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FACULTY OF PATHOLOGY

**CURRICULUM FOR HIGHER
SPECIALIST TRAINING**

IN

C H E M I C A L P A T H O L O G Y

OCTOBER, 2002

CHEMICAL PATHOLOGY

OBJECTIVES OF TRAINING

To produce fully trained Chemical Pathologists capable of independent practice in the Specialty, who have the appropriate management skills to lead a department, if required.

ENTRY REQUIREMENTS

Applicants for Higher Medical Training (HMT) 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 HMT in the Specialty should have some post registration training in General Medicine including experience in endocrinology, diabetes and metabolic diseases.

Or:

- b) have completed General Professional Training (GPT) in general medicine (which requires 2 years training in approved posts) and passed the MRCP (UK) or MRCPCH.

Candidates with no previous experience in Chemical Pathology should be able to demonstrate an interest and some commitment to the Specialty, for example through training in relevant aspects of general medicine (e.g. diabetes, endocrinology, nephrology, metabolic disorders, lipids) or in relevant research.

DURATION AND 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 and the ICHMT.

The minimum duration of HMT in Chemical Pathology is 5 years, which can include 1 year in an approved post in Chemical Pathology completed prior to appointment at SpR grade.

Candidates who have experience in approved chemical pathology posts prior to appointment to this scheme may count time spent in such posts towards the Core Training Programme for HMT provided (i) they complete the relevant sections of the HMT Trainee Logbook, (ii) this is countersigned by their supervisor and (iii) is confirmed by the National Specialty Director at the time of appointment to the scheme. Approval of such training will only be considered if evidence of the nature of the training has been submitted in advance through the Dean of HMT to the ICHMT. This will normally require a written statement from the department concerned and written support from the trainee's own National Specialty Director/programme director.

Following satisfactory completion of training, the Certificate of Satisfactory Completion of Specialist Training (CSCST) will be awarded on the recommendation of the ICHMT. This will follow the attainment of the Royal College of Pathologist's MRCPATH Part 2 examination.

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

HMT in Chemical Pathology will provide experience in several teaching hospitals or other major centres 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 appointed by the ICHMT.

As trainees are unlikely to obtain sufficient experience of chemical pathology in a single department, rotation is an essential element of HMT. 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 HMT 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.

ASSESSMENTS AND TRAINING RECORDS

Assessment of trainees will be based upon a standard format of Annual Review. The recommendations of the National Specialty Director of Higher Medical Training in Chemical Pathology and of the Trainers will be submitted to the ICHMT, which through the RCPI retains the final responsibility for advising the Medical Council on the Satisfactory Completion of Specialist Training.

A **Training Record or Log Book** will be maintained by the trainee. It should be inspected regularly and countersigned at least quarterly by the relevant Trainer (educational supervisor) and, together with other documentation and procedures in the PeTRA process, may be used to confirm the satisfactory fulfilment of the required training experience and the acquisition of competence in areas enumerated in the Curriculum. It should also be used to assist in self-assessment and should not be taken as the sole indication of competence. The Training Record will remain the property of the Trainee and must be produced at the Annual Assessment and for the final ICHMT decision on certification.

At least one of the Annual Reviews, usually towards the end of the penultimate year of training, will involve external assessment. It will be the responsibility of the Assessment Panel to indicate where specific deficiencies in the trainee's experience exist, and if required, remedial action will be recommended. In these circumstances, the recommendation to issue a Certificate of Satisfactory Completion of Specialist Training will be withheld until the assessors are satisfied that the remedial actions have been successfully undertaken.

RESEARCH, ACADEMIC AND OTHER OUT-OF-PROGRAMME APPOINTMENTS

Supervised high-quality research is encouraged and up to one year of research may be approved prospectively as an accepted component of HMT, usually in years 4 or 5. This is particularly important for those trainees who need to write dissertations as part of the Part 2 MRCPATH examination process. It will be essential to acquire in full the balance of the recommended (e.g. clinical) training remaining.

Some trainees will wish to study for a higher degree (e.g. MD, PhD) which will require longer periods of research activity that may not be predictable on appointment to a SpR post. Some trainees may wish to extend their period in research beyond 12 months to two or three years, either before obtaining an SpR post, or by stepping aside from their programme during HMT. This is perfectly acceptable, but not more than **one** year's educational credit will accrue for full time research. However, when a research appointment also includes a programmed commitment to another prescribed component of the Curriculum, the trainee may be credited with additional time towards completion. This would be adjudicated on an **ad personam** basis by the ICHMT.

Academic and out-of-programme (e.g. overseas) posts are perfectly acceptable for consideration for inclusion in HMT in Chemical Pathology provided **prospective** approval has been obtained. It is emphasised to both trainees and supervising trainers that any training plan should be carefully thought out. And if either party has doubts about a particular activity, **prospective** advice from the Programme and/or National Specialty Director should be sought, and if necessary confirmed with the dean of HMT, as there are definite restrictions on the proportion of (Irish) HMT that can be taken outside the jurisdiction of the ICHMT.

Approval of training outwith Ireland and the United Kingdom will only be considered if evidence of the nature of the training has been submitted in advance through the Dean of HMT to the ICHMT. This will normally require a written statement from the department concerned and written support from the trainee's own programme director. Overseas training may be clinical or in research and will be recognised for up to a maximum of two years *and may consist of clinical training, or include research (for which a maximum of one year credit is allowed)*.

CURRICULUM

The general aim of the curriculum is to produce trained chemical pathologists to provide specialist opinion in their clinical discipline and who have the appropriate management skills to lead a department, if required.

OBJECTIVES

The trainee should acquire or develop:

- a) Specialised factual knowledge of the natural history of those diseases upon which the chosen discipline is based.
- b) Specialised clinical skills including sufficient time in direct patient care to obtain the experience required to take responsibility for the clinical care of patients at consultant level.
- c) Interpretative skills so that a clinically useful opinion can be derived from laboratory data.
- d) Technical knowledge gained from close acquaintance with laboratory technology, so that methodology appropriate to a clinical problem can be chosen, and so that quality control and quality assurance procedures can be implemented.
- e) Research and development experience Original thought and critical assessment of published work are important to allow the trainee to contribute in a team and individually, to the development of the service.
- f) The life-long habits of reading, literature-searches, consultation with colleagues, attendance at scientific meetings, and the presentation of scientific work as part of continuing medical education.
- g) Data management skills to evaluate information derived from the population served and from the technical procedures applied in the laboratory. These skills should include familiarity with IT and the use of spreadsheets, databases and statistical packages etc.
- h) Management and communication skills. The trainee must gain experience, under supervision, in planning departmental policies and develop the leadership skills necessary to implement them.
- i) Familiarity with all aspects of health and safety requirements for laboratories.

SUMMARY OF CURRICULUM

The curriculum consists of the four components shown in the accompanying table: (1) fundamentals of laboratory practice; (2) General training programme, (3) Research and Development (including an MRCPATH Part 2 project), and (4) publications and additional qualifications. Further details of requirements may be found in the Trainee Logbook, but an outline is given here.

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| I. | FUNDAMENTALS OF LABORATORY PRACTICE |
| II. | GENERAL TRAINING PROGRAMME |
| a. | Knowledge and experience required |
| a.1 | Principles and practice of chemical pathology |
| a.2 | The use of statistics in data interpretation |
| a.3 | Information systems in the laboratory |
| b. | Laboratory Training |
| b.1 | Analytical techniques and instrumentation |
| b.2 | Laboratory management |
| b.3 | Communication skills |
| c. | Clinical Training |
| c.1 | Clinical interpretation and clinical liaison |
| c.2 | Dynamic and other function tests |
| c.3 | Direct patient care |
| c.4 | Clinical audit |
| c.5 | Other experience |
| III | RESEARCH AND DEVELOPMENT (INCL. MRCPATH PROJECT) |
| IV | PUBLICATIONS AND ADDITIONAL QUALIFICATIONS |

FUNDAMENTALS OF LABORATORY PRACTICE

Trainees are given an induction to the laboratory at the beginning of training.

PRINCIPLES AND PRACTICE OF CHEMICAL PATHOLOGY

Knowledge and experience is required of:

- biological variability
- diseases of the gastrointestinal tract and pancreas
- liver disease
- protein structure, metabolism and disorders
- basic immunology
- kidney and urinary tract disease
- pulmonary function
- disturbances of oxygen/CO₂ transport and hydrogen ion metabolism
- disturbances of water and electrolyte metabolism
- disturbances of lipid and carbohydrate metabolism
- disturbances of calcium, phosphate and magnesium metabolism
- other disorders of bone and connective tissue
- clinical enzymology
- disease based on nutritional disturbances
- mechanisms of inheritance
- basic molecular biology
- inherited metabolic disorders (including molecular genetics)
- principles of screening
- disorders of haemoglobin and porphyrin synthesis
- nervous system disorders
- cardiovascular system disorders
- disorders of the endocrine system
- toxicology
- drugs and therapeutic drug monitoring (including alcohol and drugs of abuse)
- paediatric biochemistry
- metabolic effects of trauma
- biochemical aspects of malignancy
- interferences and effects of drugs on laboratory investigations

USE OF STATISTICS IN DATA INTERPRETATION

Trainees must be familiar with basic statistical techniques, including regression analysis, analysis of variance, Demings methodology, probability statistics, parametric and non-parametric studies, reference values and population statistics, the predictive value model, significance of changes in serial results, and curve fitting routines.

INFORMATION SYSTEMS IN THE LABORATORY

First-hand knowledge is required of the applications of healthcare information technology and systems in clinical laboratories, including the electronic healthcare record, laboratory information systems, decision support systems, and the Data Protection Act.

LABORATORY TRAINING

The trainee should aim to become a competent analyst with a good understanding of method development, performance and application. Trainees are not expected to have extensive practical experience in all the areas listed in this section; wide experience should be combined with an in-depth experience of a limited range which should include the most commonly measured analytes. They should have direct experience of all areas marked as essential (e) and have some knowledge of the others (i.e. at least demonstration of techniques). All trainees should have practical experience of some techniques, the selection depending on their background, interests and the local circumstances.

- Basic Laboratory Techniques (e)
 - specimen collection, handling and storage
 - methods of standardisation and calibration
 - preparation and storage of reagents
 - centrifugation
- Quality Control and Quality Assurance (e)
 - internal quality control
 - external quality assessment
 - interpretation of QC/QA and subsequent course of action
 - near-patient testing
- Basic Investigation of an Analytical Method (e)
 - practicability
 - optimisation
 - robustness
 - inaccuracy, imprecision, sensitivity, specificity, range, detection limit
 - criteria for acceptability
 - problem solving
- Health and Safety
 - regulatory and other aspects of health and safety
- Analytical Methods
 - spectrophotometric methods (e)
 - flame emission photometry (e)
 - automated instrumentation (e)
 - electrochemical methods (e)
 - osmometry (e)
 - enzymology (e)
 - radioisotope counting (e)
 - immunochemical methods (e)
 - immunoassay (e)
 - electrophoretic methods (e)
 - chromatography (e)
 - drug analysis (e)
 - solid/dry phase chemistry (e)
 - atomic absorption spectroscopy/metal analyses
 - mass spectrometry
 - DNA/RNA analyses (e)
 - cell culture techniques
 - bioassay
 - miscellaneous analyses (occult blood, calculi, urinary pigments, faecal fat) (e)

LABORATORY MANAGEMENT

Trainees need to have experience under supervision in formulating departmental policies and clinical guidelines, and applying the leadership and teamwork skills that are necessary to implement them. They should understand how a modern laboratory service is organised, how different staff groups contribute to the pre-, intra- and post-analytical processes and how the service operates within the hospital and the health service.

COMMUNICATION SKILLS

Communication skills should be developed by report writing, presentation of data at meetings, through contributions to group discussions and attendance at departmental business meetings.

CLINICAL TRAINING

First hand practical experience of the clinical interpretation of laboratory data and clinical liaison with colleagues is essential. Trainees should be involved in regular discussions within the department and with clinicians concerning clinical problem solving, the use of laboratory procedures and protocols and the regular audit of the use of laboratory resources. Trainees should attend or participate in appropriate ward rounds, outpatient clinics, clinico-pathological conferences, on call work, etc.

Trainees must participate, under appropriate supervision, in:

- laboratory reporting rotas
- follow-up of abnormal investigations by ward/out-patient visits
- case presentations
- near-patient testing programmes.

Trainees will be expected to undertake training in the direct clinical care of patients with metabolic and other relevant disorders. Trainees will also benefit from visits to other pathology and science-based departments.

DYNAMIC AND OTHER FUNCTION TESTS

Trainees should be familiar with protocols for common dynamic function tests and other timed investigation procedures, and should gain experience in their interpretation. Trainees must gain sufficient first-hand experience to enable them to take clinical responsibility for such procedures.

DIRECT PATIENT CARE

Trainees must spend sufficient time in direct patient care to obtain the experience required to take responsibility for the clinical care of patients at consultant level. How this is achieved will depend on local circumstances and individual interests but trainees should assist in outpatient clinics for at least one of the following:

- lipid disorders/ cardiovascular risk
- diabetes mellitus
- endocrinology (including gynaecological endocrinology)
- metabolic disorders
- osteoporosis and other bone/connective tissue disorders
- renal calculi.

Experience should be obtained in the management of nutritional support, electrolyte disorders and metabolic aspects of intensive care. A consultant chemical pathologist or physician who is directly responsible for this activity must supervise training in direct patient care.

RESEARCH AND DEVELOPMENT

All trainees should undertake at least one research project during their first three years of training. The project should be consistent with the research/development programme of the laboratory or hospital and should be sufficiently novel and timely to be suitable for presentation at a scientific meeting or publication in a peer-reviewed journal. Research for a higher degree, or for a dissertation for the MRCPPath Part 2 examination, may be initiated during this period.

CLINICAL AUDIT

All trainees must be familiar with audit procedures and participate in regular clinical audit. This should include projects that cover problems locally within and between departments at the interface with primary care and at regional level.

CONTINUING STUDY, PUBLICATIONS AND ADDITIONAL QUALIFICATIONS

The trainee should acquire the life-long habits of reading, using literature and other information database searches, consultation with colleagues, attendance at scientific meetings, and the presentation of scientific work as part of continuing education. The pursuit of appropriate additional qualifications and publications of scientific work is encouraged.

TRAINING IN YEARS 4 AND 5

During this period, trainees will:

- complete the research required for the Part 2 MRCPATH examination;
- strengthen their knowledge and experience of chemical pathology; this stage of training

provides an opportunity to develop scientific and/or clinical expertise in a subspecialty (e.g. endocrinology, paediatric biochemistry, nutrition, inherited metabolic disorders);

- develop the management skills required for a post at consultant level; both the direct management responsibilities of trainees and their involvement in departmental and extra departmental management processes should increase with seniority.

TABLE OF COMPARISON

Chemical Pathology

	Europe	U.K.	IRELAND
Entry Criteria	No Model	At least 1 year and up to 3 years of general specialist training before entering Higher Specialist Training, of which a maximum of 1 year should be in chemical pathology or in another relevant specialty	(a) a minimum of one year in approved chemical pathology SHO/Registrar posts and / or (b) have completed General Professional Training (GPT) in general medicine (which requires 2 years training in approved posts) and passed the MRCPI or MRCP (UK). Candidates with no previous experience in chemical pathology should have some training in relevant aspects of general medicine (e.g. diabetes, endocrinology, nephrology, metabolic disorders, lipids).
Duration/Exposure	No Model	5 Years (may include an optional year in research)	5 Years (may include an optional year in research)
Laboratory training		As Curriculum	As Curriculum
Clinical training		As Curriculum	As Curriculum
Direct patient care		As Curriculum	As Curriculum
Logbook		✓	✓
Assessment		Formal Assessment Annually	Formal Assessment Annually

Statement of Origin of the Curriculum in Chemical Pathology

The Faculty of Pathology of the Royal College of Physicians of Ireland, in conjunction with the specialist bodies in Histopathology, Microbiology and Chemical Pathology decided to introduce specialist registrar training schemes in these disciplines. The Dean of the Faculty of Pathology, having secured approval from Comhairle na nOspideal, the Department of Health (with regard to funding) and the Postgraduate Medical and Dental Board, contacted the Dean of Higher Medical Training of the Irish Committee for Higher Medical Training (ICHMT) and proposed a Curriculum in Chemical Pathology.

The Curriculum in Chemical Pathology was developed and extended with minor modifications from the Royal College of Pathologists model. It was tabled and approved at a meeting of the consultant chemical pathologists group in Ireland (known as the Chemical Pathologists Association In Ireland - CPAI) on April 5 2000 and was subsequently approved by the Board of the Faculty of Pathology. Following advice from the Curriculum Committee of the ICHMT, further modifications were made to ensure conformity with ICHMT standard requirements and formats. The revised document was tabled and approved at a further meeting of the CPAI and was re-submitted to the ICHMT in September 2001.

Gerard Boran
National Specialty Director in Chemical Pathology
September, 2001