

Clinical Engineer



Health
South Western Sydney
Local Health District

What is a Clinical Engineer

"A Clinical Engineer is a professional who supports and advances patient care by applying engineering and managerial skills to healthcare technology."

-ACCE Definition, 1992

As clinical medicine has become increasingly dependent on more sophisticated technologies and the complex equipment associated with it, the clinical engineer, as the name implies, has become the bridge between modern medicine and equally modern engineering.

Roles of a Clinical Engineer

Clinical engineering is an interdisciplinary field practiced in a variety of settings and presenting a diversity of challenges. The clinical engineer is, by education and training, a problem solver, working with complex human and technological systems.

In the hospital, shared service, and asset management firm, the clinical engineer often functions as the technology manager for medical equipment systems. The responsibilities in this setting include financial or budgetary management, service contract management, data processing systems for managing the medical equipment, and coordination of service agreements and in-house operations. The hospital-based clinical engineer may also have responsibility for supervision of the in-house maintenance staff, depending on his or her skill set and the structure of the department. Hospital-based clinical engineers also fill other important functions in assuring that the medical equipment is safe and effective.

These functions include participation in the planning process and in the assessment of new technology, assuring regulatory compliance in the medical technology management area, investigation of incidents, and active participation in training and education of technical and medical personnel. The scope of these activities is expanding significantly as medical technology continues to become integrated into systems and the line between medical, communications, and information systems continues to blur.

Clinical engineers employed in industry work to assure that new products will meet the needs of tomorrow's medical practice. They are involved in all aspects of the development process, from medical device design and development, through product sales and support. Often, they work with teams of nurses and other hospital-based professionals in evaluating new products or concepts, and during clinical trials.

Clinical engineers also work in private practice, consulting in a variety of settings as expert witnesses, problem solving, or serving on governmental or international bodies such as ECRI the Food and Drug Administration or the World Health Organization.

Clinical engineers also have a long history of collaboration to find economic approaches to broad technology issues facing the healthcare system. They played a significant leadership role in calming the hysteria over electrical safety in the 1970's and Y2K at the turn of the century. Clinical Engineers in the US provided technical leadership to the medical telemetry task force and clinical engineers are actively working in patient safety through medical error reduction.

Clinical engineers do many things throughout the healthcare profession, but most importantly, they try to make a difference to patient outcomes through the safe application of technology.

Qualifications Required/Career Opportunities

Clinical Engineering education is based in classical engineering (usually Electronics or Mechanical), supplemented with a combination of courses in physiology, human factors, systems analysis, medical terminology, measurement, instrumentation, computer programming, information technology.

Supervision provided

Formal training is often supplemented with an Industrial Placement at a Public Hospital and courses from vendors on specific items of equipment either in Australia or overseas. Together this training gives the CE a firm grounding in hospital technology, operations, protocols, and ethics.

All of this background prepares the clinical engineer to fill a variety of roles in research, design, academia, and most often, in the clinical environment. In daily practice, the clinical engineer often serves as the translator walking between the worlds of the medical, engineering, and business professionals. Today, healthcare technology extends into information and communications systems and traditional medical equipment is more complex than ever. Assessing, managing, and solving problems in this hyper-tech world is the work of the clinical engineer.

Clinical Engineers are Professionals

Clinical Engineers, by education and training, are members of a proud profession. Through their professional society, the Engineers Australia (Biomedical College), they have established a code of ethics, pursued peer recognition and certification programs, and developed a heritage of publishing, teaching and humanitarian programs designed to "give back" to society and to prepare the next generation of practitioners. Clinical engineers, whether employed in hospitals or elsewhere, understand that the opportunity to practice in healthcare carries the responsibility to always give one's best, maintain appropriate discretion, and keep the well-being of the patient as the highest priority.

Clinical Engineers and BMETs are different

Clinical Engineers are often confused with another professional group in the hospital, the Biomedical Equipment Technicians (BMETs). In reality, these two groups perform different but equally valuable functions. The BMET is the person responsible for direct support, service, and repair of the medical equipment in the hospital. BMET education and training is usually of a more directly technical nature, and is supplemented with specific schooling in service to the equipment. BMETs answer the call when medical equipment fails to function properly and must work closely with nurses and other hospital staff, as well as the equipment vendor, as they service and maintain the equipment. The job of the clinical engineer, however, is somewhat different.

Together BMETs and Clinical Engineers work towards ensuring medical technology is available for clinicians.

What sort of person should I be?

- A logical thinker
- Interested in the application of physics and mathematics
- Enjoy working with computers and sophisticated pieces of equipment
- Good at problem solving
- Good at seeing new ways of doing things

Personal skills required of a Clinical Engineer

- Able to interact well with others
- Able to work independently
- Able to make decisions in an appropriate and efficient manner
- Well organised