

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 I: 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**

16:00-17:30

Session I 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

17:15-17:35

Lightning talks

Chair: Julian Parkhill, Wellcome Sanger Institute, UK

17:35-19:00

Poster Session I (odd numbers) with drinks reception

19:00

Dinner

Wednesday, 28 November

09:00-10:30

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 Bezdán
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

16:00-17:45

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