# Clinical Engineers: An untapped resource

Clinical Engineers (CEs) are professionals who bridge the gap between clinical users and medical technology with cultivated cross-disciplinary skills. This is a role that has been developed in North America over the last 40 years. The evolution of medical technologies has surpassed the capability of most healthcare practitioners; so much that healthcare facilities may be overwhelmed by the management of clinical technology.

**Q: What type of work does a Clinical Engineer perform?**

A CE has a subspecialty in engineering management technology and is clinically accustomed to handle medical equipment decisions among other responsibilities (See Figure 1). The scope of medical technologies that CE's are able to deal with range from infusion pumps to MRIs. Clinical Engineers need to be involved in decisions regarding medical technology as they have the ability to fully embody the project from start to finish.

**Q: What added value can a Clinical Engineer bring in my hospital?**

In the current fast-pace evolution of healthcare technology, CE's are its stewards. They easily translate clinical needs into technical requirements to uphold the hospital's standard of patient care and quality. CE's can also communicate effective strategies to enhance technology management to hospital administrators. They collaborate with others, to work towards the advancement of healthcare quality, patient safety, process reliability, healthcare availability, speed and efficiency of healthcare delivery, and cost effectiveness of process.

**Q: What value does a Certified Clinical Engineer (CCE) bring to our organization?**

Certified Clinical Engineers (CCEs) already standalone as they are degreed engineers which changes their approach towards problems from other individuals. Certification shows that a Clinical Engineer is not only competent, but passionate in their field. The Certification Program is run by the Healthcare Technology Certification Commission with a United States and Canadian Board of Examiners.

Prior to applying to become a CCE, in Canada, individuals must become a Professional Engineer which makes the individual duty-bound to a higher directive. Over and above just being a manager of equipment, Professional Engineers have a moral and legal obligation to ensure patient safety, ethical practice, and a duty of care to the public.

The certification ensures lifelong learning becomes a part of a Clinical Engineer's career. In order to keep certification, triennial renewals verify continual personal and professional growth, and that CE's maintain their acquired skills.

**Q: What is the fundamental difference between Clinical Engineers, PMPs and CHTMs?**

When consulting problems CEs have a vastly different approach than CHTMs and PMPs; CEs are trained to understand things at a system engineering level through first principle approaches while CHTMs and PMPs operate at a broader understanding. Clinical Engineers have the depth of experience and education to evaluate hospitals risks which is how they develop innovative solutions and are able to expedite decisions.

**Q: What are healthcare professionals saying about Clinical Engineers?**

"We are fortunate to have the involvement of CEs in increasing our effectiveness in care delivery through capital priority setting exercises and quality improvement projects. One recent project highlighted the importance of the CE role in overhauling the standard equipment needed for each patient's bedside on our inpatient units. We are very grateful to our CEs for their invaluable assistance on this specific project and many other capital renovations throughout the hospital."

*Ann Lynch, Vice-President, Acute Care & Chief Nurse Executive at the Children's Hospital of Eastern Ontario (CHEO)*

"CEs at CHEO has been instrumental in many projects throughout the Medical Imaging Department. With the recent acquisition of the 3T magnet, CEs have played an active role in the decision making, purchase and implementation of this technology.

With the continuing evolution of technology, the CEs have been fundamental to our department. Our close relationship and collaboration assures our Medical Imaging team with equipment that remains optimal for serving our patients. "

*Dr. Elka Miller, MD, FRCPC Chief and Research Director at the CHEO Medical Imaging Department*

**Q: Where can I find out more information on CEs?**

A: Clinical Engineers can enhance your hospital's performance in delivering patient care with technology. It is time to seek Clinical Engineers for your team, and preferentially Certified Clinical Engineers.

For more information on Clinical Engineering please contact The Canadian Medical and Biological Engineering Society (CMBES) at www.cmbes.ca

*Clinical Engineers making a difference with the neonatal transport incubator. From left, Kim Greenwood, Marie-Ange Janvier and Rachel Zhang.*

## Summary Of CE Skills

- ✓ Ongoing management of technology - intensive organization, healthcare technology and personnel
- ✓ Establishing tighter communication of systems for diagnosing information - processing and treatment
- ✓ Cross collaboration, (contractors, clinicians, etc.) to progress daily work
- ✓ Managing resources: instruments, funds or personnel
- ✓ Ensure compliance with Health Canada regulations - mandatory reporting. Medical devices licenses
- ✓ Analysis of processes to make improvements
- ✓ Requirement for documentation of policies, procedures and work logs.
- ✓ Managing medical device alerts and health reports
- ✓ Assure demands are met and correct actions are taken

**Figure 1**

*This article was submitted by Elese St.Louis, Marie-Ange Janvier PhD, P.Eng., CCE, Andrew Ibey M.Eng., P.Eng., CCE and Kim Greenwood MASc., P.Eng, CCE, FEIC.*