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A Career in the HTM Profession

Learning Objectives

- 1 Characterize the HTM profession.
- 2 Describe the role of an HTM technician.
- 3 List and describe potential employers of HTM technicians.
- 4 Characterize field service representatives.
- 5 List and describe the many job functions of an HTM technician.
- 6 List and characterize the certification types.
- 7 List and describe related professional societies and publications.

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What is the Name of this Career?

Complex healthcare technology is utilized to support safe and effective patient care. Clinicians depend on devices to monitor and treat patients. Healthcare Technology Management (HTM) professionals are part of the healthcare team, utilizing technical expertise to ensure the safety, effectiveness, and availability of critical medical technologies including devices, applications, and software. The HTM discipline interweaves patient safety, medical technology, and financial stewardship as illustrated in Figure 1.1. HTM professionals collaborate with many groups within healthcare organizations including clinicians, risk management, information technology, facilities management, and administration.

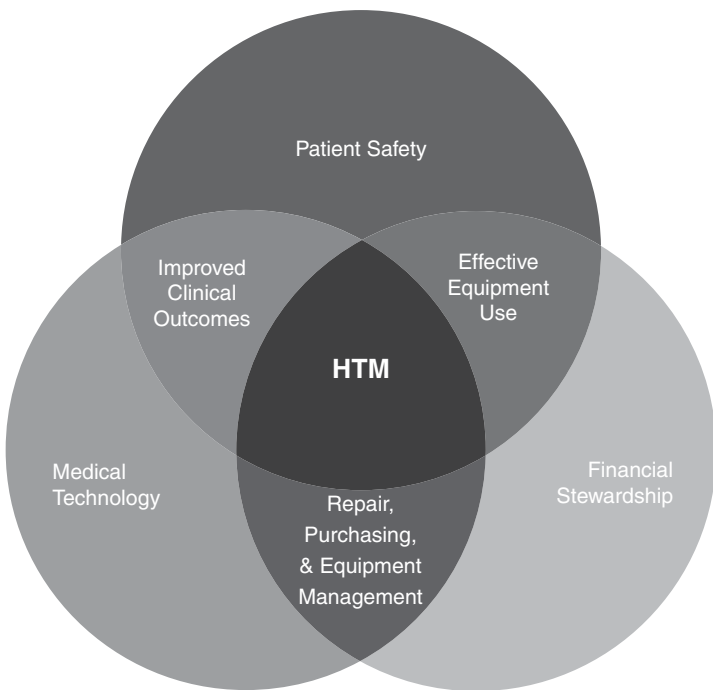


FIGURE 1.1. The HTM Profession
(courtesy of AAMI)

3 WHAT DO HTM TECHNICIANS DO?

At different hospitals, HTM technicians may have a wide variety of job titles, including HTM technician or BMET. There are many definitions for what the letters BMET stand for – biomedical equipment technician, biomedical electronics technology, medical maintenance, biomedical engineering technologist, biomedical engineer, medical engineer, and medical equipment repair technician. In general, BMET or HTM technician may be used as title for a person with technical training who works in the clinical setting and supports the equipment involved in patient care.

Technicians may be called the “biomeds,” “clinical engineers,” or the “equipment guys.” The name of the HTM-related department within a healthcare organization may vary but is often healthcare technology management, medical engineering, clinical engineering, or biomedical engineering. In some hospitals, HTM technicians may be responsible for everything from printers to computers to DVD players in the rooms of patients. In some hospitals, HTM technicians work for the maintenance departments and are dressed similarly to the maintenance workers. Other hospitals hire a wide range of technical staff who wear surgical scrubs, lab coats, monogrammed polo shirts, or dress shirts.

Who Employs HTM Technicians?

Generally, three groups of employers hire HTM technicians: hospitals, outside service providers, and the equipment manufacturers. Those who work for the hospital directly or an outside service organization (OSA) or independent service organization (ISO) may appear the same to clinical staff. Some employment issues (benefits, etc.) could be different, but the work-related duties are likely to be similar. Often, when employees work for a manufacturer, they are identified as field service representatives or FSRs.

What do HTM Technicians do?

Although the titles may vary, the core functions of HTM technicians are relatively consistent across patient care environments. Most HTM technicians perform several main categories of job

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functions. In general, technicians are responsible for the support of the technology used in healthcare. This support assures the safe use of equipment and the best possible patient care. HTM technicians work closely with medical staff to make sure technology is available, used safely, and performs as designed.

Indirectly, the *customer* of technical support services is ultimately the patient, although many times the patient and technician are not in the same place at the same time, nor are patients the *users* of medical technology. Because the clinicians depend on medical technology to deliver patient care, the most direct *customer* would be the clinician who uses the equipment. However, most experienced HTM technicians define the best employee as one who thinks of each patient as a relative or loved one. The care and attention one would expect under these circumstances should drive high quality job performance.

Hospital-employed technicians generally have the following responsibilities:

- **Equipment repair and troubleshooting** – Technicians fix equipment that is not functioning as expected. This repair may or may not be done in the HTM department work area. Technicians may need to retrieve equipment that has a “broken” sign attached to it within the patient care department, or they may be called to the operating room during a surgical case to diagnose and repair malfunctioning devices. Figure 1.2 shows a technician working on a physiological monitor at her workstation in the clinical engineering department of the hospital.
- **Preventative maintenance (PM)** – Technicians routinely verify the performance of almost all healthcare equipment at a particular time interval. This involves evaluating the performance of every aspect of a device and checking or replacing parts to ensure consistent, dependable service. PM may include conducting calibrations and safety checks as well as removing the “white dust” that comes from bed linens. Technicians in the early stages in their career may spend a great deal of time conducting PM evaluations. Performing preventive maintenance procedures is a great way to learn about all the features of a device, and the experience can assist in future troubleshooting. This type of activity

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FIGURE 1.2. A HTM Technician Works on a Physiological Monitor

is sometimes called *performance assurance*. Figure 1.3 shows a technician performing a PM on a ventilator.

- **Staff support** – Technicians provide both formal and informal equipment instruction to many groups including the users of equipment and other technicians. *In-service training* or an *in-service meeting* may be managed by the HTM technician during a clinical staff meeting to introduce users to the features of a new device, offering information needed for effective usage. Technicians also work one-on-one with clinical staff members, addressing user challenges. Excellent customer service and

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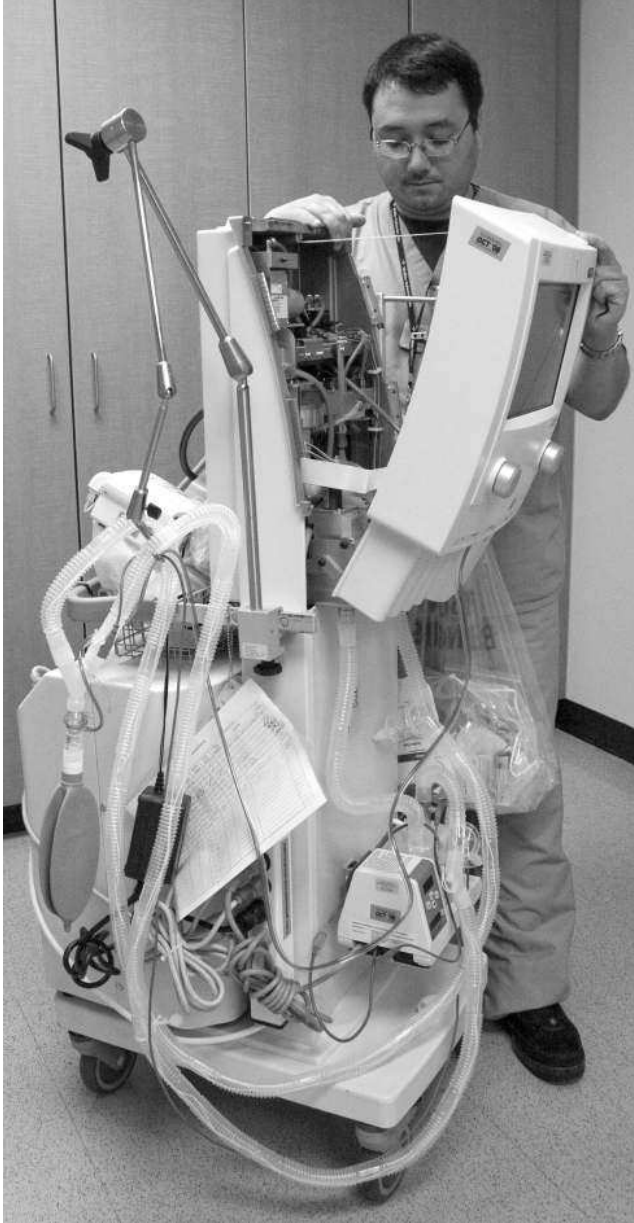


FIGURE 1.3. A HTM Technician Calibrates a Ventilator

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communication with patient care providers are vital to effective job performance.

- **Pre-purchase evaluation** – As new equipment (new models or entirely new devices) is considered for purchase, many technicians are involved in the selection decisions, usually working very closely with the medical staff. As patient care technology becomes interwoven with other medical equipment in the hospital utilizing information technology networks, the cross-departmental interactions often fall to HTM technicians.
- **Incident investigation** – When there are problems with equipment, experienced technicians are often part of the team that evaluates circumstances surrounding a malfunction.
- **Incoming inspections/assembly** – When new devices arrive at the hospital, technicians must verify that every aspect of every piece of equipment functions properly.
- **Adaptations/modifications** – HTM technicians are occasionally asked to modify equipment to better medically serve clinical staff or better serve a patient with restrictions or limitations.
- **Documentation/departmental development/training classes** – Medical device management plans, utilizing thorough documentation of technical support efforts, offer a roadmap for lifetime device support. In addition, accreditation bodies have a policy that basically concludes: “if it is not written down, it did not happen.” HTM-related departments have meetings and other activities that must be documented. In addition, HTM technicians are often expected to participate in ongoing training throughout their careers to explore new devices and technologies.
- **Updates/recalls** – When manufacturers change, recall, or update equipment (for example, software updates) the technician must locate devices, remove them from service, or make the necessary changes.
- **Safety board/disaster planning** – Technicians help to set policies, plan for emergencies, and investigate problems, especially regarding hospital-process efficiency and staff training.

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Non-hospital-employed technicians engage in a number of the previous responsibilities in addition to some of the following functions:

- **Telephone support** – Some technicians answer phone lines to assist users of equipment as well as technicians who are attempting to make a repair.
- **Sales** – Some technicians work for a manufacturer, outside service organization, or repair depot as a salesperson.
- **New equipment design** – Some technicians work for a manufacturer and design new devices.

In general, most hospital-based technicians work typical hospital first-shift hours, often 7 A.M. to 3:30 P.M. Monday through Friday. While some institutions do staff HTM departments on weekends, most departments do not provide staff during the night or on weekends. Policies for on-call coverage vary, although most hospitals easily deal with problems outside of work hours with minimal weekend and night trips back to work.

Table 1.1 contains standardized job descriptions to help HTM professionals understand the career and its opportunities. Detailed information is provided related to the entry-level position, level I. Additional details are available on the Association for the Advancement of Medical Instrumentation (AAMI) website, www.aami.org. The *Career Planning Handbook*, available free from AAMI, offers a deeper understanding of the skills and experience needed to advance in the profession, including leadership, public safety and regulatory requirements, customer service, and specific equipment expertise.

Field Service Representatives

FSRs are generally employed by the manufacturer of a medical device or technology. The person represents the company by servicing or supporting (by offering clinical staff training, for example) a particular device or group of devices at various clinical sites. Sometimes these workers are called field service engineers, equipment specialists, or customer engineers.

TABLE 1.1. AAMI HTM Job Descriptions

Healthcare Engineering Technician I (or BMET I or other title)
<p>Summary: Maintains clinical equipment through the effective use of the Medical Equipment Management Plan. Performs a variety of routine tasks associated with the installation, maintenance, calibration, and repair of a limited scope of biomedical equipment under the guidance and direct supervision of an experienced healthcare technology management (HTM) professional.</p> <p>General Guidelines: Demonstrates basic knowledge of the job, activity or function, needs supervision or mentoring on advanced assignments. Entry-level position.</p> <p>Education: Associate's degree, military training, or academic work aligned with AAMI's <i>Core Competencies for the Biomedical Equipment Technician</i>, and a basic knowledge of mathematics, anatomy, physiology, biology, physics, chemistry, medical terminology, English, computer and networking peripherals, and professional skills.</p> <p>Leadership: Demonstrated ability to learn from others on the job. Can teach some basic skills to new hires or interns.</p> <p>General Skills & Experience: Possesses basic understanding and skills related to general electromechanical systems and devices.</p> <p>Specific Experience:</p> <ul style="list-style-type: none"> • Exhibits a basic understanding and can communicate the use of devices supported. • Can provide basic support of acuity equipment for direct patient care. • Is familiar with the operations and environment that they support (hospital, clinic, etc.). • Has minimal experience in their assigned clinical environment. <p>Public Safety & Regulatory Requirements: Has a basic understanding of both local and national public safety and regulatory issues.</p> <p>Customer Service: Able to solve basic front-line customer service issues.</p> <p>Equipment Expertise: Demonstrates a basic understanding of clinical equipment, radiological, laboratory and network medical systems.</p> <p>Other: Has a basic understanding of project management terms and methods.</p>
Healthcare Engineering Technician II (or BMET II)
<p>Maintains clinical equipment through the effective use of the Medical Equipment Management Plan. Performs a variety of tasks associated with the installation, maintenance, calibration, and repair of biomedical equipment with minimal supervision.</p>

(continued)

TABLE 1.1. (cont.)

Healthcare Engineering Technician III (or BMET III)
Maintains clinical equipment through the effective use of the Medical Equipment Management Plan. Demonstrates a mastery of skills and tasks associated with the installation, maintenance, calibration, and repair of complex biomedical equipment. Capable of educating others including clinical staff related to the technical integration of the device/system.
Specialist (Radiology/Network Systems/Laboratory/Project)
Recognized as field modality expert. Highly competent in area of specialty, spending 70% of time or more in repairing, inspecting, installing, troubleshooting, and calibrating equipment in area of specialty. Serves as a front-line responder for escalated service events.
Network Integration Engineer
Assists department director with all aspects of program management, including work-history data analysis, staffing allocation, budget control, equipment acquisition planning, installation and testing, outside vendor management, development of policies and procedures, and provision of clinical engineering services. Ensures all program components support accreditation and other state and local codes related to electrical and mechanical equipment safety. Performs rounds on clinical units to verify proper equipment use and operation. Develops and monitors compliance with equipment preventive maintenance schedules. Understands data transfer, platforms used to transfer data, and interconnectivity.
Healthcare Engineer (commonly referred to as Clinical Engineer)
Assists department director with all aspects of program management, including work-history data analysis, staffing allocation, budget control, equipment acquisition planning, installation and testing, outside vendor management, development of policies and procedures, and provision of clinical engineering services. Ensures all program components support accreditation and other state and local codes related to electrical and mechanical equipment safety. Performs rounds on clinical units to verify proper equipment use and operation. Develops and monitors compliance with equipment preventive maintenance schedules.