



CAREER CONNECTION



## Clinical Engineering: Improving Quality of Life

[By Roshan Tolani]

Clinical engineering, which first became a distinct profession in the sixties, has become a vital component of healthcare delivery systems by leading the way in safe and effective applications of medical technology.

Clinical engineers essentially team up with hospital technicians in different disciplines to investigate incidents in which medical devices may have contributed to injuries or deaths. Clinical engineers' perspectives can be instrumental in identifying the root causes of injuries and deaths. Their understanding of equipment design principles, equipment operations, and maintenance can explain the relation between machines and humans.

Clinical engineers combine their knowledge of physical sciences with that of materials and manufacturing to improve the diagnosis and treatment of diseases. Working closely with patients, technical and medical staff, and equipment manufacturers, clinical engineers perform research and design, develop, and maintain the technology used in the diagnosis and treatment of diseases and the care and rehabilitation of patients.

### Contributions of Clinical Engineering

Clinical engineers perform the following activities:

- Inspect, install, and perform corrective and preventative maintenance on clinical equipment used within the healthcare system
- Conduct pre-purchase evaluations of new technology and equipment

- Help clinical departments with service-contract analysis, negotiations, and management
- Coordinate installations of clinical equipment
- Investigate device incidents
- Design and develop instruments for patient monitoring, diagnosis, treatment, and research
- Develop and maintain computer databases of medical instrumentation and equipment records
- Help hospitals purchase and use sophisticated medical instruments
- Assist with adapting instrumentation for the specific needs of physicians and hospitals
- Build and test new joint replacements, active implants, and equipment used for various types of non-invasive or precision surgeries
- Conduct clinical trials
- Handle the manufacture of aids
- Conduct research on body mechanics
- Handle day-to-day management of expensive hospital equipment such as scanners, imaging equipment, and physiological measuring and monitoring equipment
- Participate in committees and seminars

### Wonders of Clinical Engineering

The convergence of medical and engineering knowledge has helped develop products that closely match people's physical needs:

- Assistive technology: wheelchairs, walking aids, and speech synthesizers
- Biocompatible materials: artificial joints, heart valves, and hearing implants
- Minimally invasive techniques: keyhole surgery and image-guided surgery systems

### Entry Requirements

The minimum requirement to work as a clinical engineer is an accredited degree in a physical or engineering science.

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**Clinical Engineers' Skills and Knowledge**

There are many career opportunities for clinical engineers in hospitals and research laboratories. Some clinical engineers also work as consultants. To perform their duties well, clinical engineers must possess the following competencies and interests:

- Keen interest in the application of engineering to solve clinical problems
- Strong analytical skills
- Excellent communication skills for dealing with researchers, technicians, manufacturers, and patients
- Sensitivity to patients' needs
- Excellent technical knowledge
- Strong mathematical skills
- Strong teamwork skills
- Ability to work within budgetary constraints
- Motivation to remain updated on scientific engineering, and medical knowledge.

**ON THE NET**

Clinical Engineering: Scope of Service  
[clinicalengineering.duhs.duke.edu/modules/ce\\_service/index.php?id=1](http://clinicalengineering.duhs.duke.edu/modules/ce_service/index.php?id=1)

Clinical Engineering  
[en.wikipedia.org/wiki/Clinical\\_engineering](http://en.wikipedia.org/wiki/Clinical_engineering)

Clinical Engineer  
[www.nhscareers.nhs.uk/details/Default.aspx?Id=242](http://www.nhscareers.nhs.uk/details/Default.aspx?Id=242)

Careers Advice: Clinical Engineer  
[www.learnirect-advice.co.uk/helpwithyourcareer/jobprofiles/profiles/profile974](http://www.learnirect-advice.co.uk/helpwithyourcareer/jobprofiles/profiles/profile974)

Job profile: Clinical Engineer  
[www.scienceworlds.co.uk/job\\_worlds.cfm?widCall2=customWidgets.contentItem\\_show\\_1&cit\\_id=2747](http://www.scienceworlds.co.uk/job_worlds.cfm?widCall2=customWidgets.contentItem_show_1&cit_id=2747)

The Role of Clinical Engineering  
[www.accenet.org/downloads/ACCEPatientSafetyWhitePaper.pdf](http://www.accenet.org/downloads/ACCEPatientSafetyWhitePaper.pdf)

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