



**FACULTY OF  
PATHOLOGY**

ROYAL COLLEGE OF  
PHYSICIANS OF IRELAND

HIGHER SPECIALIST TRAINING IN

# CHEMICAL PATHOLOGY



**This curriculum of training in Chemical Pathology was developed in 2012 and undergoes an annual review by Dr Ana Rakovac, National Specialty Director, Dr Ann O'Shaughnessy, Head of Education, and by the Chemical Pathology Training Committee. The curriculum is approved by the Faculty of Pathology.**

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## Introduction

Chemical Pathology is a discipline in the field of Pathology which deals with the entire range of disease. It encompasses detecting changes in a wide range of substances in blood and body fluids (electrolytes, enzymes and proteins) in association with many diseases. In addition, it involves detecting and measuring tumour (cancer) markers, hormones, poisons and both therapeutic and illicit drugs. As with the other clinical pathology specialities, the largest part of a Chemical Pathologist's day is typically spent in clinical liaison. This involves advising clinicians about the appropriate tests for the investigation of a particular clinical problem, the interpretation of results and follow-up, and the effect of interferences e.g. by therapeutic drugs on test results. Evaluation of new technologies and the development of new tests is an ongoing process in Chemical Pathology. This applies particularly to areas that are now opening up, such as the use of molecular biology techniques in diagnostic tests. Specialist areas of interest include such topics as inherited metabolic diseases, trace metals and environmental monitoring, drugs of abuse, and nutrition.

In addition to the specialty-specific elements, trainees in Chemical Pathology must also acquire certain core competencies which are essential for good medical practice. These comprise the generic components of the curriculum.

## Aims

Upon satisfactory completion of specialist training in Chemical Pathology, the doctor will be **competent** to undertake comprehensive medical practice in that specialty in a **professional** manner, unsupervised and independently and/or within a team, in keeping with the needs of the healthcare system.

**Competencies**, at a level consistent with practice in the specialty of Chemical Pathology, will include the following:

- Patient care that is appropriate, effective and compassionate dealing with health problems and health promotion.
- Medical knowledge in the basic biomedical, behavioural and clinical sciences, medical ethics and medical jurisprudence and application of such knowledge in patient care.
- Interpersonal and communication skills that ensure effective information exchange with individual patients and their families and teamwork with other health professionals, the scientific community and the public.
- Appraisal and utilisation of new scientific knowledge to update and continuously improve clinical practice.
- The ability to function as a supervisor, trainer and teacher in relation to colleagues, medical students and other health professionals.
- Capability to be a scholar, contributing to development and research in the field of Chemical Pathology.
- Professionalism.
- Knowledge of public health and health policy issues: awareness and responsiveness in the larger context of the health care system, including e.g. the organisation of health care, partnership with health care providers and managers, the practice of cost-effective health care, health economics and resource allocations.
- Ability to understand health care and identify and carry out system-based improvement of care.

**Professionalism:**

Being a good doctor is more than technical competence. It involves values – putting patients first, safeguarding their interests, being honest, communicating with care and personal attention, and being committed to lifelong learning and continuous improvement. Developing and maintaining values are important; however, it is only through putting values into action that doctors demonstrate the continuing trustworthiness with the public legitimately expect. According to the Medical Council, Good Professional Practice involves the following aspects:

- Effective communication
- Respect for autonomy and shared decision-making
- Maintaining confidentiality
- Honesty, openness and transparency (especially around mistakes, near-misses and errors)
- Raising concerns about patient safety
- Maintaining competence and assuring quality of medical practice

**Entry Requirements**

Applicants for Higher Specialist Training (HST) in Chemical Pathology must:

**Either:**

- a) Have spent a minimum of one year in approved Chemical Pathology SHO/Registrar posts in which they have completed the first year of the Core Training Programme in Chemical Pathology. Furthermore, it is recommended that all candidates for HST in the Specialty should have some post registration training in General Medicine including experience in endocrinology, diabetes and metabolic diseases.

**Or:**

- b) Applicants for Higher Specialist Training (HST) in Chemical Pathology must have completed a **minimum** of two years Basic Specialist Training (BST) in General Internal Medicine in approved posts and obtained the MRCPi or (UK\*), or MRCPCH. For further information please review the BST curriculum.

Those who do not hold an MRCPi or (UK) must provide evidence of equivalent qualification.

Entry on the training programme is at year 1. Deferrals are not allowed on entry to Higher Specialty training.

## Duration & Organisation of Training

Training is undertaken in posts in departments which are educationally approved by the Faculty of Pathology (RCPI), the Royal College of Pathologists.

Following satisfactory completion of training, the Certificate of Satisfactory Completion of Specialist Training (CSCST) will be awarded. This will follow the attainment of the Royal College of Pathologist's FRCPATH Part 1 and 2 Part 2 examinations.

The FRCPATH Part 1 is normally taken after a minimum of three years' training of which two years should be in HST. The Part 2 is taken after a minimum of five years recognised training including four years of HST.

HST in Chemical Pathology will provide experience in several teaching hospitals or other major centers with academic activity, or regional hospitals. The posts within the programme will have named consultant Trainers. In addition, one consultant will act as a Programme Director, who will coordinate the training and report to the National Specialty Director.

As trainees are unlikely to obtain sufficient experience of chemical pathology in a single department, rotation is an essential element of HST. Secondment or rotational training will be used to ensure that trainees acquire the full range of chemical pathology experience. **At least 6 months must be spent acquiring knowledge of paediatric chemical pathology, including neonatal chemical pathology. Up to two years of training is permitted at any given institution or under the supervision of any individual trainer.** Secondment may also be necessary to obtain other specialised experience, e.g. toxicology.

The nature of HST in Chemical Pathology is such that it is not appropriate to specify individual skills to be acquired by the end of each year; rather, the 5 years should be looked at as a whole, so that by the end of the training period the overall objectives listed will have been achieved. Training Programmes will include suitable rotations covering all the areas of experience necessary and including a balance between teaching hospitals and specialised units so that each trainee gains the breadth of experience of their future.

Trainees must spend the first 2 years of training in clinical posts in Ireland before undertaking any period of research or Out of Programme Experience (OCPE).

## Training Programme

The training programme offered will provide opportunities to fulfil all the requirements of the curriculum of training for Chemical Pathology in approved training hospitals. Each post within the programme will have a named trainer/educational supervisor and programmes will be under the direction of the National Specialty Director for Chemical Pathology or, in the case of GIM, the Regional Specialty Advisor. Programmes will be as flexible as possible consistent with curricular requirements, for example to allow the trainee to develop a sub-specialty interest.

The experience gained through rotation around different departments is recognised as an essential part of HST. A Specialist Registrar may **not** remain in the same unit for longer than 2 years of clinical training.

Where an essential element of the curriculum is missing from a programme, access to it should be arranged, by day release for example, or if necessary by secondment.

## Assessment Process

The methods used to assess progress through training must be valid and reliable. The Chemical Pathology Curriculum has been re-written, describing the levels of competence which can be recognised. The assessment grade will be awarded on the basis of direct observation in the workplace by consultant supervisors. Time should be set aside for appraisal following the assessment e.g. of clinical presentations, case management, observation of procedures.

As progress is being made, the lower levels of competence will be replaced progressively by those that are higher. Where the grade for an item is judged to be deficient for the stage of training, the assessment should be supported by a detailed note which can later be referred to at annual review. The assessment of training may utilise the Mini-CEX, DOPS and Case Based Discussions (CBD) methods adapted for the purpose. These methods of assessment have been made available by HST for use at the discretion of the NSD and nominated trainer. They are offered as a means of providing the trainee with attested evidence of achievement in certain areas of the Curriculum e.g. competence in procedural skills, or in generic components. Assessment will also be supported by the trainee's portfolio of achievements and performance at relevant meetings, presentations, audit, in tests of knowledge, attendance at courses and educational events.

The FRCPATH Part 1 and 2 Examinations will be the main objective assessments of progress. Part 1 is a test of knowledge which can be taken after a minimum of two and a half years training. FRCPATH Part 2 may be taken after a minimum of four and a half years total training time, of which three and a half years must have been in the SpR grade. Both of these examinations can be taken in Chemical Pathology.

The Faculty of Pathology will determine the date of completion of training having regard to:

1. acquisition of FRCPATH Part 1 and 2 by examination **and**
2. satisfactory completion of all the requirements of the Curriculum in a recognised Training Programme.

The Faculty of Pathology will forward their recommendations to Medical Training for issuance of a Certificate of Satisfactory Completion of Specialist Training (CSCST) in Chemical Pathology. This certificate can then be used, along with such other documents as may be required, for an application to the Medical Council for entry to the Register of Specialists and, where appropriate, for issuance of the Council's Certificate of Specialist Doctor (CSD).

## **Generic Components**

**This chapter covers the generic components which are relevant to HST trainees of all specialties but with varying degrees of relevance and appropriateness, depending on the specialty.**

**As such, this chapter needs to be viewed as an appropriate guide of the level of knowledge and skills required from all HST trainees with differing application levels in practice.**



## Good Professional Practice

**Objective:** Trainees must appreciate that medical professionalism is a core element of being a good doctor and that good medical practice is based on a relationship of trust between the profession and society, in which doctors are expected to meet the highest standards of professional practice and behaviour.

**Medical Council Domains of Good Professional Practice:** Relating to Patients, Communication and Interpersonal Skills, Professionalism, Patient Safety and Quality of Patient Care.

### KNOWLEDGE

#### Effective Communication

- How to listen to patients and colleagues
- The principles of open disclosure
- Knowledge and understanding of valid consent
- Teamwork
- Continuity of care

#### Ethics

- Respect for autonomy and shared decision making
- How to enable patients to make their own decisions about their health care
- How to place the patient at the centre of care
- How to protect and properly use sensitive and private patient information in accordance with data protection legislation and how to maintain confidentiality
- The judicious sharing of information with other healthcare professionals where necessary for care following Medical Council Guidelines
- Maintaining competence and assuring quality of medical practice
- How to work within ethical and legal guideline when providing clinical care, carrying research and dealing with end of life issues

#### Honesty, openness and transparency (mistakes and near misses)

- Preventing and managing near misses and adverse events.
- When and how to report a near miss or adverse event
- Incident reporting; root cause and system analysis
- Understanding and learning from errors
- Understanding and managing clinical risk
- Managing complaints
- Following open disclosure practices
- Knowledge of national policy and National Guidelines on Open Disclosure

#### Raising concerns about patient safety

- Safe working practice, role of procedures and protocols in optimal practice
- The importance of standardising practice through the use of checklists, and being vigilant
- Safe healthcare systems and provision of a safe working environment
- Awareness of the multiple factors involved in failures
- Knowledge and understanding of Reason's Swiss cheese model
- Understanding how and why systems break down and why errors are made
- Health care errors and system failures
- Human and economic costs in system failures
- The important of informing a person of authority of systems or service structures that may lead to unsafe practices which may put patients, yourself or other colleagues at risk
- Awareness of the Irish Medical Councils policy on raising concerns about safety in the environment in which you work

**SKILLS**

- Effective communication with patients, families and colleagues
- Co-operation and collaboration with colleagues to achieve safe and effective quality patient care
- Being an effective team player
- Ethical and legal decision making skills
- Minimising errors during invasive procedures by developing and adhering to best-practice guidelines for safe surgery
- Minimising medication errors by practicing safe prescribing principles
- Ability to learn from errors and near misses to prevent future errors
- Managing errors and near-misses
- Using relevant information from complaints, incident reports, litigation and quality improvement reports in order to control risks
- Managing complaints
- Using the Open Disclosure Process Algorithm

**ASSESSMENT & LEARNING METHODS**

- Consultant feedback at annual assessment
- Workplace based assessment e.g. Mini-CEX, DOPS, CBD
- Educational supervisor's reports on observed performance (in the workplace): prioritisation of patient safety in practice
- RCPI HST Leadership in Clinical Practice
- RCPI Ethics programmes
- Medical Council Guide to Professional Conduct and Ethics
- Reflective learning around ethical dilemmas encountered in clinical practice
- Quality improvement methodology course - recommended

## Infection Control

**Objective:** To be able to appropriately manage infections and risk factors for infection at an institutional level, including the prevention of cross-infections and hospital acquired infection

**Medical Council Domains of Good Professional Practice:** Patient Safety and Quality of Patient Care; Management (including Self-Management).

### KNOWLEDGE

#### Within a consultation

- The principles of infection control as defined by the HIQA
- How to minimise the risk of cross-infection during a patient encounter by adhering to best practice guidelines available, including the 5 Moments for Hand Hygiene guidelines
- The principles of preventing infection in high risk groups e.g. managing antibiotic use to prevent *Clostridium difficile*
- Knowledge and understanding of the local antibiotic prescribing policy
- Awareness of infections of concern, e.g. MRSA, *Clostridium difficile*
- Best practice in isolation precautions
- When and how to notify relevant authorities in the case of notifiable infectious disease
- Understanding the increased risk of infection to patients in surgery or during an invasive procedure and adhering to guidelines for minimising infection in such cases
- The guidelines for needle-stick injury prevention and management

#### During an outbreak

- Guidelines for minimising infection in the wider community in cases of communicable diseases and how to seek expert opinion or guidance from infection control specialists where necessary
- Hospital policy/seeking guidance from occupational health professional regarding the need to stay off work/restrict duties when experiencing infections the onward transmission of which might impact on the health of others

### SKILLS

- Practicing aseptic techniques and hand hygiene
- Following local and national guidelines for infection control and management
- Prescribing antibiotics according to antibiotic guidelines
- Encouraging staff, patients and relatives to observe infection control principles
- Communicating effectively with patients regarding treatment and measures recommended to prevent re-infection or spread
- Collaborating with infection control colleagues to manage more complex or uncommon types of infection including those requiring isolation e.g. transplant cases, immunocompromised host
- In the case of infectious diseases requiring disclosure:
  - Working knowledge of those infections requiring notification
  - Undertaking notification promptly
  - Collaborating with external agencies regarding reporting, investigating and management of notifiable diseases
  - Enlisting / requiring patients' involvement in solving their health problems, providing information and education
  - Utilising and valuing contributions of health education and disease prevention and infection control to health in a community

**ASSESSMENT & LEARNING METHODS**

- Consultant feedback at annual assessment
- Workplace based assessment e.g. Mini-CEX, DOPS, CBD
- Educational supervisor's reports on observed performance (in the workplace): practicing aseptic techniques as appropriate to the case and setting, investigating and managing infection, prescribing antibiotics according to guidelines
- Completion of infection control induction in the workplace
- Personal Protective Equipment Training Course (In hospital)

## Self-Care and Maintaining Well-Being

### Objectives:

1. To ensure that trainees understand how their personal histories and current personal lives, as well as their values, attitudes, and biases affect their care of patients so that they can use their emotional responses in patient care to their patients' benefit
2. To ensure that trainees care for themselves physically and emotionally, and seek opportunities for enhancing their self-awareness and personal growth

**Medical Council Domains of Good Professional Practice:** Patient Safety and Quality of Patient Care, Relating to Patients, Communication and Interpersonal Skills, Collaboration and Teamwork, Management (including self-management).

### KNOWLEDGE

- Self-awareness including preferences and biases
- Personal psychological strengths and limitations
- Understand how personality characteristics, such as need for approval, judgemental tendencies, needs for perfection and control etc., affect relationships with patients and others
- Knowledge of core beliefs, ideals, and personal philosophies of life, and how these relate to own goals in medicine
- Know how family-of-origin, race, class, religion and gender issues have shaped own attitudes and abilities to discuss these issues with patients
- Understand the difference between feelings of sympathy and feelings of empathy
- Know the factors between a doctor and patient that enhance or interfere with abilities to experience and convey empathy
- Understanding of own attitudes toward uncertainty and risk taking and own need for reassurance
- How own relationships with certain patients can reflect attitudes toward paternalism, autonomy, benevolence, non-maleficence and justice
- Recognise own feelings in straightforward and complex patient-doctor interactions
- Recognising the symptoms of stress and burn out

### SKILLS

- Exhibiting empathy and showing consideration for all patients, their impairments and attitudes irrespective of cultural and other differences
- Ability to create boundaries with patients that allow for therapeutic alliance
- Challenge authority appropriately from a firm sense of own values and integrity and respond appropriately to situations that involve abuse, unethical behaviour and coercion
- Recognise own limits and seek appropriate support and consultation
- Work collaboratively and effectively with colleagues and other members of health care teams
- Manage effectively commitments to work and personal lives, taking the time to nurture important relationship and oneself
- Ability to recognise when falling behind and adjusting accordingly
- Demonstrating the ability to cope with changing circumstances, variable demand, being prepared to re-prioritise and ask for help
- Utilising a non-judgemental approach to patient's problem
- Recognise the warning signs of emotional ill-health in self and others and be able to ask for appropriate help
- Commitment to lifelong process of developing and fostering self-awareness, personal growth and well being
- Be open to receiving feedback from others as to how attitudes and behaviours are affecting their care of patients and their interactions with others
- Holding realistic expectations of own and of others' performance, time-conscious, punctual
- Valuing the breadth and depth of experience that can be accessed by associating with professional colleagues

**ASSESSMENT & LEARNING METHODS**

- On-going supervision
- RCPI Ethics programmes
- Wellness Matters Course
- RCPI HST Leadership in Clinical Practice course

## Communication in Clinical and Professional Setting

**Objective:** To demonstrate the ability to communicate effectively and sensitively with patients, their relatives, carers and with professional colleagues in different situations.

**Medical Council Domains of Good Professional Practice:** Relating to Patients; Communication and Interpersonal Skills.

### KNOWLEDGE

#### Within a consultation

- How to effectively listen and attend to patients
- How to structure an interview to obtain/convey information; identify concerns, expectations and priorities; promote understanding, reach conclusions; use appropriate language.
- How to empower the patient and encourage self-management

#### Difficult circumstances

- Understanding of potential areas for difficulty and awkward situations
- How to negotiate cultural, language barriers, dealing with sensory or psychological and/or intellectual impairments and how to deal with challenging or aggressive behaviour
- Knowing how and when to break bad news
- How to communicate essential information where difficulties exist, how to appropriately utilise the assistance of interpreters, chaperones, and relatives.
- How to deal with anger and frustration in self and others
- Selecting appropriate environment; seeking assistance, making and taking time

#### Dealing with professional colleagues and others

- How to communicate with doctors and other members of the healthcare team
- How to provide a concise, written, verbal, or electronic, problem-orientated statement of facts and opinions
- The legal context of status of records and reports, of data protection confidentiality
- Freedom of Information (FOI) issues
- Understanding of the importance of legible, accessible, records to continuity of care
- Knowing when urgent contact becomes necessary and the appropriate place for verbal, telephone, electronic, or written communication
- Recognition of roles and skills of other health professionals
- Awareness of own abilities/limitations and when to seek help or give assistance, advice to others; when to delegate responsibility and when to refer

#### Maintaining continuity of care

- Understanding the relevance of continuity of care to outcome, within and between phases of healthcare management
- The importance of completion of tasks and documentation, e.g. before handover to another team, department, specialty, including identifying outstanding issues and uncertainties
- Knowledge of the required attitudes, skills and behaviours which facilitate continuity of care including, being available and contactable, alerting others to avoid potential confusion or misunderstanding through communications failure

#### Giving explanations

- The importance of possessing the facts, and of recognising uncertainty and conflicting evidence on which decisions have to be based
- How to secure and retain attention avoiding distraction
- Understanding how adults receive information best, the relative value of the spoken, written, visual means of communication, use of reinforcement to assist retention
- Knowledge of the risks of information overload
- Tailoring the communication of information to the level of understanding of the recipient
- Strategies to achieve the level of understanding necessary to gain co-operation and partnership; compliance, informed choice, acceptance of opinion, advice, recommendation

**Responding to complaints**

- Value of hearing and dealing with complaints promptly; the appropriate level, the procedures (departmental and institutional); sources of advice, and assistance available
- The importance of obtaining and recording accurate and full information, seeking confirmation from multiple sources
- Knowledge of how to establish facts, identify issues and respond quickly and appropriately to a complaint received

**SKILLS**

- Ability to appropriately elicit facts, using a mix of open and closed-ended questions
- Using “active listening” techniques such as nodding and eye contact
- Giving information clearly, avoiding jargon, confirming understanding, ability to encourage co-operation, compliance; obtaining informed consent
- Showing consideration and respect for other’s culture, opinions, patient’s right to be informed and make choices
- Respecting another’s right to opinions and to accept or reject advice
- Valuing perspectives of others contributing to management decisions
- Conflict resolution
- Dealing with complaints
- Communicating decisions in a clear and thoughtful manner
- Presentation skills
- Maintaining (legible) records
- being available, contactable, time-conscious
- Setting realistic objectives, identifying and prioritising outstanding problems
- Using language, literature (e.g. leaflets) diagrams, educational aids and resources appropriately
- Establish facts, identify issues and respond quickly and appropriately to a complaint received
- Accepting responsibility, involving others, and consulting appropriately
- Obtaining informed consent
- Discussing informed consent
- Giving and receiving feedback

**ASSESSMENT & LEARNING METHODS**

- Mastering Communication course (Year 1)
- Consultant feedback at annual assessment
  - Workplace based assessment e.g. Mini-CEX, DOPS, CBD
  - Educational supervisor’s reports on observed performance (in the workplace): communication with others e.g. at handover. ward rounds, multidisciplinary team members
- Presentations
- RCPI Ethics programmes
- RCPI HST Leadership in Clinical Practice Course



## Leadership

**Objective:** To have the knowledge, skills and attitudes to act in a leadership role and work with colleagues to plan, deliver and develop services for improved patient care and service delivery.

**Medical Council Domains of Good Professional Practice:** Patient Safety and Quality of Patient Care; Communication and Interpersonal Skill; Collaboration and Teamwork; Management (including Self-Management); Scholarship.

### KNOWLEDGE

#### Personal qualities of leaders

- Knowledge of what leadership is in the context of the healthcare system appropriate to training level
- The importance of good communication in teams and the role of human interactions on effectiveness and patient safety

#### Working with others

- Awareness of own personal style and other styles and their impact on team performance
- The importance of good communication in teams and the role of human interactions on effectiveness and patient safety

#### Managing services

- The structure and function of Irish health care system
- Awareness of the challenges of managing in healthcare
  - Role of governance
  - Clinical directors
- Knowledge of planning and design of services
- Knowledge and understanding of the financing of the health service
  - Knowledge of how to prepare a budget
  - Defining value
  - Managing resources
- Knowledge and understanding of the importance of human factors in service delivery
  - How to manage staff training, development and education
- Managing performance
  - How to perform staff appraisal and deal effectively with poor staff performance
  - How to rewards and incentivise staff for quality and efficiency

#### Setting direction

- The external and internal drivers setting the context for change
- Knowledge of systems and resource management that guide service development
- How to make decisions using evidence-based medicine and performance measures
- How to evaluate the impact of change on health outcomes through ongoing service evaluation

**SKILLS**

- Effective communication with patients, families and colleagues
- Co-operation and collaboration with others; patients, service users, carers colleagues within and across systems
- Being an effective team player
- Ability to manage resources and people
- Managing performance and performance indicators

**Demonstrating personal qualities**

- Efficiently and effectively managing one-self and one's time especially when faced with challenging situations
- Continues personal and professional development through scholarship and further training and education where appropriate
- Acting with integrity and honesty with all people at all times
- Developing networks to expand knowledge and sphere of influence
- Building and maintaining key relationships
- Adapting style to work with different people and different situations
- Contributing to the planning and design of services

**ASSESSMENT & LEARNING METHODS**

- Mastering Communication course (Year 1)
- RCPI HST Leadership in Clinical Practice (Year 3 – 5)
- Consultant feedback at annual assessment
- Workplace based assessment e.g. Mini-CEX, DOPS, CBD
- Educational supervisor's reports on observed performance (in the workplace): on management and leadership skills
- Involvement in hospital committees where possible e.g. Division of Medicine, Drugs and Therapeutics, Infection Control etc.

## Quality Improvement

**Objective:** To demonstrate the ability to identify areas for improvement and implement basic quality improvement skills and knowledge to improve patient safety and quality in the healthcare system.

**Medical Council Domains of Good Professional Practice:** Patient Safety and Quality of Patient Care; Communication and Interpersonal Skills; Collaboration and Teamwork; Management; Relating to Patients; Professionalism

### KNOWLEDGE

#### Personal qualities of leaders

- The importance of prioritising the patient and patient safety in all clinical activities and interactions

#### Managing services

- Knowledge of systems design and the role of microsystems
- Understanding of human factors and culture on patient safety and quality

#### Improving services

- How to ensure patient safety by adopting and incorporating a patient safety culture
- How to critically evaluate where services can be improved by measuring performance, and acting to improve quality standards where possible
- How to encourage a culture of improvement and innovation

#### Setting direction

- How to create a 'burning platform' and motivate other healthcare professionals to work together within quality improvement
- Knowledge of the wider healthcare system direction and how that may impact local organisations

### SKILLS

- Improvement approach to all problems or issues
- Engaging colleagues, patients and the wider system to identify issues and implement improvements
- Use of quality improvement methodologies, tools and techniques within every day practice
- Ensuring patient safety by adopting and incorporating a patient safety culture
- Critically evaluating where services can be improved by measuring performance, and acting to raise standards where possible
- Encouraging a culture of improvement and innovation

#### Demonstrating personal qualities

- Encouraging contributions and involvement from others including patients, carers, members of the multidisciplinary team and the wider community
- Considering process and system design, contributing to the planning and design of services

### ASSESSMENT & LEARNING METHODS

- RCPI HST Leadership in Clinical Practice
- Consultant feedback at annual assessment
- Involvement in hospital committees where possible e.g. Division of Medicine, Drugs and Therapeutics, Infection Control etc.

## Scholarship

**Objective:** To develop skills in personal/professional development, teaching, educational supervision and research

**Medical Council Domains of Good Professional Practice:** Scholarship

### KNOWLEDGE

#### Teaching, educational supervision and assessment

- Principles of adult learning, teaching and learning methods available and strategies
- Educational principles directing assessment methods including, formative vs. summative methods
- The value of regular appraisal / assessment in informing training process
- How to set effective educational objectives and map benefits to learner
- Design and delivery of an effective teaching event, both small and large group
- Use of appropriate technology / materials

#### Research, methodology and critical evaluation

- Designing and resourcing a research project
- Research methodology, valid statistical analysis, writing and publishing papers
- Ethical considerations and obtaining ethical approval
- Reviewing literature, framing questions, designing a project capable of providing an answer
- How to write results and conclusions, writing and/or presenting a paper
- How to present data in a clear, honest and critical fashion

#### Audit

- Basis for developing evidence-based medicine, kinds of evidence, evaluation; methodologies of clinical trials
- Sources from which useful data for audit can be obtained, the methods of collection, handling data, the audit cycle
- Means of determining best practice, preparing protocols, guidelines, evaluating their performance
- The importance of re-audit

### SKILLS

- Bed-side undergraduate and post graduate teaching
- Developing and delivering lectures
- Carrying out research in an ethical and professional manner
- Performing an audit
- Presentation and writing skills – remaining impartial and objective
- Adequate preparation, timekeeping
- Using technology / materials

### ASSESSMENT & LEARNING METHODS

- An Introduction to Health Research (online)
- Performing audit course (online)
- Effective Teaching and Supervising Skills course (online) - recommended
- Educational Assessment Skills course - recommended
- Health Research Methods for Clinicians - recommended

## Management

**Objective:** To understand the organisation, regulation and structures of the health services, nationally and locally, and to be competent in the use and management of information on health and health services, to develop personal effectiveness and the skills applicable to the management of staff and activities within a healthcare team.

**Medical Council Domains of Good Professional Practice:** Management.

### KNOWLEDGE

#### Health service structure, management and organisation

- The administrative structure of the Irish Health Service, services provided in Ireland and their funding and how to engage with these for best results
- Department of Health, HSE and hospital management structures and systems
- The national regulatory bodies, health agencies and patient representative groups
- Understanding the need for business plans, annual hospital budgets, the relationship between the hospital and PCCC

#### The provision and use of information in order to regulate and improve service provision

- Methods of collecting, analysing and presenting information relevant to the health of a population and the apportionment of healthcare resources
- The common ways in which data is presented, knowing of the sources which can provide information relevant to national or to local services and publications available

#### Maintaining medical knowledge with a view to delivering effective clinical care

- Understanding the contribution that current, accurate knowledge can make to establishing clinical effectiveness, best practice and treatment protocols
- Knowledge of sources providing updates, literature reviews and digests

#### Delegation skills, empowerment and conflict management

- How to assess and develop personal effectiveness, improve negotiating, influencing and leadership skills
- How to manage time efficiently, deal with pressure and stress
- How to motivate others and operate within a multidisciplinary team

### SKILLS

- Chairing, organising and participating in effective meetings
- Managing risks
- Managing time
- Delegating tasks effectively
- Managing conflicts
- Exploring, directing and pursuing a project, negotiating through the relevant departments at an appropriate level
- Ability to achieve results through an understanding of the organisation and its operation
- Ability to seek / locate information in order to define an issue needing attention e.g. to provide data relevant to a proposal for change, establishing a priority, obtaining resources
- Ability to make use of information, use IT, undertake searches and obtain aggregated data, to critically evaluate proposals for change e.g. innovative treatments, new technologies
- Ability to adjust to change, apply management, negotiating skills to manage change
- Appropriately using management techniques and seeking to improve these skills and personal effectiveness

**ASSESSMENT & LEARNING METHODS**

- Mastering Communication course
- Performing audit course (online)
- RCPI HST Leadership in Clinical Practice
- Annual audit
- Consultant feedback on management and leadership skills
- Involvement in hospital committees

## Standards of Care

**Objective:** To be able to consistently and effectively assess and treat patients' problems

**Medical Council Domains of Good Professional Practice:** Patient Safety and Quality of Patient Care; Relating to Patients; Communication and Interpersonal Skills; Collaboration and Teamwork: Management (including Self-Management); Clinical Skills.

### KNOWLEDGE

#### Diagnosing Patients

- How to carry out appropriate history taking
- How to appropriately examine a patient
- How to make a differential diagnosis

#### Investigation, indications, risks, cost-effectiveness

- The pathophysiological basis of the investigation
- Understand the clinical significance of reference ranges, positive and negative predictive value and potential risks of inappropriate tests
- The procedures for commonly used investigations, common or/and serious risks
- Understanding of the sensitivity and specificity of results, artefacts, PPV and NPV
- Understanding significance, interpreting and explaining results of investigations
- Logical approach in choosing, sequencing and prioritising investigations

#### Treatment and management of disease

- Natural history of diseases
- Quality of life concepts
- How to accurately assess patient's needs, prescribe, arrange treatment, recognise and deal with reactions / side effects
- How to set realistic therapeutic goals, to utilise rehabilitation services, and use palliative care approach appropriately
- Recognising that illness (especially chronic and/or incapacity) has an impact on relationships and family, having financial as well as social effects e.g. driving

#### Disease prevention and health education

- Screening for disease: methods, advantages and limitations
- Health promotion and support agencies; means of providing sources of information for patients
- Risk factors, preventive measures, and change strategies applicable to smoking, alcohol, drug abuse, and lifestyle
- Disease notification; methods of collection and sources of data

#### Notes, records, correspondence

- Functions of medical records, their value as an accurate up-to-date commentary and source of data
- An understanding of the need and appropriate use of problem-orientated discharge notes, letters, more detailed case reports, concise out-patient reports and focused reviews
- Appreciating the importance of up-to-date, easily available, accurate information, and the need for communicating promptly e.g. with primary care

#### Prioritising, resourcing and decision taking

- How to prioritise demands, respond to patients' needs and sequence urgent tasks
- Establishing (clinical) priorities e.g. for investigations, intervention; how to set realistic goals; understanding the need to allocate sufficient time, knowing when to seek help
- Understanding the need to complete tasks, reach a conclusion, make a decision, and take action within allocated time
- Knowing how and when to conclude

**Handover**

- Know what are the essential requirements to run an effective handover meeting
  - Sufficient and accurate patients information
  - Adequate time
  - Clear roles and leadership
  - Adequate IT
- Know how to prioritise patient safety
  - Identify most clinically unstable patients
  - Use ISBAR (Identify, Situation, Background, Assessment, Recommendations)
  - Proper identification of tasks and follow-ups required
  - Contingency plans in place
- Know how to focus the team on actions
  - Tasks are prioritised
  - Plans for further care are put in place
  - Unstable patients are reviewed

**Relevance of professional bodies**

- Understanding the relevance to practice of standards of care set down by recognised professional bodies – the Medical Council, Medical Colleges and their Faculties, and the additional support available from professional organisations e.g. IMO, Medical Defence Organisations and from the various specialist and learned societies

**SKILLS**

- Taking and analysing a clinical history and performing a reliable and appropriate examination, arriving at a diagnosis and a differential diagnosis
- Liaising, discussing and negotiating effectively with those undertaking the investigation
- Selecting investigations carefully and appropriately, considering (patients') needs, risks, value and cost effectiveness
- Appropriately selecting treatment and management of disease
- Discussing, planning and delivering care appropriate to patient's needs and wishes
- Preventing disease using the appropriate channels and providing appropriate health education and promotion
- Collating evidence, summarising, recognising when objective has been met
- Screening
- Working effectively with others including
  - Effective listening
  - Ability to articulate and deliver instructions
  - Encourage questions and openness
  - Leadership skills
- Ability to prioritise
- Ability to delegate effectively
- Ability to advise on and promote lifestyle change, stopping smoking, control of alcohol intake, exercise and nutrition
- Ability to assess and explain risk, encourage positive behaviours e.g. immunisation and preventive measures
- Involve patients' in solving their health problems, by providing information and education
- Availing of support provided by voluntary agencies and patient support groups, as well as expert services e.g. detoxification / psychiatric services
- Act in accordance with, up to date standards on palliative care needs assessment
- Valuing contributions of health education and disease prevention to health in a community
- Compile accurate and appropriate detailed medical notes and care reports including the results of examinations, investigations, procedures performed, sufficient to provide an accurate, detailed account of the diagnostic and management process and outcome, providing concise, informative progress reports (both written and oral)
- Transfer information in an appropriate and timely manner



- Maintaining legible records in line with the Guide to Professional Conduct and Ethics for Registered Medical Practitioners in Ireland
- Actively engaging with professional/representative/specialist bodies

#### **ASSESSMENT & LEARNING METHODS**

- Consultant feedback
- Workplace based assessment e.g. Mini-CEX, DOPS, CBD
- Educational supervisor's reports on observed performance (in the workplace)
- Annual Audit
- Medical Council Guide to Professional Conduct and Ethics

## Dealing with & Managing Acutely Ill Patients in Appropriate Specialties

**Objectives:** To be able to assess and initiate management of patients presenting as emergencies, and to appropriately communicate the diagnosis and prognosis. Trainees should be able to recognise the critically ill and immediately assess and resuscitate if necessary, formulate a differential diagnosis, treat and/or refer as appropriate, elect relevant investigations and accurately interpret reports.

**Medical Council Domains of Good Professional Practice:** Patient Safety and Quality of Patient Care, Clinical Skills.

### KNOWLEDGE

#### Management of acutely ill patients with medical problems

- Presentation of potentially life-threatening problems
- Indications for urgent intervention, the additional information necessary to support action (e.g. results of investigations) and treatment protocols
- When to seek help, refer/transfer to another specialty
- ACLS protocols
- Ethical and legal principles relevant to resuscitation and DNAR in line with National Consent Policy
- How to manage acute medical intake, receive and refer patients appropriately, interact efficiently and effectively with other members of the medical team, accept/undertake responsibility appropriately
- Management of overdose
- How to anticipate / recognise, assess and manage life-threatening emergencies, recognise significantly abnormal physiology e.g. dysrhythmia and provide the means to correct e.g. defibrillation
- How to convey essential information quickly to relevant personnel: maintaining legible up-to-date records documenting results of investigations, making lists of problems dealt with or remaining, identifying areas of uncertainty; ensuring safe handover

#### Managing the deteriorating patient

- How to categorise a patients' severity of illness using Early Warning Scores (EWS) guidelines
- How to perform an early detection of patient deterioration
- How to use a structured communication tool (ISBAR)
- How to promote an early medical review, prompted by specific trigger points
- How to use a definitive escalation plan

#### Discharge planning

- Knowledge of patient pathways
- How to distinguish between illness and disease, disability and dependency
- Understanding the potential impact of illness and impairment on activities of daily living, family relationships, status, independence, awareness of quality of life issues
- Role and skills of other members of the healthcare team, how to devise and deliver a care package
- The support available from other agencies e.g. specialist nurses, social workers, community care
- Principles of shared care with the general practitioner service
- Awareness of the pressures/dynamics within a family, the economic factors delaying discharge but recognise the limit to benefit derived from in-patient care

**SKILLS**

- BLS/ACLS (or APLS for Paediatrics)
- Dealing with common medical emergencies
- Interpreting blood results, ECG/Rhythm strips, chest X-Ray, CT brain
- Giving clear instructions to both medical and hospital staff
- Ordering relevant follow up investigations
- Discharge planning, including complex discharge
- Knowledge of HIPE (Hospital In-Patient Enquiry)
- Multidisciplinary team working
- Communication skills
- Delivering early, regular and on-going consultation with family members (with the patient's permission) and primary care physicians
- Remaining calm, delegating appropriately, ensuring good communication
- Attempting to meet patients'/ relatives' needs and concerns, respecting their views and right to be informed in accordance with Medical Council Guidelines
- Establishing liaison with family and community care, primary care, communicate / report to agencies involved
- Demonstrating awareness of the wide ranging effects of illness and the need to bridge the gap between hospital and home
- Categorising a patients' severity of illness
- Performing an early detection of patient deterioration
- Use of structured communication tools (e.g. ISBAR)

**ASSESSMENT & LEARNING METHODS**

- ACLS course
- Record of on call experience
- Mini-CEX (acute setting)
- Case Based Discussion (CBD)
- Consultant feedback

## Therapeutics and Safe Prescribing

**Objective:** To progressively develop ability to prescribe, review and monitor appropriate therapeutic interventions relevant to clinical practice in specific specialities including non-pharmacological therapies and preventative care.

**Medical Council Domains of Good Professional Practice:** Patient Safety and Quality of Patient Care.

### KNOWLEDGE

- Pharmacology, therapeutics of treatments prescribed, choice of routes of administration, dosing schedules, compliance strategies; the objectives, risks and complications of treatment cost-effectiveness
- Indications, contraindications, side effects, drug interaction, dosage and route of administration of commonly used drugs
- Commonly prescribed medications
- Adverse drug reactions to commonly used drugs, including complementary medicines
- Identifying common prescribing hazards
- Identifying high risk medications
- Drugs requiring therapeutic drug monitoring and interpretation of results
- The effects of age, body size, organ dysfunction and concurrent illness or physiological state e.g. pregnancy on drug distribution and metabolism relevant to own practice
- Recognising the roles of regulatory agencies involved in drug use, monitoring and licensing e.g. IMB, and hospital formulary committees
- Procedure for monitoring, managing and reporting adverse drug reaction
- Effects of medications on patient activities including potential effects on a patient's fitness to drive
- The role of The National Medicines Information Centre (NMIC) in promoting safe and efficient use of medicine
- Differentiating drug allergy from drug side effects
- Know the difference between an early and late drug allergy, and drug side-effects
- Good Clinical Practice guidelines for seeing and managing patients who are on clinical research trials
- Best practice in the pharmacological management of cancer pain
- The management of constipation in adult patients receiving palliative care

### SKILLS

- Writing a prescription in line with guidelines
- Appropriately prescribing for the elderly, children and pregnant and breast feeding women
- Making appropriate dose adjustments following therapeutic drug monitoring, or physiological change (e.g. deteriorating renal function)
- Reviewing and revising patients' long term medications
- Anticipating and avoiding defined drug interactions, including complementary medicines
- Advising patients (and carers) about important interactions and adverse drug effects including effects on driving
- Providing comprehensible explanations to the patient, and carers when relevant, for the use of medicines
- Being open to advice and input from other health professionals on prescribing
- Participating in adverse drug event reporting
- Take and record an accurate drug allergy history and history of previous side effects

**ASSESSMENT & LEARNING METHODS**

- Consultant feedback
- Workplace based assessment e.g. Mini-CEX, DOPS, CBD
- Educational supervisor's reports on observed performance (in the workplace): prioritisation of patient safety in prescribing practice
- Guidance for health and social care providers - Principles of good practice in medication reconciliation (HIQA)

## Specialty Section

## Laboratory Competencies

### Introduction to Chemical Pathology

**Objective:** To achieve knowledge of laboratory chemical pathology and to offer advice on the interpretation of results

#### KNOWLEDGE

##### Operation of automated analysers

- Principles behind automated analysers
- Interpretation of results-generated
- Identification of invalid results

##### Knowledge of specimen collection, handling, transport and sample storage

- Understanding the use of specific preservatives and possible interference in assays
- Familiar with the functions of pathology reception, the phlebotomy service
- Comprehending the problems associated with 24-hour urine collections

##### Principles of health and safety

- Familiar with all aspects of health and safety in the laboratory
- Aware of the pathologist's legal obligations
- Irish National Accreditation Board (INAB) for standards to obtain and retain full laboratory accreditation
- The role of the Health and Safety Executive

##### IT and communication skills

- Understanding the Data Protection Act
- Familiar with fundamental aspects of computing within the laboratory, databases, spreadsheets, internet
- Proactive attitude to new technology

##### Principles of audit

- Understanding audit
- Recognise the benefit of audit

##### Principles of quality control and assurance

- Full understanding of quality control and quality assurance
- Understanding EQA and NEQAS
- The use of external NEQAS and the processing of data by these schemes
- Critical evaluation of external quality assurance data so as to identify the possible cause of aberrant data, including the constraints due to instrumentation, reagents and operations

##### Presentation, diagnosis and management of common chemical pathology disorders

#### SKILLS

- IT use on a day-to-day basis
- Communication skills
- Participation in multidisciplinary clinical audit
- Apply quality control principles to laboratory
- Recognise the disorder in the laboratory and advise on the differential diagnosis and initial management of common chemical pathology disorders
- Be aware of the need to consult

**ASSESSMENT & LEARNING METHODS**

- Audit course (Year 1)
- Laboratory induction
- Core Laboratory Skills course
- Annual audit



## Analytical Techniques and Instrumentation

**Objective:** To be a competent analyst with appreciation of a range of analytical techniques, their performance, comparative usefulness and applications. To be competent in the management of the chemical pathology laboratory.

### KNOWLEDGE

#### Laboratory techniques and centrifugation

- Methods of standardisation and calibration
- Identification of common method interferences
- Use of pipettes
- Preparation and storage of reagents
- Use and maintenance of centrifuges
  - *Ultrafiltration*
  - *Ultracentrifugation*

#### Assay interference

- Understand the mechanisms by which common interferents affect laboratory assays (haemolysis, jaundice, lipaemia)
- Heterophilic antibodies

#### Automated instrumentation

- Random access, immunoassay analysers robotics and modular systems
- Understand the technology and design of biochemistry analysers and appreciate their limitations

#### Spectrometric methods

- Spectrometry: visible, UV, reflectance, bichromatic, derivative, linear diode array, infra-red
- Turbidimetry, nephelometry, densitometry, fluorimetry, Nuclear magnetic resonance
- Mass spectrometry Flame emission spectrometry
- Atomic absorption: flame, furnace

#### Osmometry

- Principle of technique

#### Electrometric methods

- Ion selective electrodes Na<sup>+</sup>, K<sup>+</sup>, Cl<sup>-</sup>, H<sup>+</sup>, pO<sub>2</sub>, pCO<sub>2</sub>, Ca<sup>2+</sup>, NH<sub>4</sub><sup>+</sup>, Mg<sup>2+</sup>, Li<sup>+</sup>

#### Enzymology

- Fixed interval, kinetic assays, isoenzymes, enzymes as reagents

#### Radioisotope counting

- $\gamma$ - and  $\beta$ -counting

#### Immunochemical techniques

- Immuno-assay, -metric assays, -electrophoresis, -fixation, -diffusion
- Labels enzyme, fluorimetric, and chemiluminescent

#### Electrophoresis

- Cellulose acetate, Agarose, PAGE (SDS, gradient), isoelectric focusing

#### Chromatography

- Thin layer chromatography (TLC), column, ion exchange, affinity, gas chromatography (GC), high pressure liquid chromatography (HPLC)

**Point of care testing**

- Glucose, bilirubinometers, blood gas, ion-specific electrodes, urinalysis, cardiac markers

**Solid/dry phase chemistry**

- Dipstick, thin film

**DNA/RNA/chromosomal**

- Analyses, PCR, Southern blotting Interpret mutation analysis across a variety of disorders, micro satellite analysis, sequencing reactions
- Understanding of their application to diagnoses and family studies

**SKILLS**

- Experience of techniques and the application of the above methods
- Fully conversant with the performance and limitations of widely used methods in chemical pathology
- Detect errors and sources of error
- Take responsibility for assays
- Ensure analytical competence
- Establish a close rapport and understanding with laboratory staff
- Sample preparation: desalting
- Undertake and advise on QA schemes, interdisciplinary liaison

**ASSESSMENT & LEARNING METHODS**

- DOPS
- Case Based Discussion (CBD)
- Practical experience of investigating assay interference
- ECP
- FRCPath

## Evaluation of an Analytical Method

**Objective:** competence to establish and validate a new method

### KNOWLEDGE

- Practicability
- Optimisation of reaction conditions
- Recognition of critical parameters (robustness)
- Bias
- Imprecision
- Sensitivity
- Specificity
- Investigation of common interferences
- Range
- Criteria for acceptability

### SKILLS

- Familiarity with the standard operating procedure of a new method and evaluation
- Interpret a new method and understand the requirements for validation of a new method

### ASSESSMENT & LEARNING METHODS

- CBD: New method
- A minimum of one presentation of a method of validation during training

## Laboratory Management Competencies

**Objectives:** to develop skills to take independent responsibility for the direction and management of the service

### KNOWLEDGE

- Request initiation, specimen transport and what contributes to error
- Principles of successful management
- The structure and organisation of the Department of Health, where decision making occurs, process of change and ways of influencing decisions
- Apply the concepts of accreditation, e.g. INAB, good laboratory practice
- Conversant with legal requirements and Department of Health guidance
- Appreciates the place of laboratory automation and IT
- Personnel management including industrial relations
- Practical aspects of personnel management, industrial relations, team building, staff training, motivation, continuing education, appraisal, dealing with problems, colleagues
- Understanding mentoring and supervision relative to personal and professional development, prioritising work, time management, delegation, planning, staff motivation
- Appreciation that compliance with INAB standards ensures that training facilities are adequate

### Quality assurance

- Control the quality of a method
- Internal quality control programmes
- Quality control rules
- Use of external quality assurance programmes
- Laboratory accreditation
- Application to point of care testing

### Health and safety

- Health and safety guidelines
- Individual and collective responsibility
- Handling potentially infectious samples and noxious chemicals
- Radiation protection measures Mechanical, fire and electrical safety
- Dealing with an accident
- Current safety guidelines

### Selection of analytical equipment

- Specification and evaluation of an analytical system
- Financial issues relating to analyser installation (capital purchase, reagent rental, competitive tendering)

### IT

- The role of IT in delivery and management of service
- Stages in producing results and problems with turnaround time
- Instrument interfaces
- Links to other computers
- Reporting/authorisation procedures
- Patient identification and methods of ensuring accuracy
- Management statistics
- E-mail and intra/internet
- Data protection act
- Retention of records
- Review of pathology services
- Freedom of Information act

### Skills

- Organisation of the analytical and reporting process
- Multidisciplinary working patterns

- Interpretation of quality control/quality assurance data and advise on subsequent course of action
- IT skills

#### **ASSESSMENT & LEARNING METHODS**

- Documented experience of business planning, finance, financial control, costing, pricing Contracting, purchasing, resource management Write a business case e.g selection and evaluation of equipment
- Shadowing senior departmental staff involved in business planning, writing business case, contracting, finance and resource management
- Participation where appropriate in appointment of junior staff
- Participation in departmental staff appraisal programme
- Attendance at departmental management meetings
- Attend senior laboratory management committees (Year 3- 5)
- Perform accreditation review of a section of the laboratory
- Acting/assisting laboratory quality control officer and attending laboratory quality control meetings
- Complete risk assessment and attend Health and Safety committee meetings
- Participation in the local process of selection of analytical equipment
- Complete one horizontal and 1 vertical audit during training (Quality management system)
- Audit course (Year 1)
- Annual Audit
- Core Pathology programme
- HST Leadership for Pathology (> year 3)
- FRCPath

## Clinical Governance and Audit Competencies

**Objectives:** knowledge of the lines of accountability, quality improvement programmes, clinical audit, evidence-based practice, clinical standards and guidelines, managing risk and quality assurance programmes

### KNOWLEDGE

- Clinical governance
- Clinical risk management
- Departmental organisation
- Investigative protocols
- Service quality
- Recognising roles, responsibility and accountability
- Workload compared with national standards, clarity of lines of responsibility and accountability in pathology, communications within and outside the department
- Availability and adherence to agreed protocols for investigations of common conditions
- Turnaround time, complaint analysis with lessons learnt and action taken, availability of out-of-hours service
- Patient centered care
- Share best practice with others
- Learn from mistakes and complaints
- Maintenance of probity in clinical and laboratory practice

### Clinical audit

- Clinical effectiveness and audit:
  - concept of systematic reviews and evidence-based medicine
  - role of audit in the hospital
  - audit cycle
  - participation in regular clinical audit, within and between departments, at the interface with primary care and at regional level
- Philosophy of clinical effectiveness: role of clinical audit in achieving this, methods of clinical audit in healthcare
- Use audit to gather evidence provided by formal review of practices and clinical performance that quality requirements and the needs of governance are being met

### SKILLS

- Participation in risk assessment
- Monitoring/reporting adverse events
- Plan, undertake, report, and present audits at multidisciplinary audit meetings and the follow up

### ASSESSMENT & LEARNING METHODS

- CBD: Clinical Risk Management (1 per year)
- Performing Audit course (Year 1)
- Annual audit – include one turnaround time audit during training programme

## Chemical Pathology of Disease

**Objective:** to relate understanding of normal human biochemistry and physiology to the chemical pathology of screening, diagnosis and monitoring of disease.

### KNOWLEDGE

#### Overview

- Physiology, biochemistry, pathogenesis, pathophysiology natural history, epidemiology, presentation, diagnosis, causes, classification, complications, molecular biology, diagnostic methods
- Biochemical, haematological and radiological techniques for investigations, diagnosis and screening
- Knowledge of the pharmacology of the therapeutic agents required in management
- Molecular biology to identify genetic disorders

#### Biological variability

- Reference values and population statistics:
  - common reference intervals
  - inter- and intra-individual variation
  - assessment and application of biological variance data in setting analytical goals
  - assessing utility of reference values
  - effects of age upon reference ranges
  - significance of changes in serial results
- The effect of genetic and environmental influences such as age, sex, nutrition, time of day, stress, posture, hospitalisation and therapeutic agents on biochemical results

#### Gastrointestinal Tract:

- Comprehensive knowledge of gastrointestinal disease in relation to chemical pathology
- Understand and manage GI Disorders
- Investigation of chronic diarrhea
- Investigation of endocrine disorders of the GI Tract
- Malignancy, neoplasms of the gut

#### Liver (Hepatobiliary)

- Liver physiology and biochemistry
- Biochemical assessment of liver function
- Interpretation of liver function tests (LFTs)
- Hepatocellular liver diseases
- Cholestatic liver diseases
- Bilirubin metabolism
- Investigation of jaundice in adult and paediatric practice
- Iron overload syndromes
- Alpha -1- antitrypsin deficiency
- Wilson disease
- Function of exocrine pancreas
- Acute and chronic pancreatitis
- Investigation of exocrine pancreatic disease
- Investigation of jaundice in adult and pediatric practice
- HFE genotyping

**Urogenital tract**

- Clinical evaluation of renal disease
- Observation of renal replacement therapy in situ
- Physiology of the kidney
- Clinical and biochemical assessment of GFR
- Biochemical assessment of renal function
- Urinalysis
- Fluid and electrolyte balance
- Acid-base balance and disorders
- Intravenous fluid replacement
- Disorders of magnesium
- Nephrolithiasis
- Acute renal failure
- Chronic kidney disease
- Glomerular diseases
- Tubulointerstitial diseases
- Prostatic disease
- Obstruction of the genitourinary tract
- Hypertension – essential and secondary

**Gas transport and H<sup>+</sup> metabolism**

- Physiology of normal respiration, O<sub>2</sub>, CO<sub>2</sub>, transport, buffers
- Respiratory and renal mechanisms in acid-base homeostasis
- Respiratory disease
- Causes and assessment of acid-base disturbances: measurement of H<sup>+</sup>, pCO<sub>2</sub>, pO<sub>2</sub>, satn
- Concept actual bicarbonate, standard bicarbonate, base excess
- Determinants and assessment of tissue oxygenation



**Water and electrolytes**

- Distribution of water and electrolytes
- Turnover of body fluids
- Regulation of extracellular fluid, osmolality and volume:
  - antidiuretic hormone
  - renin-angiotensin-aldosterone
  - natriuretic peptides
- Water depletion and excess
- Hypo- and hypernatraemia
- Hypo- and hyperkalaemia
- Metabolic effects of trauma/surgery/stress
- Principles of intravenous fluid therapy

**Proteins**

- Principles of measurement
- Properties and functions of the principal plasma proteins including:
  - albumin
  - protease inhibitors
  - transport proteins
  - ceruloplasmin
  - clotting factors
  - *complement*
  - immunoglobulins
- Hypoalbuminaemia and investigation
- Paraproteinaemias and investigation
- *Cryoglobulinaemia*
- Proteins of inflammation
- *Plasmapheresis*
- Immunoglobulin deficiencies
- Alpha-1-antitrypsin deficiency
- *Cytokines*

**Lipids**

- Apolipoproteins and lipid metabolism
- Metabolic basis inherited and acquired hyper- and hypo-lipoproteinaemias
- Biochemical basis for atheroma, coronary heart disease and associated risk factors
- Patient classification: familial hypercholesterolaemia, familial combined dyslipidaemia, type III dyslipidaemia, polygenic hypercholesterolaemia,
- Atherogenic lipoprotein phenotypes, secondary causes
- Primary and secondary cardiovascular disease prevention
- Laboratory investigation and principles of management of hyperlipidaemia
- 

**Cardiovascular system**

- Atheroma, coronary heart disease, stroke and associated risk factors
- Current methods of calculating risk and their shortcomings
- Use of biochemical markers for risk stratification in acute coronary syndromes
- Biochemical markers of myocardial damage/ventricular function
- Hypertension (biochemical investigation and management)

**Diabetes mellitus and glucose**

- Glucose metabolism
- Classification of diabetes
- Diagnostic criteria: diabetes, impaired glucose tolerance (IGT), IFG impaired fasting glucose (IFG)
- Pathophysiology of diabetes:
  - insulin-dependant, type 1 diabetes
  - insulin-resistance, type 2 diabetes
  - secondary
- Distinguish between the various causes of diabetes

**Diabetes mellitus and glucose (continued)**

- Complications of diabetes:
  - Acute metabolic
    - diabetic ketoacidosis
    - hyperosmolar non ketotic
    - hypoglycaemia
  - Chronic:
    - Microvascular:
      - nephropathy, microalbuminuria
      - neuropathy and retinopathy
    - Macrovascular:
      - lipid abnormalities
      - coronary heart disease
      - peripheral vascular disease
- Principles of treatment of diabetes and monitoring of diabetic control:
  - use of insulin and other pharmacological agents
  - dietary modification
  - home monitoring with meters
  - continuous overnight glucose monitoring
- Extra laboratory glucose monitoring
- Glycated haemoglobin, insulin, C-peptide, microalbumin assays
- Causes and laboratory investigation of hypoglycaemia in adults and children

**Endocrinology**

- Adult and Paediatric
  - acromegaly and dwarfism
  - prolactinoma/macroprolactin
  - diabetes insipidus
  - dynamic function testing
  - isolated hormone deficiency and panhypopituitarism
- Adrenal cortex:
  - steroid production
  - Cushing's syndrome
  - insufficiency: assessment of reserve
  - Conn's syndrome
  - congenital adrenal; hyperplasia, diagnosis, management, intersex
- Adrenal medulla:
  - catecholamine metabolism
  - pheochromocytoma
  - neuroblastoma
  - measurement and interpretation of catecholamines and metabolites
- Thyroid:
  - congenital hypothyroidism and screening programmes
  - hypo- and hyper-thyroidism
  - autoimmune disease, autoantibodies
  - adenoma/carcinoma
  - radioactive iodine *in vivo* studies
  - investigation and monitoring therapy
  - problems of interpretation: binding proteins, drug effects, sick euthyroid syndrome
- Medullary carcinoma of the thyroid
- Interpretation and reporting on results of investigations and monitoring therapy
- Appreciation of the role of imaging, scans
- Experience of insulin, TRH,
- GnRH, glucagon, pituitary function, growth hormone secretion and water deprivation tests
- Experience of tests of adrenal function
- Gonads:
  - pituitary-gonadal axis
  - sexual differentiation
  - precocious and delayed puberty
  - ovarian cycle
  - metabolism of testosterone
  - ovarian failure and menopause
  - polycystic ovarian syndrome
  - investigation of female; infertility, hirsutism, virilisation
  - hormone-replacement therapy
  - oral contraceptives - metabolic effects
  - investigation of male infertility, gynaecomastia, feminisation, testicular tumours, testicular failure
  - monitoring of fertility treatment
- Endocrine effects: cancer, ectopic hormones
- Multiple endocrine neoplasia

**Calcium, magnesium, bone**

- Calcium, magnesium, phosphate, parathyroid hormone (PTH) and vitamin D metabolism
- Hyper- and hypo-parathyroidism
- Hyper and hypocalcaemia:
  - calcium sensor abnormalities
- Hypo- and hyper-phosphataemia
- Hypo- and hyper-phosphatasaemia
- Disorders of magnesium
- Osteoporosis inc: steroid therapy and chronic malabsorption
- Osteomalacia:
  - renal osteodystrophy
- Paget's disease
- Chemical pathology of collagen
- Assays: calcium (total, adjusted, ionised), PTH, vitamin D, biochemical markers of bone disease

**Nutrition**

- Protein-energy malnutrition
- Markers of nutritional status
- Effects and investigation of vitamin deficiency or excess
- Trace element deficiency or excess
- Principles and practical nutritional support – parenteral and enteral
- Re-feeding syndrome
- Biochemistry of starvation
- Obesity: investigation, classification, risk factors, complications
- Nutritional management of disease

**Haemoglobin and porphyrins**

- Haemoglobin metabolism
- Anaemia and its investigation
- Assessment iron status
- Detection abnormal haemoglobins: inherited and acquired
- Metabolic basis of thalassaemia and sickle cell disease, screening
- Red cell enzyme defects
- Porphyrin: metabolic basis, investigation, diagnosis, monitoring

**Enzymology**

- Stability, induction
- Isoenzymes – structural basis, separation, quantitation
- Assays:
  - amylase and lipase
  - alkaline phosphatase
  - aminotransferases
  - angiotensin converting enzyme
  - creatine kinase
  - lactate dehydrogenase
  - gamma-glutamyl transferase
  - cholinesterase and variants

**Genetics and molecular biology**

- Mode of inheritance:
  - structure of nucleic acids
  - meiosis and mitosis
  - simple Mendelian and complex diseases
  - mitochondrial inheritance
  - mode of inheritance for genetic counselling, antenatal diagnosis and screening
- Protein synthesis:
  - transcription and translation
  - defects in protein synthesis arising from genetic mutations
- Molecular pathology of single gene disorders
- *Gene therapy*
- The application of Mendelian genetics and Bayes Theorem, and the calculation of pre-and post-test probabilities in genetic counselling

**Pregnancy**

- Maternal and foetal physiology, complications, detection
- Screening: Down's syndrome, foetal malformations, neural tube defects, hydatidiform mole, choriocarcinoma, ectopic pregnancy
- Pre-natal investigation: inborn errors
- Monitoring phenylketonuria, diabetes, thyroid disease, liver disease
- Effects of pregnancy on routine biochemical tests
- Biochemical, statistical and ethical issues surrounding antenatal screening

**Neuromuscular system**

- Formation and composition of cerebro spinal fluid (CSF)
- Multiple sclerosis, muscular dystrophy
- Parkinson's disease
- Biochemistry of psychiatric disease
- Biochemistry of muscle disease
- Use of CSF in diagnosis and monitoring disease

**Cancer**

- Nature of malignancy and tumour growth
- Biochemical effects and treatment:
  - tumour markers: prostate, lung, breast, ovary, gastro-intestinal (GIT), pancreas, thyroid, pituitary, adrenal, neuroblastoma, hepatoblastoma, teratoma
- Use of biochemical markers in diagnosis and monitoring tumours

**Metabolic response to**

- Surgery, trauma, burns, shock

**Therapeutic drug monitoring and toxicology**

- Pharmacokinetics, half-life, dosage prediction
- Metabolic effects of ethanol
- Monitoring of drug therapy, e g: digoxin, lithium, antiepileptics, theophylline, caffeine, methotrexate, immunosuppressive, antibiotics
- Overdose, e g: salicylate, barbiturate, paracetamol, tri-cyclic antidepressants, benzodiazepines
- Drug addiction: opiates, amphetamine, methylenedioxy-methamphetamine (MDMA), benzodiazepines, cocaine, alcohol
- Appreciation of factors affecting drug action or metabolism
- Effects of post-mortem changes on the results of laboratory investigations
- Poisoning, e g lead, mercury, aluminium, carbon monoxide, paraquat, iron, ethylene glycol, methanol, organophosphate compounds
- Laboratory investigation of the unconscious and deceased patient
- Awareness of legal procedure surrounding investigation of death

**SKILLS**

- Able to interpret and report on the results of investigations and monitoring therapy
- Advising on the appropriate use and interpretation of the results of the laboratory investigations in screening for disease, to establish (differential) diagnosis, to monitor progress and treatment according to clinical circumstances
- Liaise and communicate clearly with colleagues and other clinical teams in primary and secondary care both verbally and via clinic letters
- Acting as an effective interface between laboratory and clinical staff, as part of team
- Interact effectively with members of multidisciplinary teams in hospital, GP and community
- Recognises the importance of good communication and supportive care for successful patient outcomes
- Relate theoretical knowledge and laboratory results to patient management and clinical practice

**ASSESSMENT & LEARNING METHODS**

- FRCPATH
- Observe breath tests
- Observe Cancer screening test – colorectal
- CBD: Liver function test
- CBD: Renal disease
- DOPS
- OSPE

## Paediatric Chemical Pathology

**Objective:** to relate understanding of normal paediatric biochemistry and physiology to the chemical pathology of screening, diagnosis and monitoring of disease

### KNOWLEDGE

#### Newborn

- Biochemical problems in the premature and full term newborn infant:
  - fluid balance
  - jaundice and liver disease
  - hypoglycaemia
  - calcium and phosphate homeostasis; metabolic bone disease of prematurity
  - hypomagnesaemia
  - hyperammonaemia
  - sweat tests
  - nutrition
- Factors affecting method selection, investigation and biochemical results in the foetus, premature and full-term newborn infant
- Appropriate specimen collection and storage

#### Childhood

- Hypoglycaemia
- Calcium and phosphate disturbances
- Hyperammonaemia
- Liver disease and Reye's syndrome
- Lactic acidosis
- Renal disorders including Fanconi syndrome and tubular defects
- Principles, practice and interpretation of the Sweat Test

#### Inherited metabolic disorders

- Knowledge and understanding of the presentation, investigations, management and mechanisms of inheritance of the major categories of inborn errors of metabolism, including disorders of:
  - Amino acid, urea cycle, organic acid, fatty acid oxidation, mitochondrial, peroxisomal, purine and pyrimidine metabolism (primary and secondary), transport, carbohydrate, cerebral lipidosis, lysosomal, mucopolysaccharide and oligosaccharide, and metal disorders
- Understand the principles of treatment (dietary manipulation, coenzyme supplementation and enzyme replacement)
- Principles of common analytical methods:
  - Quantitative and qualitative analyses (including GCMS and tandem mass spectrometry) for:
    - amino acids, organic acids, carnitine and acylcarnitines, enzyme assay, mucopolysaccharides, tissue culture, DNA
- Biochemical consequences of a primary enzyme block in a metabolic pathway and the way in which clinical and pathological signs may be produced
  - Detection:
    - screening: principles and methods
    - evaluation of detection programmes
    - prenatal diagnosis
  - Methods and monitoring of treatment
- Effects of inborn errors on the results of routine biochemical tests and the effects of metabolic stress upon patients with inborn errors such as PKU, fatty acid oxidation defects, glycogen storage and urea cycle defects

- Knowledge of principles, criteria and methods involved in national and international newborn bloodspot screening programmes
- Understand investigation strategies for
  - hypoglycaemia; hyperammonaemia, encephalopathy, rhabdomyolysis

**Endocrine disorders**

- Investigation of ambiguous genitalia in the newborn and the diagnosis of congenital adrenal hyperplasia
- Knowledge of newborn bloodspot screening programmes for endocrine disorders
- Diagnosis and investigation of children with short stature
- Knowledge and investigation of individuals presenting with precocious puberty

**SKILLS**

- Able to interpret and report on the results of investigations and monitoring therapy
- Advising on the appropriate use and interpretation of the results of the laboratory investigations in screening for disease, to establish (differential) diagnosis, to monitor progress and treatment according to clinical circumstances
- Liaise and communicate clearly with colleagues and other clinical teams in primary and secondary care both verbally and via clinic letters
- Act as an effective interface between laboratory and clinical staff, as part of team
- Interact effectively with members of multidisciplinary teams in hospital, GP and community
- Recognise the importance of good communication and supportive care for successful patient outcomes
- Relate theoretical knowledge and laboratory results to patient management and clinical practice

**ASSESSMENT & LEARNING METHODS**

- DOPS
- CBD
- Nutrition course
- FRCPath



## Competencies in the Interpretation of Laboratory Data

**Objectives:** Ability to advise on the interpretation of laboratory results in diagnosis, treatment and monitoring of patients To attain a level of knowledge of clinical practice, giving the ability to conduct a dialogue with clinical colleagues, confidently and competently, in relation to: appropriate selection of tests; interpretation of their results; initiation of further investigation based on these results; contribution to the construction, organisation and interpretation of clinical research projects

### KNOWLEDGE

- Basic biochemistry, physiology and chemical pathology of the disease processes under investigation in the laboratory
- Nature of biochemical investigations undertaken and provided to other specialties
- Contribute competently at ward rounds and case presentations
- Competent to take part in duty biochemist and reporting rota
- Competent in the knowledge of other diagnostic disciplines and their relevance to chemical pathology

### SKILLS

- Appropriate comments when reporting laboratory results
- Critical appreciation of the role of biochemical tests
- Liaison with clinical colleagues
- Follow-up of abnormal investigations

### ASSESSMENT & LEARNING METHODS

- Mini-CEX
- FRCPATH
- OSPE

## Competencies in Research and Development

**Objectives:** experience in research and development to develop skills in independent and team-driven problem solving, critical assessment of published work and for gaining analytical expertise. All trainees to undertake at least one research project during their first three years of training. The project should be consistent with the research and development programme of the laboratory or hospital and should be sufficiently novel and timely to be suitable for presentation at a scientific meeting and publication in a peer reviewed journal. Research for a higher degree, or for a dissertation for the Part 2 examination may be initiated during this period.

### KNOWLEDGE

#### Scientific and research ability

- Formulate research questions and develop appropriate experimental design
- Undertake analytically and clinically based research and/or development projects
- Design, cost, undertake and evaluate experiments
- Troubleshoot methods, make appropriate modifications and test for validity
- Statistics appropriate to clinical and laboratory practice

#### Principles of critical review

- Critical review and appraisal of literature
- To assess the validity of data, experimental design and problem solving techniques
- Implementing evidence-based chemical pathology

#### Research presentation skills/Produce work of publishable quality

- How to submit research for presentation
- Awareness of appropriate bodies for publication

#### Data handling and statistical methods

- Statistical interpretation of:
  - laboratory and population data
  - standard deviation and error
  - median and mean
  - linear regression and correlation methods
  - methods of assessing agreement
  - F-test
  - analysis of variance
  - independent events
  - concept of significance and related statistics
  - t- test
  - confidence intervals
  - non-parametric statistics
  - predictive value: positive and negative
  - specificity and sensitivity
  - receiver operating characteristic curves
  - odds ratios
  - relative risk
  - chi-square tests
  - curve fitting routines
  - power calculations

**Research and development**

- framework and funding
- ethical committees
- hospital R&D structures
- health technology assessment
- project grant schemes
- research councils
- charitable research funding sources
- Understanding of the processes for application for grants to support research projects

**SKILLS**

- Writing reports
- Maintain an enquiring attitude
- Obtain consent for the use of patient samples in research
- Using library and IT facilities
- Computer use within the laboratory: spreadsheets, databases
- Correct analysis of results using appropriate statistical tools
- Awareness of the opportunities for research

**ASSESSMENT & LEARNING METHODS**

- Present a poster and publish a paper in a peer reviewed journal
- Have written at least one local research and ethics committee (LREC) submission for a project approval

## Competencies in Direct Patient Care

### Generic Aspects of Clinical Management

**Objective:** competent in the generic and communication skills required for assessment and treatment of patients, referred for a specialist biochemical opinion within an outpatient setting. Trainees should be competent in at least two of the clinical modalities, and would be expected to have had at least the same clinical experience in these areas as those trainees in chemical pathology/metabolic medicine

#### KNOWLEDGE

- Physiology, biochemistry, pathogenesis, pathophysiology natural history, epidemiology, presentation, diagnosis, causes, classification, complications, molecular biology and diagnostic methods
- Biochemical, haematological and radiological techniques required for the investigations, diagnosis and screening
- Pharmacology of the therapeutic agents required in management

#### Molecular biology to identify genetic disorders

- Role of antenatal diagnosis/family screening/molecular biology techniques in prenatal and family testing

#### Principles of clinical governance, clinical risk and clinical audit including the audit cycle

- Knowledge of the benefit of audit to clinical care

#### Educating patients about their disease, investigations, lifestyle, treatment

- Inform clearly both verbal and in writing
- Advising patients about access to patient groups and information
- Involving patients in developing their treatment and care

#### SKILLS

- Elicit a comprehensive history including social, family and dietary aspects
- Recognise presenting features and conduct the examination competently
- Use appropriate investigations to establish diagnosis
- Formulate management and treatment plans
- Document clearly in the patient notes
- Explain the diagnosis, treatment and side effects to the patient and relatives
- Breaking bad news including poor prognosis
- Liaise and communicate with colleagues, teams in primary and secondary care, both verbally and in writing
- Relate theoretical knowledge and laboratory results to patient management and clinical practice
- Involvement in ongoing audit
- Educating patients about their disease, investigations, lifestyle, treatment
  - Inform clearly both verbal and in writing
  - Advising patients about access to patient groups and information
  - Involving patients in developing their treatment and care

#### ASSESSMENT & LEARNING METHODS

- Performing Audit course (Year 1)
- Mastering Communication (Year 1)
- Annual Audit
- Mini-CEX

## Calcium and Metabolic Bone Disorders

**Objective:** competent to diagnose and manage patients with disorders of calcium and bone metabolism

### KNOWLEDGE

- Calcium, magnesium, phosphate, PTH and vitamin D metabolism Hyper- and hypo-parathyroidism
- Causes and investigation of hyper- and hypocalcaemia: calcium sensor abnormalities
- Hypo- and hyper-phosphataemia Hypo- and hyper-phosphatasaemia
- Disorders of magnesium
- Osteogenesis imperfecta
- Osteomalacia
- Renal osteodystrophy Paget's disease of bone Osteoporosis inc steroid therapy and chronic malabsorption
- Application, interpretation and theory of bone densitometry Investigation of bone turnover including biochemical bone markers
- Acute management hypercalcaemia

### SKILLS

- Able to interpret bone densitometry and radioisotope scans requested
- Able to treat and monitor bone and mineral disorders

### ASSESSMENT & LEARNING METHODS

- CBD
- Mini-CEX
- FRCPath

## Diabetes Mellitus

**Objective:** competent to manage patients with diabetes mellitus

### KNOWLEDGE

- Diagnostic criteria for diabetes, IGT and IFG
- Principles of management of diabetic ketoacidosis, hyperosmolar non-ketotic state, hypoglycaemia
- Avoid and treatment of complications: eye disease, renal disease, hypertension, neuropathy, foot care
- Distinguish between the various causes of diabetes
- Pathophysiology of diabetic foot complications
- Practice of home monitoring inc continuous overnight glucose monitoring
- Organisation of local diabetes service
- Familiar with educational materials
- Organisation of an education programme to health professionals and patients

### SKILLS

- Screening for macro- and micro-vascular complications by means of clinical Examination and investigations
- Able to initiate treatment with appropriate hypoglycaemic agent, lipid lowering and antihypertensive drugs
- Able to give appropriate lifestyle advice: employment, driving, diet, exercise, weight, smoking, alcohol
- Review patients after commencement of treatment and adjust treatment as necessary to optimise glucose control and lipid profile
- Interpret results of screening
- Able to refer
- Advice on the avoidance of complications
- Able to advise, interpret and discuss the use of these with patients

### ASSESSMENT & LEARNING METHODS

- Attend foot clinics
- Mini-CEX

## Inherited Metabolic Disorders

**Objective:** competent to manage patients with inherited metabolic disorders

### KNOWLEDGE

- Investigation, diagnosis, treatment and management of adult patients with inborn disorders of:
  - intermediary metabolism: phenylalanine, ornithine, urea cycle, branched chain amino acids, homocystine, galactose, glycogen, MMA
  - membrane transport: cystinuria, Fanconi syndrome, RTA, cystic fibrosis
  - fatty acid oxidation
  - lysosomal metabolism
  - metals: Wilson disease, haemochromatosis
  - mitochondrial metabolism
  - peroxisomal metabolism
  - purine and pyrimidine
  - previously presenting with:
    - encephalopathy and hyper-ammonaemia
    - porphyrias
- Use of specialised laboratory investigations and their interpretation
- Use of specialised dietary interventions or treatments
- Use of specific treatments and drugs
- Prenatal assessment: Down's syndrome, neural tube defects, cystic fibrosis

### SKILLS

- Able to counsel affected families and offer advice on prophylaxis and treatment
- Able to obtain skin biopsies

### ASSESSMENT & LEARNING METHODS

- CBD
- Mini-CEX

## Nutrition

**Objectives:** competent to manage patients with nutritional disorders

### KNOWLEDGE

- Principles and practical nutritional support: parenteral and enteral
- Types of nutritional support, complications and their detection
- Markers of nutritional status
- Effects and investigation of vitamin and trace element excess and deficiency
- Decide and prescribe nutrition support
- Prescribe nutrition support and care of patients with standard and long-term total parenteral nutrition (TPN)
- Appropriate use and care of: central and peripheral feeding lines, naso gastric (NG), naso jejunal (NJ), percutaneous endoscopic gastrostomy (PEG), percutaneous endoscopic jejunostomy (PEJ) feeding tubes
- Use of anti-emetics, GIT prokinetics
- Obesity: investigation, classification, treatment, risk factors
- Dietary and lifestyle changes
- Therapeutic agents

### SKILLS

- Assessment and management of nutritional status and requirements
- Management of patients with excess fluid/electrolyte losses
- Management of complications: diabetes, hypertension, hyperlipidaemia
- Calculate BMI
- Measure skin fold thickness, body impedance
- Measure total body fat
- Appropriate referral
- Clinical and laboratory monitoring of patients receiving nutrition support
- Avoid, detect, manage complications
- Working as part of a multidisciplinary team

### ASSESSMENT & LEARNING METHODS

- Nutrition course
- Mini-CEX
- CBD



## Endocrine Disorders

**Objective:** to gain experience and understanding of the aetiopathogenesis and the clinical management of common encountered endocrine disorders

### KNOWLEDGE

#### Thyroid disease

- Theoretical curriculum for thyroid Diagnostic criteria for hypo-, hyper-thyroidism, thyroiditis, malignancy
- Principles of management
- Treatment and pharmacology
- Biochemical thyroid function tests
- Appropriate follow up tests and intervals for testing
- Identify clinical features of thyroid disease
- Distinguish between the various causes of thyroid disease

#### Pituitary

- Hypopituitarism
- Prolactinoma / hyperprolactinaemia
- Acromegaly
- Non-functioning pituitary tumours
- Cushing's disease

#### Adrenal

- Cushing's syndrome
- Hypoadrenalism
- Congenital adrenal hyperplasia
- Pheochromocytoma / paraganglioma
- Adrenal incidentaloma
- Primary hyperaldosteronism
- Endocrine hypertension

#### Neuroendocrine and pancreas

- Carcinoid syndrome
- Insulinoma
- Gasterinoma (Z-E Syndrome)

#### Reproductive

- Primary hypogonadism – male and female
- Amenorrhoea
- Polycystic ovarian syndrome (pcos)
- Infertility – male and female
- Menopause

#### Specific Paediatric Endocrinology

- Disorders of growth
- Disorders of puberty

#### Miscellaneous

- Multiple Endocrine Neoplasia
- Autoimmune polyglandular syndrome

**SKILLS**

- Initiate treatment with appropriate drug and monitor response
- Sufficient first-hand experience to take clinical responsibility for such procedures
- Interpretation and reporting of endocrine function tests

**ASSESSMENT & LEARNING METHODS**

- Mini-CEX
- CBD

## Documentation of Minimum Requirements for Training

- These are the minimum number of cases you are asked to document as part of your training. It is recommended you seek opportunities to attain a higher level of exposure as part of your self-directed learning and development of expertise.
- You should expect the demands of your post to exceed the minimum required number of cases documented for training.
- If you are having difficulty meeting a particular requirement, please contact your specialty coordinator.

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
<b>Section 1 - Training Plan</b>				
<b>Personal Goals Plan</b> ( <i>Copy of agreed Training Plan for your current training year signed by both Trainee &amp; Trainer</i> )	Required	1	Training Post	Personal Goals Plan
<b>Section 2 - Training Activities</b>				
<b>Outpatient Clinics</b>				Clinics
Diabetes	Required	50	Training Programme	
Endocrine	Required	50	Training Programme	
Pituitary	Required	5	Training Programme	
Thyroid	Required	5	Training Programme	
Fertility	Required	5	Training Programme	
Metabolic – including Paediatrics	Required	15	Training Programme	
Inborn Errors of Metabolism	Required	15	Year of Training	
Bone	Required	25	Training Programme	
Lipid/CVD Risk Factors	Required	25	Training Programme	
<b>Clinical Liaisons (Adult and Paediatric) including:</b>	Required	20	Training Programme	Clinical and Other Liaisons
In-patients				

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
Ward Visit				
Outpatients				
Paediatrics				
Primary Care				
Other (please specify)				
<b>Laboratory processes</b>				Laboratory Activities
<b>Pre-analytical processes</b>				
Sources and control of preanalytical variation	Required	1	Year of Training	
Automation of preanalytical processes	Required	1	Year of Training	
<b>Analytical processes</b>				
Spectral techniques	Required	1	Year of Training	
Immunochemical techniques	Required	1	Year of Training	
Chromatographic techniques	Required	1	Year of Training	
Mass spectrometry	Required	1	Year of Training	
Electrophoretic techniques	Required	1	Year of Training	
Molecular diagnostic techniques	Required	1	Year of Training	
Point-of-care-testing	Required	1	Year of Training	
<b>Post-analytical processes</b>				
Authorisation of results				
Clinical validation of results				
Reporting of results	Required	30	Year of Training	
<b>Laboratory automation</b>	Required	1	Year of Training	
<b>Laboratory information systems</b>	Required	1	Year of Training	
<b>Quality assurance in laboratory medicine</b>	Required	5	Year of Training	
<b>Quality Management Systems in laboratory medicine</b>	Required	5	Year of Training	
<b>Health and Safety in the laboratory medicine</b>	Required	5	Year of Training	
<b>Clinical governance in laboratory medicine</b>	Required	5	Year of Training	
<b>Procedures</b>				Procedures
Basic Laboratory Techniques – Including all of the following				

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
Use of pipette	Required	1	Training Programme	
Use of balance	Required	1	Training Programme	
Use of pH meter	Required	1	Training Programme	
Preparation of buffer	Required	1	Training Programme	
Use of a spectrophotometer	Required	1	Training Programme	
Instrument calibration	Required	1	Training Programme	
manual (specify), e.g. osmometry	Required	1	Training Programme	
POCT				
measurement of glucose using meter	Required	1	Training Programme	
urinalysis using 'dipstick'	Required	1	Training Programme	
urine pregnancy test	Required	1	Training Programme	
use of blood gas machine	Required	1	Training Programme	
use of bilirubinometer	Required	1	Training Programme	
Molecular Diagnostics				
DNA extraction	Required	1	Training Programme	
PCR	Required	1	Training Programme	
Agarose gel electrophoresis	Required	1	Training Programme	
Clinical Diagnostic Procedure	Required	5	Training programme	
performance of sweat test				

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
supervision of dynamic function tests				
<b>Details of Additional Special Experience</b>				Clinical Activities
Paediatric experience	Desirable	1	Training Programme	
Haematology	Desirable	1	Training Programme	
Blood transfusion	Desirable	1	Training Programme	
Microbiology	Desirable	1	Training Programme	
Virology	Desirable	1	Training Programme	
Immunology/Serology	Desirable	1	Training Programme	
Genetics/Molecular Diagnostics	Desirable	1	Training Programme	
Histopathology	Desirable	1	Training Programme	
Dietetics/Nutrition	Desirable	1	Training Programme	
Pharmacy/Clinical Pharmacology	Desirable	1	Training Programme	
District or Community Hospital Attachment	Desirable	1	Training Programme	
<b>Management Experience</b>				
Chairing a laboratory management/staff/quality meeting	Desirable	1	Training Programme	Management Experience
<b>Section 3 - Educational Activities</b>				
<b>Mandatory Courses</b>				Teaching Attendance
Ethics Foundation	Required	1	Training Programme	
Ethics for Pathology	Required	1	Training Programme	

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
Health Research – An Introduction	Required	1	Training Programme	
HST Leadership for Pathology (Year 3+)	Required	1	Training Programme	
Mastering Communications (Year 1)	Required	1	Training Programme	
Performing Audit (Year 1)	Required	1	Training Programme	
Core pathology I	Required	1	Training Programme	
Core pathology II	Required	1	Training Programme	
Core pathology III	Required	1	Training Programme	
Wellness Matters	Required	1	Training Programme	
<b>Non – Mandatory Courses</b>	Desirable	1	Training Programme	Teaching Attendance
<b>Study Days</b> ( <i>minimum of 5 per year</i> )	Required	5	Year of Training	Teaching Attendance
<b>Attendance at In-house activities</b> ( <i>a mix of at least 3 of the following</i> )				Attendance at Hospital Based Learning
Grand Rounds	Required	5	Year of Training	
Radiology Conference	Desirable	1	Training Programme	
Histopathology Conferences	Desirable	1	Training Programme	
Journal Club	Required	5	Year of Training	
MDT Meetings	Desirable	1	Training Programme	
Seminar	Required	5	Year of Training	
Lecture	Required	5	Year of Training	
<b>Examinations</b>				Examinations

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
FRCPATH Part I examination	Required	1	Training Programme	
FRCPATH Part II examination	Required	1	Training Programme	
<b>Delivery of Teaching</b> ( <i>minimum 5 formal teaching session per month</i> )				Delivery of Teaching
Observation of trainee-led teaching event.	Required	2	Year of Training	
Lecture	Required	2	Year of Training	
Tutorial	Required	2	Year of Training	
<b>Research</b>	Required	2	Training Programme	Research Activities
<b>Audit activities and Reporting</b> (1 per year either to start or complete, Quality Improvement (QI) projects can be uploaded against audit)	Required	1	Year of Training	Audit and QI
<b>Audit Activities; Quality Assurance</b> <ul style="list-style-type: none"> <li>• Preparation of QC material</li> <li>• Measurement of EQA material</li> <li>• Discussion of EQA report</li> <li>• Audit of Quality Management System</li> </ul>	Required	5	Year of Training	Audit & QI
<b>Publications</b>	Desirable	1	Year of Training	Additional Professional Experience
<b>Presentations</b>	Required	2	Year of Training	Additional Professional Experience
<b>National/International meetings</b>	Required	2	Year of Training	Additional Professional Experience
<b>Additional Qualifications</b>	Desirable	1	Year of Training	Additional Professional Experience
<b>Committee Attendance</b> ( <i>1 per year</i> )	Required	1	Year of Training	Additional Professional Experience
<b>Section 4 - Assessments</b>				



Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
<b>DOPS</b>				Procedures, Skills, & DOPS
Basic Laboratory Techniques (Includes all activities) <ul style="list-style-type: none"> <li>• use of pipette</li> <li>• use of balance</li> <li>• Use of pH meter</li> <li>• preparation of buffer</li> <li>• Use of a spectrophotometer</li> <li>• Instrument calibration</li> <li>• manual (specify), e.g. osmometry</li> </ul>	Required	1	Training Programme	
POCT (Includes all activities) <ul style="list-style-type: none"> <li>• measurement of glucose using meter</li> <li>• urinalysis using 'dipstick'</li> <li>• urine pregnancy test</li> <li>• use of blood gas machine</li> <li>• use of bilirubinometer</li> </ul>	Required	1	Training Programme	
Molecular Diagnostics (Includes all activities) <ul style="list-style-type: none"> <li>• DNA extraction</li> <li>• PCR</li> <li>• Agarose gel electrophoresis</li> </ul>	Required	1	Training Programme	
Clinical Diagnostic Procedure (Includes all activities) <ul style="list-style-type: none"> <li>• performance of sweat test</li> <li>• supervision of dynamic function tests</li> </ul>	Required	5	Training Programme	
<b>CBD</b>	Required	5	Year of Training	Case Based Discussion
<b>Mini-CEX</b>	Required	2	Year of Training	Mini-CEX
<b>Quarterly Assessment/End of Post</b>	Required	4	Year of Training	Quarterly Assessment/End of Post
<b>End of Year Evaluation</b>	Required	1	Year of Training	End of Year Evaluation