola virus disease during the recent epidemic in West Africa, where a single zoonotic spill-over event led to an outbreak with human transmission on an unprecedented scale. In response to the epidemic the World Health Organization published an important framework for use of experimental medicines; the Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI). Comparison of patient outcomes between those managed in treatment centres in West Africa and the mainly young and fit medically evacuated population who received state of the art intensive care is difficult. As expected the medically evacuated population had lower mortality (18%), suggesting provision of adequate supportive care could improve outcomes. Sir Jacobs explained the evidence for immunological and pharmacological interventions, including convalescent serum, monoclonal antibodies, such as Zmapp and Mil77, and the antiviral agent remdesivir.⁵ As the current situation in the Democratic Republic of the Congo demonstrates, further outbreaks are inevitable. Innovative trial protocols ready for rapid deployment when an outbreak strikes are needed if the utility of novel therapeutics is to be determined.

The effective treatment of HIV is arguably the greatest success story of modern medicine; however, despite the promise of a near-normal life expectancy, many patients experience issues with medication side effects and stigma. Can we do better – can we develop a cure? Professor John Frater (Professor of Infectious Diseases, University of Oxford) is working towards this goal. Patients with virological suppression on therapy experience a rebound viremia on withdrawal of antiretrovirals owing to reactivation

of latently infected CD4 T lymphocytes. With tempered optimism, Professor Frater discussed potential strategies for elimination of these latently infected cells and presented novel chip-based cell-sorting techniques to allow their detection.

Session 4: 'Progress occurs where truths are questioned' Aniekee Tochukwu Eziekiel. What's new in..?

Whole-genome sequencing (WGS) is increasingly being implemented into diagnostic pathways. Public Health England has recently transitioned to performing WGS on all tuberculosis isolates. Dr Tim Walker (Academic Clinical Lecturer, University of Oxford) demonstrated how information provided by WGS can rapidly detect an array of increasingly well-characterised genomic drug resistance markers, reducing the number of isolates requiring laborious phenotypic susceptibility testing. Whilst this approach is currently restricted to first- and second-line agents, increasing data on strains from across the globe should allow prediction of susceptibility to a range of drugs from genomic data alone.

Dr Eavan Muldoon (Consultant in Infectious Disease, Mater Misericordiae University Hospital, Dublin) discussed management of fungal disease. Diagnosis is often delayed owing to failure to consider fungi in the differential, whilst new patient groups are being rendered susceptible to infection by novel therapies, such as tyrosine kinase inhibitors. Laboratory diagnostics are often highly specialised and delivered by reference laboratories, resulting in delays. Early imaging can provide rapid information and is particularly useful in cases of pulmonary pathogens, such as *Aspergillus*. Drug resistance to first-line agents is common, so antimicrobial susceptibility testing and therapeutic dose monitoring should be performed in all cases of invasive disease.

To close, Professor Jonathan Sandoe (Associate Clinical Professor of Microbiology, University of Leeds) discussed the management of cardiac device infections, specifically permanent pacemakers, implantable cardioverter defibrillators and cardiac resynchronisation devices. Infections are divided into those involving the generator pocket and endocardial infection, but these often coexist. Management of an infected device is almost invariably involves its complete removal when possible, highlighting the importance of building good working relationships between colleagues from cardiology and cardiac surgery.

Take home message

Despite the threat of AMR and the inevitability of further outbreaks of zoonotic pathogens, the overwhelming mood at the symposium was one of optimism. Personal highlights were the presentations from researchers conducting innovative and clinically relevant work, much of it readily

translational and likely to alter clinical practice in the near future. It was particularly inspiring to see young researchers represented amongst an extremely high-quality panel of speakers. Therapeutic advances and the emergence of novel pathogens have altered the specialty dramatically in the past decade, it will be fascinating to see the challenges and changes the future brings.

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