Whole Genome Sequencing
Course information

Title: Clinical interpretation and implementation of microbiological whole genome sequencing techniques
Type: Short course
Organisation: For Health Education England (HEE), by The Association for Clinical Biochemistry & Laboratory Medicine (ACB), in partnership with Great Ormond Street Hospital Learning Academy (GLA)

Course objectives

The course addresses the question: *How does Whole Genome Sequencing (WGS), other molecular technologies and the management of generated data impact on patient pathways and outcomes in the management of infectious diseases?*

It is designed as professional development for staff working in a healthcare setting with clinical exposure to microbiological sequencing data and test results. It is designed to ensure understanding of molecular microbiology results and to support their implementation into clinical workflows.

The objective is to upskill healthcare professionals currently working in a healthcare setting with clinical exposure to microbiological sequencing and test results that will:

- Facilitate learning and enhance knowledge of molecular microbiology processes to improve clinical practice and implementation to results into routine patient management
- Develop an understanding of how data analytics are used to review and inform management choices
- Develop an understanding of available molecular microbiological techniques in order to select appropriate methods to answer clinical queries

A better understanding of Whole Genome Sequencing (WGS), molecular approaches to support clinical management decisions and the use of sequencing data will make an important contribution for future pandemic preparedness.

Learning outcomes

Knowledge and understanding

1. Demonstrate comprehensive knowledge of microbiology and virology in relation to the molecular microbiology including cause, spread and management of infection
2. Appraise and debate the benefits and limitations of available techniques in relation to clinical queries

Intellectual skills

3. Critically examine and apply research for molecular diagnosis of infection, impacts of new and emerging infections, use of tools for monitoring and epidemiology within different healthcare environments and systems including global health

Practical skills

4. Evaluate evidence for test selection, understanding of molecular processes and quality assurance within molecular workflow

Transferrable skills

5. Critically interrogate complex datasets linked to case based discussions and surveillance including incident investigation, individual patient management decisions and outbreak management
6. Justify and interpret advanced clinical decision making and test requesting evidence from infected cases, including creation of a diagnostic and management plan
7. Create a strategy for the implementation of a new molecular tests to support a patient pathway

Learning methods

Learning will be delivered in three complementary ways, across a total of 200 hours.

1. **Virtual contact time** (i.e. timetabled hours during which the learning activity is undertaken under the direct supervision of a lecturer) – 30 hours
2. **Blended learning** (i.e. content that informs or consolidates the course content) – 20 hours
3. **Self-directed learning** (i.e. related learning activities without direct supervision) – 150 hours

A virtual learning environment (VLE) will form the main platform for delivery. Teaching methods to be used within the module include: lectures, case studies, reflective practice, group work including student-led presentations, webinars, tutorials and workshops.

Curriculum

(Indicative content, subject to change)

- Cause, spread and diagnosis of infection
- Understanding of clinical workflow: pre analytical (sample selection), analytical (sample processing and data verification) and post analytical (result implementation)
- Infrastructure requirements for implementation of sequencing technologies including platforms, computation resource
- Ethical considerations and governance in relation to sequencing data
- Processes for implementation of novel techniques within clinical pathways
- Use of molecular diagnostic results to inform patient management decision (resistance profiling, virulence testing etc)
- Benefits and limitation of different techniques to support clinical test requesting
- Use of molecular testing within different clinical environments, selection of the right test to support answering the clinical query posed

Course dates

The contact hours segment of the course will take place in four cohorts on the following dates:

- **17-21 April 2023** - in person at Goodenough College, London - 50 delegates
- **26-30 June 2023** - virtual setting - 100 delegates
- **11-15 September 2023** - virtual setting - 100 delegates
- **20-24 November 2023** - in person at Goodenough College, London - 50 delegates