FACULTY OF PHARMACEUTICAL MEDICINE

OF THE ROYAL COLLEGES OF PHYSICIANS OF THE UNITED KINGDOM

DIPLOMA IN PHARMACEUTICAL MEDICINE

SYLLABUS FOR THE DIPLOMA IN PHARMACEUTICAL MEDICINE

INTRODUCTION

The syllabus for the Diploma in Pharmaceutical Medicine is composed of nine modules:

1. Medicines Regulation
2. Clinical Pharmacology
3. Statistics and Data Management
4. Clinical Development
5. Drug Safety
6. Healthcare Marketplace
7. Role of the Medical Department
8. Discovery of New Medicines
9. Therapeutics

The first six modules listed correspond to the advanced training modules for Pharmaceutical Medicine Specialty Training. In addition, 'Discovery of New Medicines' is considered an essential area of knowledge for physicians entering a career in pharmaceutical medicine. Similarly, ‘Therapeutics’ has always been included in the syllabus but its importance to the practice of all areas of pharmaceutical medicine is emphasised by its designation as a separate module.

The content of the syllabus is listed under the separate modules below. There is a considerable degree of overlap and some topics appear under more than one module though it is not intended to imply that any topic is restricted only to those modules under which it is listed. The order of listing does not reflect importance.

1. MEDICINES REGULATION

The general principles of medicines regulation
Medicines regulation in UK, EU, USA, Japan
Activities and contribution of International Conference on Harmonisation
Good Manufacturing Practices, Good Laboratory Practices, Good Clinical Practices
Clinical Trials regulations – IND, CTA, EU Directives etc
Common Technical Document, Overviews
Reporting of adverse drug reactions, periodic safety update reports
Product information – Summary of Product Characteristics, Patient Information Leaflets
Licensing – MAA, NDA, abridged applications, updating and maintaining licences
Orphan drugs
Provisions for and use of unlicensed medicines
Drug abuse and dependence
Non-prescription drugs and reclassification of Prescription Only and Pharmacy only medicines
Codes of practice, industry self regulation, advertising
Fraud and professional misconduct
Patents, legal issues, parallel imports
Ethics and Ethics Committees
Pharmacopoeias

2. CLINICAL PHARMACOLOGY

PRE-CLINICAL DEVELOPMENT TO SUPPORT TESTING IN HUMANS

Safety testing – acute, subacute toxicology, genotoxicology, reproductive toxicology, topical irritation and hypersensitivity, safety pharmacology, immunotoxicology
Pharmacokinetics and metabolism
Pharmaceutical Development - formulations, manufacture and supply of materials, labelling and presentation, stability and storage, purity, compatibility, disposal

EXPLORATORY CLINICAL DEVELOPMENT

Assessment of preclinical data
Planning of studies in Exploratory Development

Populations for exploratory studies - healthy volunteers and patients
Ethics – principles, peer review, informed consent, Declaration of Helsinki
Regulation
Studies - objectives, design, conduct and analysis, choice of site
Tolerability and safety
Use of biomarkers and pharmacodynamic endpoints, dose-response
Pharmacokinetics, ADME and pharmacokinetic/pharmacodynamic models
Interpretation of study design, analysis and results

CLINICAL PHARMACOKINETICS

Concepts – half-life, volume of distribution, clearance
Bioavailability and bioequivalence
Drug-drug and drug-disease interactions (extrinsic factors)
Studies in different populations (intrinsic factors)
Pharmacogenetics
Population pharmacokinetics
Applicability of pharmacokinetics to dosage regimen and study design

3. STATISTICS AND DATA MANAGEMENT

THE PURPOSE AND FUNDAMENTALS OF STATISTICS

TRIAL DESIGN, HYPOTHESIS TESTING, POWER

Pre-trial decisions and specification
Risk factors, confounding variables
The null hypothesis, Type I and II errors, significance, power

MEASUREMENT AND TYPES OF DATA

Standardisation
Variations in biometry in population, in disease

DATA COLLECTION AND MANAGEMENT

Options for data collection (manual and electronic)
Creation, maintenance and security of databases, software validation and archiving
Data management from clinical trials: corrections, computer capture, verifications and extraction
Within-trial decisions, data management, extraction and manipulation

TYPES OF ANALYSIS

Analysis of efficacy end-points and of safety
Paired and non-paired tests, parametric and non-parametric tests, confidence limits
Handling of rating and visual analogue scales, patient diaries and laboratory values

INTERPRETATION OF STUDY DESIGN, ANALYSIS AND RESULTS

Assessment of violations, withdrawals, errors, bias
Statistical principles and issues in report writing: data manipulation, transposition, merging
Clinical interpretation of trial
Final report writing and formatting for registration dossier and publications

4. CLINICAL DEVELOPMENT

PLANNING AND ORGANISATION

Organisation and operation of project teams
Objective and target setting
Integrated project planning
Requirements for licensing of new medicines
Budgeting and costs control

REGULATION AND ETHICS

EU Directives
ICH – Good Clinical Practices
Ethics – principles, peer review, informed consent, Declaration of Helsinki
Regulatory review
Indemnity
Confidentiality and data protection

CLINICAL TRIALS

Planning of clinical trial programme – use of preclinical and Phase I data
Study types and designs
Documentation - protocols, reports, source documents, case report forms, study master file, investigator's brochure
Contractual arrangements with investigators and contract research organisations
Study conduct
Quality control and quality assurance
Adverse Events and Serious Adverse Events – definitions, collection, reporting, assessment, coding
Interpretation of study design, analysis and results
Formulations, manufacture and supply of materials, labelling and presentation, stability and storage, purity, compatibility, disposal
Data management and statistical analysis

5. DRUG SAFETY

PRECLINICAL

In vitro and *in vivo* testing

Toxicology: dose-range finding, GLP studies, requirements to support exposure in humans, safety testing of topicals, immunotoxicity, genotoxicity, carcinogenicity, reproductive toxicity
Safety pharmacology
Studies of drug metabolism to predict interactions
Implications of findings to studies in humans

CLINICAL TRIALS

Adverse Events and Serious Adverse Events – definitions, collection, reporting, assessment, coding, ICH and CIOMS

ADVERSE DRUG REACTIONS

Classification of Adverse Reactions, idiosyncrasy, accidents
Mechanisms, predisposing factors in health and disease
Dosage, accumulation, interactions
Assessment of evidence and management
Reporting
Carcinogenicity and genotoxicity
Prevention

REGULATION

Dear doctor letters and withdrawal of products
SmPCs and PILs
Drug abuse and dependence
Non-therapeutic drug use
Life and storage safety of medicinal products

PHARMACOVIGILANCE

Methods and ethics of adverse event monitoring, post-marketing surveillance, spontaneous reporting, Post-authorisation safety studies of Marketed Medicines, Periodic Safety Update Reports
Benefit-risk assessment
Issue and crisis management

PHARMACOEPIDEMIOLOGY

Databases
Signal generation
True and apparent incidence and prevalence data
Sensitivity and specificity of indices

6. HEALTHCARE MARKETPLACE

Quality of Life
Marketing structure and competition, price negotiations
National and local formularies
Product information, advertising and claims

Product support and promotion
Product life-cycle management
Product liability
Codes of practice including the MHRA Blue Guide
Principles and practice of marketing
Measurement of healthcare, governmental policy and third-party reimbursement
Principles of health economics
Pharmacoepidemiology
Competition, in-licensing, co-marketing

7. ROLE OF MEDICAL DEPARTMENT

Clinical research
Regulatory submissions
Pharmacovigilance
Quality assurance
Information services
Data management
Financial control
Legal compensation
Crisis management

8. DISCOVERY OF NEW MEDICINES

The philosophy behind and organisation of research
Disease target identification and selection
Patenting new active substances
Receptor-based approaches, agonists, antagonists, enzyme inhibitors, genomics, proteomics
Lead optimisation and candidate selection of molecules for exploratory human investigation
In vitro and *in vivo* testing of new compounds
Relationship between animal and human pharmacology

9. THERAPEUTICS

Management of common acute and chronic diseases
Major drug classes including biologicals
Measurement of drug effects
Adverse drug reactions
Benefit:risk
Drug interactions
Prescribing for particular populations e.g. children, elderly, pregnant and breast feeding women, patients with renal or hepatic impairment
Controlled drugs and drug dependence

Overdosage and treatment of poisoning
Patient compliance and information
Therapeutic drug monitoring