Antimicrobial Resistance – Genomes, Big Data and Emerging Technologies

27 - 29 November 2018

Wellcome Genome Campus,
Hinxton, Cambridge, UK

Conference Programme

Tuesday, 27 November

12:00-13:20 Registration with lunch

13:20-13:30 Welcome and Introductions
Sharon Peacock, London School of Hygiene and Tropical Medicine, UK

13:30-14:30 Keynote Lecture
Session Chair: Sharon Peacock, London School of Hygiene and Tropical Medicine, UK

Big gaps in our knowledge about AMR
Mark Woolhouse,
University of Edinburgh, UK

14:30-15:30 Session 1: Machine learning and prediction of antimicrobial resistance
Chair: Julian Parkhill, Wellcome Sanger Institute, UK

14:30 Global surveillance of AMR and the challenges for machine learning
Zamin Iqbal
EMBL-EBI, UK

15:00 Considerations for coding evolution: a meta-analysis of machine-learning based prediction of antibiotic resistance
Allison Hicks
Harvard University, USA

15:15 Analysis of Machine Learning Methods in Predicting Drug Resistance of Mycobacterium Tuberculosis
Leonid Chindelevitch
Simon Fraser University, USA

15:30-16:00 Afternoon Tea
Session 1 continued: Machine learning and prediction of antimicrobial resistance

16:00 Using machine learning to predict antimicrobial minimum inhibitory concentrations and associated genomic features for nontyphoidal Salmonella
James Davis
University of Chicago, USA

16:30 Machine Learning Approaches for Improving Antimicrobial Resistance Prediction in M. tuberculosis using PointFinder
Camilla Hundahl Johnsen
Technical University of Denmark, Denmark

16:45 A k-mer-based method for the identification of phenotype-associated genomic biomarkers and predicting phenotypes of sequenced bacteria.
Erki Aun
University of Tartu, Estonia

17:00 Using machine learning to guide targeted and locally-tailored empiric antibiotic prescribing in a children’s hospital in Cambodia
Mathupanee Oonsivilai
Mahidol-Oxford Tropical Medicine Research Unit, Thailand

Lightning talks
Chair: Julian Parkhill, Wellcome Sanger Institute, UK

17:35-19:00 Poster Session 1 (odd numbers) with drinks reception

19:00 Dinner

Wednesday, 28 November

Session 2: Genomic surveillance and epidemiology: its role in detection, tracking and control of antimicrobial resistance
Chair: Iruka Okeke, University of Ibadan, Nigeria

09:00 Distribution of microbial communities and antimicrobial resistances in urban environments and in space
Daniela Bezdan
Weill Cornell Medicine, USA

09:30 Changing patterns of antimicrobial resistance acquisition and spread in a single hospital for priority pathogens
Nick Thomson
Wellcome Sanger Institute, UK
10.00  Epidemic of carbapenem-resistant Klebsiella pneumoniae in Europe is driven by nosocomial spread: Inference from a continent-wide population analysis
   Sophia David
   Wellcome Sanger Institute, UK

10.15  Changing pattern of Carbapenemase-Producing Enterobacteriaceae (CPE) in Hong Kong hospitals, a 7-year overview.
   Margaret Ip
   Chinese University of Hong Kong, Hong Kong

10:30-11:00  Morning Coffee

11:00-12:30  Session 3: Genomic evidence that informs the debate on ‘farm to fork’ transmission of resistant pathogens
   Chair: Sharon Peacock, London School of Hygiene and Tropical Medicine, UK

11:00  Meat, urine and time machines
   Lance Price
   George Washington University, USA

11:30  The challenges of leadership
   Gwyn Jones
   RUMA (Responsible Use of Medicines in Agriculture), UK

12:00  One Health genomic surveillance of E. coli reveals separate populations and mobile genetic in humans and livestock
   Catherine Ludden
   London School of Hygiene and Tropical Medicine, UK

12:15  Superbugs in the supermarket: High prevalence of antibiotic resistances in chicken meat-associated enterococci
   Daria Van Tyne
   University of Pittsburgh, USA

12:30-14:00  Lunch

14:00-15:00  Keynote Lecture
   Chair: Susanna Dunachie, Nuffield Department of Medicine, UK

   State of the World’s Antibiotics in 2018
   Ramanan Laxminarayan
   The Center for Disease Dynamics, Economics & Policy (CDDEP), USA / India

15:00-15:30  Session 4: Global burden of disease from drug-resistant infections: monitoring and evaluation
   Chair: Susanna Dunachie, Nuffield Department of Medicine, UK

15:00  The Challenges Of Estimating the Global Burden of AMR
   Susanna Dunachie
   Nuffield Department of Medicine, UK

15:30-16:00  Afternoon Tea
Session 4 continued: Global burden of disease from drug-resistant infections: monitoring and evaluation

16:00 Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the European Union and the European Economic Area in 2015: a population-level health estimate
Alessandro Cassini
ECDC, Sweden

16:30 Developing a geospatial modelling framework to estimate the burden of antimicrobial resistance
Annie Browne
University of Oxford, UK

17:00 Global surveillance of antimicrobial resistance through sewage samples and functional resistance
Pimlapas Leekitcharoenphon
Technical University of Denmark, Denmark

17:15 See and Sequence: Whole Genome Sequencing for the Surveillance of Antimicrobial Resistance in the Philippines
Silvia Argimon
Centre for Genomic Pathogen Surveillance, UK

17:30 Transmission dynamics and between-species interactions of multidrug-resistant Enterobacteriaceae
Thomas Crellen
Mahidol-Oxford Research Unit, Thailand

17:45-18:05 Lightning talks
Chair: Iruka Okeke, University of Ibadan, Nigeria

18:05-19:30 Poster Session 2 (even numbers) with drinks reception

19:30 Conference Dinner

Thursday, 29 November

09:00-10:30 Session 5: Translating bacterial genomics into routine clinical practice
Chair: Iruka Okeke, University of Ibadan, Nigeria

09:00 Public health surveillance of antimicrobial resistance in gastrointestinal pathogens
Claire Jenkins
PHE, UK

09:30 Time to move on from 150 years of shoe leather epidemiology for outbreak detection
Sharon Peacock
London School of Hygiene and Tropical Medicine, UK
10:00 Defining a relatedness cut-off between MRSA isolate genomes that predicts the probability of an outbreak  
Francesc Coll  
London School of Hygiene & Tropical Medicine, UK

10.15 Implementing genomic-based AMR surveillance from the ground up  
Anthony Underwood  
Centre for Genomic Pathogen Surveillance, WSI, UK

10:30-11:00 Morning Coffee

11:00-12:30 Session 6: Emerging technologies and analysis approaches  
Chair: Till Bachmann, University of Edinburgh, UK

11:00 Training and validation of a novel 30-mRNA panel, HostDx Sepsis, for diagnosing and prognosing acute infections and sepsis  
Tim Sweeney  
Inflammatix, USA

11:30 Antibiotic stewardship in the context of the human microbiome  
Debby Bogaert  
University of Edinburgh, UK

12:00 Genome-wide association uncovers novel candidate resistance and compensatory mutations in antibiotic-resistant Neisseria gonorrhoeae  
Kevin Ma  
Harvard TH Chan School of Public Health, USA

12:15 Characterising beta-lactam antibiotic resistance in healthy human gut microbiota  
Lindsay Pike  
Wellcome Sanger Institute, UK

12:30-12:45 Closing remarks  
Sharon Peacock, London School of Hygiene and Tropical Medicine, UK

12:45-13:30 Lunch

13:30 Coaches depart to Cambridge City Centre and Train Station, Stansted Airport via Heathrow Airport