### COMMON PRESENTATIONS AND CONDITIONS
Basic Trainees will require a sufficient depth of knowledge of these presentations and conditions.

- 22q11.2 deletion syndrome
- Cardiomyopathy and genetic cardiac arrhythmia
- Cystic fibrosis
- Deafness
- Duchenne muscular dystrophy (DMD)
- Fragile X syndrome (FXS)
- Hypoglycaemia
- Klinefelter syndrome
- Marfan syndrome
- Myotonic dystrophy
- Neurofibromatosis Type 1 (NF-1)
- Noonan syndrome (NS)
- Osteogenesis imperfect (OI)
- Trisomy 21 (Down Syndrome)
- Turner syndrome

For all common presentations, Basic Trainees will need to **know how to:**

**Synthesise**
- incorporate epidemiology, pathophysiology and clinical science
- recognise the clinical presentation
- take a relevant clinical history
- conduct an appropriate examination
- establish a differential diagnosis
- plan and arrange appropriate investigations

**Manage**
- provide initial, evidence-based management
- discuss the principles of ongoing management
- apply quality use of medicines
- recognise potential complications of the disease and its management, and initiate preventative strategies
- refer appropriately

**Consider other factors**
- identify broader considerations and their impact on diagnosis and management

### LESS COMMON OR MORE COMPLEX PRESENTATIONS AND CONDITIONS
Basic Trainees will need to have an awareness of, and an understanding of appropriate resources that should be used to help manage patients with these presentations and conditions.

- Alpha-1 antitrypsin deficiency
- Alagille syndrome
- Amino acid metabolism defects:
  - aspartic acid (Canavan disease)
  - cysteine/cysteine
  - glycine
  - glutamic acid
  - lysine
  - methionine
  - phenylalanine
  - proline
  - tryptophan
  - tyrosine
  - valine/leucine/isoleucine
- Angelman syndrome
- Carbohydrates metabolism defects
  - glycogen storage diseases
  - defects in galactose metabolism

For all less common and more complex presentations, Basic Trainees will need to **know how to:**

**Synthesise**
- incorporate epidemiology, pathophysiology and clinical science
- recognise the clinical presentation
- take a relevant clinical history
- conduct an appropriate examination
- establish a provisional diagnosis
- plan and arrange appropriate initial investigations

**Manage**
- initiate therapy in consultation
- discuss broad therapeutic options
defects in fructose metabolism
defects in intermediary carbohydrate metabolism with lactic acidosis

- Disorders of chromosomal duplication or deletion, such as Cri du chat
- Familial and genetic malignancies
- Genetic aspects of endocrine disorders:
  - congenital adrenal hyperplasia
  - congenital hypothyroidism
- Genetic aspects of haematological disorders:
  - G6PD deficiency
  - haemochromatosis
  - haemophilia
  - sickle cell disease
  - thalassaemia
- Genetic aspects of neurological disorders:
  - ataxia telangiectasia
  - Charcot Marie tooth
  - Rett syndrome
  - tuberous sclerosis
- Genetic disorders of growth and musculoskeletal development:
  - achondroplasia
  - osteogenesis imperfecta
  - Treacher Collins syndrome
- Genetic metabolic disorders
  - Gaucher disease
  - phenylketonuria
  - Wilson disease
- Huntington disease
- Lipid metabolism defects, such as:
  - lipidosis (lysosomal storage disease)
  - lipoprotein metabolism disorders
  - mitochondrial fatty acid oxidation disorders
  - very long chain fatty acids disorders
- Mucopolysaccharidoses
- Prader-Willi syndrome
- Williams syndrome

recognise potential complications
refer appropriately

Consider other factors
identify broader considerations and their impact on diagnosis and management

Basic principles of individualised medicine and pharmacogenetics
Definitions of polymorphism, mutation, genetic segregation analysis, sex-
AND CLINICAL SCIENCE
Basic Trainees will be able to describe the principles of the foundational sciences.

- linked, multifactorial and polygenic inheritance
- Genetic testing techniques such as
  » exome and genome sequencing
  » fluorescence in situ hybridisation (FISH)
  » gene sequencing
  » polymerase chain reaction (PCR)
- Principles of (classical) Mendelian and population genetics, sex-linked, mitochondrial inheritance, uniparental disomy, repeating triplet sequences, and polygenic inheritance
- Principles of major cancer genetics
- Process of defining pathogenicity of mutations
- Structure and function of human cells, genes, DNA, RNA and proteins
- Theory behind dietary therapy in Inborn Errors of Metabolism (IEM)
- Theory behind enzyme replacement therapy and substrate inhibition therapy
- Use of co-factors in Inborn Errors of Metabolism (IEM)

INVESTIGATIONS AND PROCEDURES
Basic Trainees will know how to select and interpret the results of these investigations and procedures.

- Appropriate use of clinical photography
- Chromosome microarray
- Conventional karyotype
- Cystic fibrosis (CF) mutation testing
- Dysmorphic feature description
- Exome and genome sequencing
- Fluorescence in situ hybridisation (FISH) probes
- Karyotype
- Metabolic screening tests
- Molecular karyotype (including obtaining patient consent)
- Neonatal screening
- Single gene testing for conditions such as cystic fibrosis (CF), dystrophin, and Fragile X
- Skeletal survey
- Skin biopsy
- Specialised growth charts

IMPORTANT SPECIFIC ISSUES
Basic Trainees will be able to identify important specialty-specific issues and their impact on diagnosis and management.

- Appropriate referral to Clinical Genetics services, including referral for prenatal testing, carrier testing and pre-implantation genetic diagnosis
- The need to counsel around findings of variants of uncertain significance (VOUS) and incidental findings in genetic testing; including the absence of prognostic information, need for family studies and possibility of functional studies
- Pre-natal options for:
  » fetal gender determination
  » fetal mutation testing
  » first trimester screening, including nuchal translucency and non-invasive prenatal testing
  » non-testing
  » parental testing
  » pre-implantation genetic diagnosis
- Goals and potential benefits of the Human Genome Project (HGP)
- Implications to a family of a genetic diagnosis including discussion of autosomal recessive, autosomal dominant, and X-linked inheritance
- The importance of taking a family history, documenting it on a genogram and determining the mode of inheritance.
- Legal and ethical principles of genetic testing, including the need for written informed consent, predictive testing processes and ethical barriers to testing minors for adult onset conditions, and ethics consultation.
- Process for obtaining consent for genetic testing
- Recognising clinical features suggestive of an underlying genetic condition or syndromic diagnosis
- Variants of uncertain significance (VOUS), reduced penetrance, and attenuated phenotype

**LEARNING METHODS**

Suggested opportunities, activities, and resources to assist with learning.

- Clinical experience in genetics in a range of settings
- Access and use genetic databases such as:
  - London medical databases’ The Winter-Baraitser Dysmorphology Database [www.lmdatabases.com](http://www.lmdatabases.com)
  - Online Mendelian Inheritance in Man (OMIM) [www.omim.org](http://www.omim.org)
  - Pictures of Standard Syndromes and Undiagnosed Malformations (POSSUM) [www.possum.net.au](http://www.possum.net.au)