

Clinical engineering, medical electronics and equipment design

Join the team and
make a difference

These highly scientific and innovative roles form part of the discipline of clinical engineering. Individuals working in this area are concerned with the specification, installation, maintenance, design and development of medical equipment, working with a wide range of staff in many different clinical areas to meet patient needs.

What will you do?

As a **clinical engineer working in equipment management**, you will provide essential support to colleagues working in various areas of medicine. You may maintain and repair equipment such as patient monitors, ventilators, anaesthetic machines, incubators and operating theatre equipment. At the more senior level, you will advise on the need for new equipment, help in its selection, advise on safety and risks associated with its use and investigate clinical incidents that may have occurred because of equipment failure.

You may also manage equipment that's needed during and after medical treatment, including during rehabilitation. This includes scanners, imaging machines and measuring or monitoring equipment. In addition, you'll ensure high standards of safety and performance and carry out training for users.

In **medical electronics and instrumentation**, you'll work with clinicians using cutting-edge electronic and computing techniques to develop new forms of treatment and specialised medical



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equipment. Successes in this area include the development of life-support machines, critical-care units and advances in prosthetics.

Similarly, in **equipment design and development** you will work with clinicians, including other healthcare scientists, technologists, prosthetists and orthotists to create and improve medical equipment that benefits the patient. This might include assessment, designing, developing and provision of assistive technology such as wheelchairs, walking aids, robotic devices and speech synthesisers.

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wide range of staff in many
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You will build and test prototypes, run clinical trials and evaluate results. There will be opportunity to work closely with patients and some of the equipment you deal with will be custom built for a patient. Often, the materials used will need to be biocompatible to minimise the chances of being rejected by a patient's body.

If you enjoy using your scientific and engineering expertise to make a significant difference to people's lives, these are likely to be highly rewarding careers.

You'll work with clinicians using cutting-edge electronic and computing techniques to develop new forms of treatment



Where will you work?

You could work in hospital wards, clinics, intensive care units, operating theatres, or in a laboratory or workshop.

Scientists working in this field will deal with a variety of clinical engineering activities and will be encouraged to share their expert knowledge.

Some home visits to patients may be required.

You may work according to an on-call rota that includes evenings and weekends

What skills and qualities will you need?

- strong scientific/engineering and technical aptitude
- desire to innovate to create new methods of patient care and treatment
- good knowledge of physiology, anatomy, biology and pathology
- excellent communication skills – you will have to work with and reassure patients and their families or carers
- the ability to concentrate for long periods
- the ability to plan and prioritise
- attention to detail



What entry routes are available?

To become a clinical technologist, you will need to have a BTEC Higher National Certificate/Diploma or NVQ Level 4 in an appropriate physical, engineering or related science subject. To qualify as a clinical technologist in one of these areas, you need to undertake a vocational BSc degree in clinical technology.

To become a clinical scientist, you will first need to take the course on a part-time/block release basis, whilst working in a post as a trainee clinical technologist. You will be paid as you undergo the on-the-job elements of your training and the NHS may pay the

tuition fees. The theoretical elements of the vocational modules are carried out part-time or through block release at a university-accredited institution. On completion of your training you will be eligible to join the Voluntary register of Clinical Technologists.

If you have a first-class or upper second-class degree in a relevant subject, you may be eligible to join the NHS Clinical Scientists Training Scheme. This is a four-year programme of in-depth training in a specialist area, during which you will be paid whilst undertaking the clinical elements of your training. Some employers may also pay your tuition fees and offer financial support while you undertake theoretical academic elements of your training. This will usually lead to an MSc or specialist postgraduate diploma and give you the opportunity to work at the forefront of research and knowledge as a clinical scientist registered with the Health Professions Council. For more information, visit

www.nhsclinicalscientists.info

With GCSEs or an equivalent NVQ and/or previous work experience it is often possible to start work as a trainee or assistant in healthcare science, combining on-the-job training with study so that you learn as you earn. For more information, see the *Clinical support worker* factsheet.

Some employers also offer cadet schemes, which involve a two-year training programme that gives you experience of different jobs within healthcare science.

For more information on the range of opportunities available in healthcare science, please visit www.nhs Careers.nhs.uk/list/qualifications. This gives more specific details about what qualifications are necessary for each role.

You can search for current vacancies and download job descriptions at www.jobs.nhs.uk

How can you develop your career?

Clinical engineering and its specialist branches are developing rapidly as the need for improved techniques and equipment in the NHS grows. There are excellent career prospects that include openings for research, management and education – in fact, you will be encouraged to study, perhaps for an MSc or PhD.

With training, responsibility and experience, you could reach the highest level in the profession, attaining consultant status, at which level you are likely to be in charge of a large department or making a significant contribution to your area of expertise.

Find out more about what training is open to you and how you can develop your career, at www.nhscareers.nhs.uk/list/training

As well as moving to more senior and specialised roles within this area, you will also have the chance to take on additional responsibilities and progress within the organisation as part of the Career Framework. For more information about this initiative, please see the *Careers in healthcare science* booklet.

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Pay

The national pay system for the NHS is called Agenda for Change (AfC). This applies to all staff in healthcare science except the most senior managers. These are examples of roles and the AfC bands at which they may be paid: healthcare science support worker (Band 2); healthcare science assistant (Band 4); healthcare science practitioner (Band 5); healthcare science specialist (Band 6); healthcare science advanced (Band 7); healthcare science consultant (Band 8a-c). For more information, visit www.nhscareers.nhs.uk/list/payandbenefits

To find out more about this area of healthcare science, please visit www.nhscareers.nhs.uk/list/working

For more information on the professional bodies relevant to healthcare science, please visit www.nhscareers.nhs.uk/list/contacts

