INTRODUCTION TO THE UK CURRICULUM IN CLINICAL GENETICS

Clinical Geneticists work in multidisciplinary regional genetic centres in the UK, in close collaboration with laboratory scientists, clinical co-workers (genetic counsellors) and academic colleagues.

The specialty of Clinical Genetics is constantly changing and the clinical geneticist must take account of new knowledge and molecular developments and alter clinical practice accordingly. S/He will be an information resource for other medical specialists. Clinical geneticists need a wide range of clinical skills, as genetic disorders can affect people of all ages and involve all body systems. Communication skills are particularly important in explaining complex concepts and genetic test results to families enabling them to make informed decisions and choose an appropriate course of action.
The clinical geneticist works closely with clinical scientists who manage cytogenetic, molecular and biochemical genetic laboratories. The clinical geneticist gives advice to other professionals such as teachers, NHS commissioners and lay organisations. Finally, clinical geneticists have an important role in public education and public debate about ethical and other diverse issues that arise from new developments in the clinical application of genetic knowledge.

The content of the UK curriculum and the teaching / learning methods described were determined by the Specialty Advisory Committee (SAC) in Clinical Genetics. The SAC membership represents clinical trainers and trainees in the specialty, the UK Clinical Genetics Society, the Royal College of Physicians, the Royal College of Paediatrics and Child Health, the Joint Royal Colleges Post-Graduate Training Board (JRCPTB) and patient organisations.

Clinical Genetic training programmes in the UK are based in Regional Genetic Centres and all individual programmes are approved by the statutory Post-Graduate Training and Education Board (PMETB).Successful completion of specialist training leads to award of CCT (Certificate of Completion of Training) and entry into the General Medical Council (GMC) Specialist Register, which allows a doctor to be appointed as a Consultant in the Specialty.

ENTRY CRITERIA AND LENGTH OF HIGHER SPECIALIST TRAINING IN CLINICAL GENETICS.

After graduation, all UK trainees undertake 2 years of "Foundation" training; Foundation year 1 (F1) pre-registration and Foundation year 2 (F2) post-registration.

Those who achieve specified generic competencies go on to undertake two years of Core Medical Training (ST1 and ST2 level) in either general medicine or paediatrics before appointment by competitive interview into a Clinical Genetics training programme at ST3 level. Specialist training in Clinical Genetics takes a further 4 years.

The Clinical Genetics curriculum follows on from the successful completion of the core training curricula. Applicants for Clinical Genetic training posts are expected to have acquired MRCP(UK) or MRCPCH part 1 examination and need to acquire part 2 prior to CCT.

Exemption from part of the 4 year specialist training programme in Clinical Genetics can be granted for trainees who have an MSc in genetics (up to 6 months exemption) or a BSc in genetics (up to 3 month exemption). Up to one year of relevant research can also be counted

towards the 4 year training programme. However, trainees must complete 3 full years of specialist clinical genetics training and cannot count previous degrees as well as research time. With prior approval of the training content, part of the specialist clinical genetics training can be undertaken in centres overseas, but at least two years of training, including the final year must be undertaken in the UK

The total training period in the UK (after full registration with the GMC) is therefore 7 years: 3 years core medical training and 4 years specialist Clinical Genetics training.

CLINICAL GENETICS CURRICULUM: CONTENT OF LEARNING

The specialty curriculum is complementary to the generic curriculum which applies to all 28 physicianly specialities. The generic curriculum follows the headings of good medical practice and runs through from core training to CCT

The training programme in Clinical Genetics aims to produce clinicians who:

CLINICAL	MANAGEMENT	RESEARCH, TEACHING, LEARNING	AUDIT, CLINICAL GOVERNANCE
Apply knowledge of formal genetics and basic sciences in the diagnosis of genetic disorders. Establish diagnoses by history taking, clinical examination and investigations. Calculate genetic risks. Address all aspects of the healthcare needs of patients and their families. Recognise the limitation of their own expertise and know when to seek assistance of colleagues.	Work as part of a team. Manage time and resources to the benefit of themselves, their patients and colleagues. Utilise effectively current methods in information technology.	Are effective educators of both patients and colleagues. Are able to take responsibility for their own educational needs and the attainment of these needs. Plan, conduct and write-up a research project. Debate the social, ethical and legal issues that affect the practice of clinical genetics. Use skills of life long learning to keep up to date with developments in Clinical Genetics.	Develop new clinical practices based on analysis of developments in genetic laboratory diagnostics. Carry out clinical audit and act on the results. Accept the clinician's role and responsibilities in providing high quality patient care, setting and monitoring standards. Participate fully in all Clinical Governance Activities.

CURRICULUM COMPETENCES TO BE ACHIEVED

This Clinical Genetic curriculum defines the following competencies required during training to achieve CCT (Certificate of Completion of Training) and enter the Specialist Register as a Clinical Geneticist. Each competency is defined by the knowledge, skills and attitudes that need to be demonstrated.

1. GOOD CLINICAL CARE
   Includes pre-clinic preparation, history taking, examination, investigations including imaging, diagnosis and management, note keeping, letter writing, time management, decision making, phlebotomy, skin biopsy and clinical photography

2. COMMUNICATION SKILLS AND GENETIC COUNSELLING
   Includes genetic consultations, counseling for diagnostic, carrier, predictive and prenatal testing, discussion of reproductive options, breaking bad news, counselling using interpreters, handling complaints and communication with colleagues

3. FORMAL GENETICS AND BASIC SCIENCES
   Includes cellular and molecular mechanisms that underpin inheritance in man, patterns of inheritance and risk assessment, emerging genetic technologies and their application and social and ethical implications of genetic knowledge.

4. COMMON GENETIC REFERRALS
   Knowledge of common disorders and skills to carry out specialist diagnosis, assessment and genetic counselling. Includes, but not restricted to: multifactorial disorders, congenital abnormalities, chromosomal abnormalities, learning disability, inborn errors of metabolism, deafness and cardiac, renal, ophthalmic and connective tissue disorders.

5. NEUROGENETICS
   Skills and knowledge to recognise, assess and investigate genetic causes of central and peripheral nervous system dysfunction. Includes, but not restricted to: Huntingdon Chorea and genetic dementias, neuropathies, hereditary spastic paraplegias, spinal muscular atrophies, muscular dystrophies and myopathies, neurocutaneous syndromes, epilepsy and mitochondrial cytopathies.

6. PAEDIATRIC GENETICS AND DYSMORPHOLOGY
   Knowledge and skills to make syndromal diagnosis in children, including birth defects, growth disorders, learning disability, skeletal dysplasias and effect of teratogens.

7. CANCER GENETICS
   Skills and knowledge to deal with common and rare cancers that have a genetic cause or predisposition and to institute targeted screening programmes. Includes, but not restricted to: APC, MEN, NF2 and von Hippel-Lindau disease.

8. PRENTAL DIAGNOSIS AND FETAL DYSMORPHOLOGY
   Skills and knowledge to undertake genetic assessment of fetal disorders, and counsel parents, including knowledge of prenatal diagnostic procedures

9. LABORATORY GENETICS
   Knowledge of laboratory techniques and ability to interpret laboratory results in a clinical setting, achieved through attachment to the laboratories.

10. ORGANISATION AND PROVISION OF GENETIC SERVICES FOR POPULATIONS
    Understanding of practical, legal and ethical issues arising from genetic registers and screening programmes.

11. JOINT SPECIALIST CLINICS (MULTIDISCIPLINARY)

Knowledge and experience to provide genetic advice within a multidisciplinary clinic setting

12. MAINTAINING GOOD MEDICAL PRACTICE
    Commitment to life long learning and reflective practice

13. MAINTAINING TRUST
    Includes professional behaviours, doctor-patient relationship, knowledge of regulatory bodies, patient education, maintaining personal health and probity.

14. ETHICS AND LEGAL ISSUES
    Includes informed consent, confidentiality, legislation, ethical issues relating to genetic services,

15. TEAM WORKING AND LEADERSHIP SKILLS
    Includes responsibility, motivation, organisation and negotiation skills.

16. TEACHING AND EDUCATIONAL SUPERVISION
    Skills to be an effective teacher, understanding and participation in appraisal and assessment

17. RESEARCH
    Design, undertake and analyse and write up and present a research project

18. CLINICAL GOVERNANCE
    Clinical governance principles and structures, risk management, evidence based medicine, audit and use of guidelines.

19. PRINCIPLES OF MANAGEMENT
    Structure of NHS and principles of management

20. INFORMATION TECHNOLOGY
    Use of genetic databases and knowledge of Data Protection Act.

LEARNING EXPERIENCES

Clinical competencies are gained through work-based experience, undertaking all aspects of genetic consultations. Some training centres provide modular training, others provide year by year experience to gain required competencies. Additional experience may be gained through attendance at specialist clinics or attachments to other departments or genetic centres Trainees are attached to genetic laboratories to gain experience of molecular and cytogenetic analysis and interpretation.

Formal teaching is provided by the training centre and trainees have funded study leave to attend training days, courses and Conferences.

Research may be undertaken within the four year training programme. Alternatively, if funding is achieved, 1-3 years may be taken "out of programme" to undertake research leading to an MD or PhD.

SUPERVISION AND ASSESSMENT

All trainees are allocated an Educational Supervisor who monitors progress throughout the training programme and a Clinical Supervisor who teaches and monitors individual modules/years of the programme. Work place based assessment includes mini clinical evaluation exercises (mini CEX), formal case based discussion and multisource feedback. All trainees maintain a training portfolio and undergo formal annual assessment known as ARCP (Annual Review of Competence Progression). Training programmes and progress of individual trainees are monitored by the Postgraduate Deanery, the Clinical Genetic Specialist Advisory Committee, the Joint Royal Colleges Post-Graduate Training Board and the statutory Post-Graduate Medical and Education Board.

Certificates of Completion of Training (CCTs) are awarded on satisfactory completion of higher specialist training, which allows a doctor to be included on the General Medical Council Specialist Register. Doctors who have trained elsewhere can be assessed for inclusion on the Specialist Register under Article 14 legislation.