



EPBS Policy Statement on

Biomedical Scientists

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EPBS is an International Non-Profit Association (AISBL) registered under the Belgian law
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The European Association for Professions in Biomedical Science

The EPBS was formed in May 1999 at The Hague, Netherlands. This non profit organisation is committed to promoting best practice and ethics for Biomedical Scientists throughout Europe. Membership of the EPBS is open to professional bodies committed to developing Biomedical Science with the aim of improving health care. Governance of the EPBS is in accordance with its adopted statutes and internal regulations. There are currently 22 members.

1 Who are Biomedical Scientists

Biomedical science is one of the broadest areas of modern science and underpins much of modern medicine - from determining the blood requirements of critically ill patients to identifying outbreaks of infectious diseases to monitoring biomarkers in cancer.

Biomedical scientists analyse specimens from patients to provide data to help doctors diagnose and treat disease and are at the heart of multi-disciplinary teams in healthcare and provide other professionals with vital scientific information, allowing them to make informed clinical decisions in the investigation, diagnosis, treatment and monitoring of patients. This can involve measuring chemicals to monitor patient condition, investigating disease by looking at tumour samples and identifying micro-organisms in the fight against infection. They also ensure blood stocks are adequate at critical times, matching blood to patients. Up to 80 % of diagnoses rely on their work.

The profession is governed by a strict code of conduct, performance and ethics, which includes patient confidentiality and well-being.

2 What do Biomedical Scientists do

Biomedical scientists are key decision makers. They act in accordance with the study and research process, designing, planning, organizing, applying, evaluating and validating all analytical processes. This extends to the scope of prognosis, screening, prevention, diagnosis, treatment and follow-up of different pathologies, research and teaching.

These professionals develop their activity in several fields of expertise, predominately in the key pathology disciplines: cytopathology and histopathology, clinical biochemistry, cytogenetics and molecular biology, haematology and transfusion science, clinical immunology (including immunotherapy), clinical microbiology and virology, forensic sciences and thanatology, forensic pathology, and public and veterinary health. This requires the scientific understanding and application of qualitative and quantitative laboratory methods using optical or electronic microscopy, biochemical, immunological, cytometry and molecular biology, including image analysis and digital pathology in order

to issuing an investigative report and diagnostic opinion on products of a biological nature.

Biomedical Scientists have the knowledge, skills and abilities to autonomously and independently process and analyse the available information and results obtained, stimulating research in laboratory biomedical sciences, producing indeterminate knowledge in the field and its application in health promotion. In addition, they have the capacity for planning, organization and management, participating in the definition and execution of health policies.

2.1 Skills and competencies (ESCO)

Biomedical scientists are highly trained and highly skilled healthcare professionals. Their advanced skills demonstrate the mastery and innovation required to solve complex and unpredictable problems in a specialised field of work or a study.

Skills

- Analysis of Blood, Tissues and other Bodily Fluids
- Interpretation of Results
- Participating in Research
- Data Management

Competencies

- Sample selection and optimal conditions for testing
- Choice of Analytical Method
- Correct use of analytical methods
- Validation of Methods
- Quality Assurance
- Results analysis and reporting

Specialised Biomedical Scientists are able to develop new knowledge and procedures and to integrate knowledge from different fields.

Skills

- Analysis of Blood and Tissues using advanced methods
- Interpretation of Results for specific disease cohorts
- Quality Management
- Initiating Research
- Data Management and advanced statistical analysis

Competencies

- Advising on choice of sample and conditions for testing
- Deciding on optimal Analytical Method
- Correct use and troubleshooting of analytical methods
- Development and Validation of Methods
- Quality Management Systems

- Organisation of workload
- Liaison with clinical teams
- Management of Point Care Systems

Advanced Biomedical Scientists have the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research or innovation and to extend and redefine existing knowledge or professional practice.

Skills

- Analysis of Blood and Tissues using advanced methods
- Interpretation of Results for specific disease cohorts
- Defining Quality Management Systems
- Directing and Initiating Research
- Data Management and advanced statistical analysis
- Publication
- Laboratory Direction and Management

Competencies

- Choice of sample and conditions for testing
- Choice of Analytical Method
- Correct use and troubleshooting of analytical methods
- Development and Validation of Methods
- Quality Assurance
- Departmental Governance
- Clinical Liaison
- Review of evidence for evidence based medicine
- Directing collaborative research projects

Biomedical Scientists have:

- an analytical approach
- sound research skills
- responsibility
- the ability to work as part of a multidisciplinary team
- the ability to concentrate for long periods
- a good level of accuracy and attention to detail
- an enquiring mind and good problem-solving skills
- ability to lead a research and development team
- empathy and understanding when working directly with patients
- clear and effective written and verbal communication skills to transfer often complex, technical information and research results and to interact with employees, interns and students.

2.2 Knowledge

Biomedical scientists have a solid and comprehensive knowledge of life sciences that substantiates the evolution of know-how that allows the valid and critical interpretation of laboratory results, the execution of research projects, the creation of codes of good practice, as well as social, ethical and deontological considerations, in order to support the development of the relevance of Biomedical Scientist in health and disease.

The professional profile is characterised by a broad range of knowledge, skills and competences that allow them to cover the area of clinical analysis and public health and pathological, cytological and thanatological anatomy, enabling professionals to work in the areas of clinical biochemistry, microbiology, immunology, haematology, immunohematology, histocompatibility, genetics, molecular pathology, cell biology, public health, histopathology, cytopathology, immunocytochemistry, clinical and forensic thanatology.

Biomedical scientists need to be up-to-date on new technologies and on the latest discoveries and applications on the current perform in the lab.

Biomedical Scientists

- Disease Diagnosis
Know the pathological basis of disease and the methodological basis of its diagnosis and monitoring of treatment
- Pathological and molecular basis of disease
- Factors that influence analytical processes and impact on results
- Principles of Analytical Methods and Techniques
- Statistics
- Research Methods

Specialised Biomedical Scientists

- Disease Diagnosis
Know the pathological basis of disease and the methodological basis of its diagnosis and monitoring of treatment
- Pathological and molecular basis of disease
- Specialist knowledge of specific diseases
- Factors that influence analytical processes and impact on results
- Principles of Analytical Methods and Techniques
- Statistics
- Research Methods

Advanced Biomedical Scientists

- Disease Diagnosis
Know the pathological basis of disease and the methodological basis of its diagnosis and monitoring of treatment
- Pathological and molecular basis of disease

- Factors that influence analytical processes and impact on results
- Principles of Analytical Methods and Techniques
- Advanced Statistics
- Research Methods

2.3 Responsibility and autonomy

Biomedical scientists manage complex technical and professional activities or projects. They take the responsibility for decision-making in their work or study contexts: management and analysis of clinical specimens from collection to provision of quality assured result which impacts on patient care. They take responsibility for managing their professional development and contribute to reviewing the strategic performance of teams.

Specialised Biomedical Scientists are departmental leaders who coordinate the analysis of clinical specimens from collection to provision of quality assured result. They liaise with the doctors and nurses treating patients to diagnose disease, identify potential treatment and monitor outcomes. They participate in multidisciplinary team meetings identifying treatment options

Advanced Biomedical Scientists demonstrate substantial authority, leadership, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts, including research. They undertake the departmental direction for coordination of analysis of clinical specimens from collection to provision of quality assured result. Direction of education and competence assurance of staff in team.

2.4 Qualifications

Biomedical Scientists:	Bachelors Qualification EQF Level 6
Specialised Biomedical Scientists:	Master Qualification EQF Level 7
Advanced Biomedical Scientists:	PhD or 2 Master Qualifications EQF Level 7-8

3 Where do Biomedical Scientists work

Biomedical Scientists are able to work in a wide variety of public or private laboratories, as well as in educational institutions. They have expanded roles in different areas and may be expected to work on evenings, week-end shifts or be on-call.

Here are some examples of places, where Biomedical Scientists operate service, and roles where they display Advanced Scope of Practice.

3.1 Diagnostic

Mainly in the field of healthcare, it includes: haematology, clinical chemistry, microbiology, genetics and molecular pathology, cytology and histopathology.

- Blood collection
- Performing analyses on patient's samples, body fluids and/or tissues
- Quality control assessment
- Advice to doctors and other medical professionals, staff
- Medical reports
- Clinical trials and collaborations
- Training of undergraduate Biomedical Scientists
- Multidisciplinary Team input
- Point-of-Care Testing coordination and supervision

3.2 Blood and transplant Centers

- Screening and matching tests to provide patients with suitable blood products and help saving their lives
- Haemo-vigilance
- Pharmaco-vigilance
- Advice to doctors and other medical professionals, staff

3.3 Education

- Tutoring and Lecturing medical and science students
- Training and education of biomedical scientists
- Supervision of undergraduate and postgraduate research projects
- Development of future training schemes for medical and biomedical science undergraduates and graduates
- Validation of educational programmes

3.4 Research

The work of Biomedical Scientists is essential for the function of many research laboratories. Biomedical scientists are involved in carrying out new research and developing new techniques or laboratory methods for the analysis of patient samples for diagnosis and treatment in healthcare.

3.5 In Vitro Diagnostic

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3.6 Other laboratories

- Laboratories for the analysis and control for the prevention and protection of the environment
- Military laboratories
- Forensic laboratories
- Pharmaceutical industry
- Commercial function and marketing agencies operating in the field of laboratory diagnostics
- Pharmacies: to prepare chemotherapy infusion
- Biomedical scientists also work in veterinary laboratories (eg. Zooprohylactic Institutes)

4 How to become a Biomedical Scientist

The Biomedical Science degree encompasses a set of courses, structurally and methodologically organised, aiming at the formation of a licensee that reveals a profile of scientific knowledge and practical skills necessary to meet the threshold standards for qualified practice as a health profession in biomedical science.

The minimum standard of education for biomedical scientists acceptable to the European Association for Professions in Biomedical Science (EPBS) is a Bachelor level or 1st cycle under the Bologna Process.

The standard envisaged is a minimum of 4 years of higher Education (240 ECTS) including supervised clinical practice. Before being registered or licensed for independent practice, a Biomedical Scientist candidate should undergo a supervised and assessed clinical placement.

Students in biomedical science will develop the scope of their activity at laboratory level in a broad range of clinical laboratory specialities: clinical biochemistry, microbiology, haematology, immunology, endocrinology, genetics, molecular biology, immune-haemotherapy, histocompatibility, cytopathology, histo-technology, clinical and forensics, immunohistochemical and molecular pathology technologies, public health.

These subjects are studied in the context of the evaluation and application of the analytical methods that support evidence-based practice and are best suited to the laboratory diagnosis, therapeutics, monitoring and prevention of the disease.

The licensees process biological samples (blood, tissues and other bodily fluids from the living or dead organism), in order to perform analytical determinations that enable evaluation of results to inform diagnosis, treatment, monitoring or screening for which they are intended.

Biomedical science graduates are competent to critically analyse the available knowledge and information, stimulating research in laboratory sciences producing indeterminate knowledge in the field and its application in health promotion.

In addition, the capacity of planning, organization and management, participating in the definition and execution of health policies.

Professional Recognition at the European Union

The recognition of professional qualifications laid down in Directive 2005/36/EC enables the free movement of professionals such as doctors or architects within the EU. Other professions such as sailors or aircraft controllers do not fall under Directive 2005/36/EC and are governed by specific legislation. Special laws also exist for lawyers and commercial agents.

Professions falling under Directive 2005/36/EC

The professions falling under the Directive are nurses, midwives, doctors (general practitioners and specialists), dental practitioners, pharmacists, architects and veterinary surgeons.

Directive 2005/36/EC applies in general to regulated professions unless otherwise stated. A non-exhaustive list of professions covered by Directive 2005/36/EC is available in the database of regulated professions.

5 Future of the profession

The short-term development plan for the profession

- Harmonisation of education in all countries of the European geographic area
- Greater activity of Biomedical Scientists in scientific work
- Preparation of Guidelines for different areas of laboratory diagnostics, which would lead to harmonisation in the work of Biomedical Scientists and thus better health care
- More active promotion of a profession that would lead to greater visibility of the profession
- Greater number of biomedical science associations of the European geographic area united into European umbrella Organisation (EPBS)

The long-term development plan for the profession

- A unique register of Biomedical Scientists at European level
- Ensure that the group title for our profession in the EU Database of Regulated Professions is a single title that reflects the correct title and standing of the profession
- Ensure that the categorisation and title of our profession by ESCO correctly places us with the group of Health Professionals
- Active work of Biomedical Scientists in the EU and WHO-Europe bodies for health care

6 Useful links / References

More information could be found on

- www.epbs.net
- EPBS policies
- European Qualification Framework :
<https://ec.europa.eu/ploteus/en/content/descriptors-page>
- <https://www.prospects.ac.uk/job-profiles/biomedical-scientist>
- <https://mphprogramslist.com/careers/biomedical-scientist-career-salary-outlook/>
- http://ec.europa.eu/growth/tools-databases/regprof/index.cfm?action=profession&id_profession=1480&tab=countries&quid=2&mode=asc&maxRows=*#top
- http://ec.europa.eu/growth/tools-databases/regprof/index.cfm?action=profession&id_profession=1480&tab=countries&quid=2&mode=asc&maxRows=*#top

**Approved by the EPBS General Governing Body
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