INSTITUTE OF BIOMEDICAL SCIENCE

www.ibms.org

FUNCTIONALITY MAP FOR BIOMEDICAL SCIENTISTS

A biomedical scientist is a health professional registered with the Health Professions Council and who holds an accredited honours degree in biomedical science or equivalent. Biomedical scientists, ranging from entry level to advanced levels of practice, provide safe, effective and extensive delivery of pathology or laboratory medicine services to support the clinician.

EDUCATION AND TRAINING

Biomedical science is now well characterised in educational terms by the content of the increasing number of Institute accredited biomedical science courses. In 2005 there were over 40 universities offering undergraduate and postgraduate courses.

Uniformity of approach is assured by the Institute's accreditation process and by the Heads of University Centres of Biomedical Science (HUCBMS) development and discussion forum.

First Degrees

Training and education leading to registration as a biomedical scientist requires an IBMS accredited co-terminus or integrated BSc honours degree in biomedical science (three/four years), which involves a wide knowledge and skills base encompassing a range of pathology specialties.

The IBMS Certificate of Competence leading to registration with the Health Professions Council legally defines the entry gate to the profession through training and education. Biomedical scientists are sometimes recruited from degree courses other than those accredited by the IBMS. Supplementary education drawn from accredited degree courses ensures the acquisition of the relevant knowledge base to underpin initial laboratory training and to achieve registration with the Health Professions Council.

Higher degrees and specialist training

The professional role continues to develop as individuals progress through their career, securing a Specialist Diploma in a chosen specialty(ies) in pathology after a minimum of two years' post-registration training. A Masters level qualification may follow and subsequently a Higher Specialist Diploma (at least five-years after registration). Diplomas of Expert and Extended Practice might then be acquired (probably between five and ten years' post-registration). Ultimately, an Advanced Specialist Diploma equips members to practise at consultant level.

Continuing professional development

It is now generally accepted that professionals face a commitment to embrace the philosophy of lifelong learning. It is essential therefore to define a framework to underpin this activity.

Biomedical scientists work in a variety of laboratory environments with the significant majority being employed within the NHS in the diverse disciplines which together constitute pathology or laboratory medicine. (Appendix 1)

Biomedical scientists embrace the concept of continuing professional development (CPD) encompassing the systematic maintenance, improvement and broadening of their knowledge and skills through lifelong education and training in order to perform their professional duties to the best of their ability. They own and manage their personal development plans, identifying areas that require further development, or which influence career development, competence based training and changes to their professional practice.

FUNCTIONALITY MAP

In close consultation within the profession, the Institute has developed a functionality map, which delineates and describes the functions biomedical scientists generally perform.

The emphasis between the divisions of the map will inevitably vary with individual job descriptions and employment gradings. However, the educational criteria for all biomedical scientists ensures a knowledge base, which can be developed by training programmes. This map is intended to build on, and provide a continuum from, the Health Professions Council's *Standards of Proficiency*.

A CLINICAL

Have a detailed understanding of the normal physiology and pathology of disease.

Have a detailed understanding of the normal functioning of the human body, with a particular emphasis on the pathology discipline, in order to provide a foundation for the understanding of the disease process.

Recognise changes in analytical data in relation to biological variation in normal and disease states and utilise professional training, education and professional judgment in order, as part of the Healthcare scientist team, to advise clinicians on relevant investigations.

Understand the underlying mechanisms of the pathology of the disease.

Recognise significant changes in relevant signs, symptoms and other indicators, and understand the effects of diagnostic or therapeutic procedures in order to provide interpretative judgements within the specialty.

Understand the variation in results within the disease state relevant to the discipline and be aware of external parameters which influence laboratory results.

Be responsible for the scientific and analytical service design and the implementation

of protocols, procedures and methods in order to improve, monitor and manage patient care as appropriate, ensuring effective first class service to the user. Ensure a wide clinical knowledge base to be able to communicate effectively with clinical and other professional colleagues, to take part in clinical audits and contribute to clinical excellence initiatives.

B SCIENTIFIC

Possess critical skills in the use of knowledge and data together with the ability to make a basic assessment of the problems.

Hold wide scientific knowledge and skills of related discipline(s).

Have extensive understanding of the principles of the techniques and methods employed in the discipline.

Use professional judgement to advise the user of the correct sample type and on agreed procedures.

Understand the reason for testing and its limitations in the diagnosis and in the management of patients.

Provide diagnostic interpretation of results, which may include guidance to clinicians on supplementary investigations and reflex testing to aid patient management.

Contribute to improvements in clinical, scientific and technological knowledge and practice.

Contribute to the scientific understanding and development of the profession.

Be proficient with information on developments and needs in the disciplines.

Plan clinical, scientific and technological research and development demonstrating research skills to develop, improve and advance current knowledge and practice both within the laboratory and in relevant extended practice environments.

Perform comprehensive and critical literature searches.

Perform, evaluate, draw conclusions and communicate outcomes of clinical, scientific and technological research.

C TECHNOLOGICAL

Acquire knowledge and experience of analytical technique and maintain good analytical and laboratory practice.

Demonstrate proficiency in current laboratory technology.

Evaluate, procure and commission new equipment and associated computer software for use in scientific and technological services.

Prepare, calibrate and verify equipment for use in scientific and technological services.

Perform scientific and analytical procedures to the required operational standard demonstrating that outputs are valid according to quality standards.

Co-ordinate biological and other specimens pre- and post-analysis; select suitable specimens and procedures relevant to patients' clinical needs.

Use knowledge of analytical principles to resolve problems associated with methods due to sample or reagent limitations.

Create and maintain records and documentation, interpret outputs into outcomes reliably and accurately in the clinical context.

Identify accurately the cause of procedural abnormalities and implement effective remedies.

Promote, develop and maintain quality systems ensuring that effective service is provided through quality assurance and audit.

Actively participate in internal and external quality assurance schemes and Clinical Pathology Accreditation (UK) assessments and audit processes.

Optimise utilisation of all available resources.

Directly involve and manage pathological investigations outside the boundaries of the laboratory, eg point-of-care testing in diversity of settings.

Define and develop standards for the quality control of equipment and devices. Ensure standards of accuracy, precision and efficiency in the performance of analyses or operation of equipment.

Comply with British and European Standards and those laid down by professional and accrediting organisations.

Provide safe and effective service though regular service, maintenance, repair and troubleshooting of equipment both within the laboratory and in the primary care sector.

Devise, evaluate and introduce new procedures using scientific methods and techniques for the analysis of biological and other specimens.

Understand underlying principles and practice with respect to health and safety aspects of work promoting the development and maintenance of health, safety and security in the work place.

Using critical analyses of patient data to assist clinicians consider diagnoses.

Report the results of the analysis of biological and other specimens.

D MANAGERIAL

Understand the basic aspects of the management of staff and physical resources.

Direct and manage clinical, scientific and technological services formulating and developing strategies and policies for the management and promotion of services.

Plan and manage work force requirements and service needs.

Develop, plan, implement and monitor administrative systems and procedures to meet service needs.

Recruit and retain the work force in relation to service needs.

Manage people and create an effective working environment to maintain good working relationships with all members of staff and promote effective teamwork.

Ensure annual performance reviews and personal development planning processes are carried out effectively.

Understand the health and safety issues related to the laboratory.

Ensure compliance with all local, national and international standards of work practice.

Promote the importance and benefits of quality and be responsible for issues affecting effective service identified by quality and audit processes.

Establish and maintain quality of standards for scientific and technological services.

Monitor the performance of services and procedures against quality standards.

Develop guidelines and patient care pathways within the organisation.

Create and maintain an environment which is conducive to learning and development.

Identify, plan, co-ordinate and evaluate educational, training and development of biomedical scientist and support grade professionals.

Actively maintain professional development and competence for relevant healthcare scientist personnel.

Be aware of personnel issues related to the training, competence and codes of practice and behaviour.

Audit the appropriateness and effectiveness of scientific and technological services and procedures.

Ensure the service meets requirements within the framework of clinical governance.

Perform risk management and prepare relevant documentation for regular assessment and monitoring purposes.
To present and disseminate clinical audit and research findings as appropriate.

Identify, plan, co-ordinate and evaluate the education, learning, training and development of services, colleagues, other professionals and the profession as a whole in order to deliver the healthcare priorities of the organisation and the Department of Health.

Promote Continuing Professional Development and systematic learning for all personnel.

Implement changes in practice in response to clinical audit and national guidelines and recommendations.

Ensure that confidential information is managed in accordance with data protection legislation.

Biomedical Scientist Consultant

Perform an in-depth complex role involving high level of scientific skill, practice and theoretical knowledge.

Continually promote and demonstrate best practice, facilitating the introduction of evidence-based research.

Actively develop the service to ensure that care pathways are patient focussed.

Exercise managerial responsibility, leadership and professional autonomy in relation to laboratory and other information requiring analysis and interpretation to assist with patient and environmental management.

Develop networks and partnerships with other organisations within the employing authority to ensure effective liaisons and the dissemination of information and advice in line with local and national objectives.

Undertake planning of service within the national framework, leading strategic changes and direction.

Work in partnership with other members of a multidisciplinary team to develop and implement local and national policies and standards.

Provide professional leadership and guidance in this specialist area of practice to appropriate local and national teams.

Provide expert scientific advice to support the clinician.

Provide expert input into education and training programmes.

Initiate and direct audit and research.

E COMMUNICATION

Possess skills that pertain to communication with colleagues in the immediate department and wider clinical communication.

Present findings in both written and spoken media through reports, scientific papers, posters, seminars and lectures.

Educate and train colleagues as part of a multidisciplinary team and undertake responsibility for supervising junior members of the team.

Communicate effectively with colleagues within the wider clinical community and using modern communication media leading and participating in change management.

F ETHICAL

Practise within the professional and ethical framework.

Exercise professional judgement, skill and care, fulfilling a professional role with integrity, refraining from its misuse without compromise to professional standards to the detriment of patients, employers or professional colleagues.

Seek to safeguard patients and others, particularly in relation to health and safety.

Treat with discretion all confidential information and data and maintain strict confidentiality of patient related information and data.

Strive to ensure professional competence, maintain, improve and update professional knowledge and skills.

Respect the integrity of other professional groups, collaborate and work jointly with others in the interest of patients and users of the service.

Promote the study and development of biomedical science and the education and

training of biomedical scientists.

Understand employers' mission statements and corporate objectives and report any difficulties encountered in the performance of professional duties.

G INFORMATION TECHNOLOGY

Comply with legislation relating to data protection, computer misuse, confidentiality and licensed software [Refs. Data Protection Act 1984 Schedule 1. Computer Misuse Act 1990. London: HMSO, 1990. (ISBN 0 10 541890 0) Freedom of Information London Act 2000 HMSO.]

Select and model computer programmes within pre-packaged software options.

Design systems if pre-packaged options not available, modify packaged programmes.

APPENDIX 1

Biomedical Science Disciplines

Cellular Pathology
Clinical Chemistry
Cytopathology
Haematology
Histocompatibility and Immunogenetics
Medical Microbiology
Molecular Biology
Immunology
Transfusion Science
Stem Cell Biology
Virology