

A World of Difference: Biomedics Abroad

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Overseas, certification/education standards vary as do job duties and the role of associations.



Biomedics in the United States follow a pathway of education, training, and work experience, plus involvement in associations that support the industry. But what are career paths like for biomedics around the globe, who may be coping not only with medical technology systems at varying levels of development, but also with less-structured educational and training options? And what should

American biomedics expect if they elect to work abroad, as some do for organizations like the Michigan-based non-governmental organization (NGO) International Aid (IA)?

Certification and Education

For starters, says Billy Teninty, director of IA's medical equipment training (MET) program, don't expect that certification is a necessity for the job.

"I have not worked in a developing country that requires certification for biomedical technicians," says Teninty, who has used volunteer biomed to teach equipment-troubleshooting courses in Ghana, Honduras, Kosovo, and the Philippines. "As a result, I do not require AAMI or other certification for the instructors or service technicians. However, I do ask for resumés and try to select the best-qualified applicant for each assignment. When on the field, the selected applicants participate as instructors in our 4-week training session in electronics and medical equipment technology. Our biomed training program conducts two 4-week sessions per year over a 3-year period."

In India, there also are no specific requirements or eligibilities for working in the field, says Sanjay P. Sood, an Indian biomed who is also a World Health Organization consultant.

"Although some colleges and universities offer bachelor's, master's, and diploma programs in the field of biomedical engineering and biomedical instrumentation, there is no certification available for engineers and technicians," says Sood, who is currently on impermanent assignment for the National Telemedicine Project in Mauritius, India. He also has been contributing as a coordinator and domain-expert for biomedical equipment technology for the project. "There are a few organizations that also provide short-term training programs through their self-designed programs."

Sood also has been working as a consultant for the World Bank-aided project Punjab Health Systems Corp, which was formed in 1996. "Through this project, the state hired the services of a biomed as a consultant for the first time, and I worked with them for 2 years before helping [Punjab Health Systems] to recruit a team of biomedical technicians and a chief biomed to perform on a regular basis," Sood says. Before then, there were no formally qualified biomed in the state appointed specifically for maintenance and repair of medical equipment in the state's hospitals, according to Sood.

"Except for the tertiary-level hospitals, the government hospitals do not have formally qualified biomedical technicians," Sood says. "In the North Indian State of Punjab, there are a couple of biomedical technicians assigned for five to six state-owned hospitals in the region, and the chief biomed technician is placed at the headquarters. The scenario is more or less similar in other Indian states."

In Botswana, where Darius Walume works for a 500- to 600-bed referral hospital in Francistown, university or equivalent training up to a degree standard is required for direct entry as an assistant biomedical engineer intern. After that period, the intern undergoes generally supervised experience for up to 2 years.

“There is a lack of control over standards generally, and many of the old staff do not have training,” Walume says. “Rather, they have learned by experience. There also is a mixture of new entrants without adequate background knowledge or training. It’s a mixed bag, and as a result, there is a need to put an organized system in place for quality vetting at all stages, including recruitment and professional training of interns.”

Until recently, it was virtually impossible to employ qualified medical device management personnel in England due to a lack of educational facilities specializing in the area.

“As a result, those with backgrounds in electronic and electromechanical engineering have been hired,” says Mark L. Callaghan, assistant manager in the Medical Equipment Service Unit (MESU) of Queen’s Medical Centre University Hospital National Health Service (NHS) Trust in Nottingham, England. “Once in post, these staff undertake extensive in-house training to familiarize them with anatomy and physiology together with the specifics of medical device management. Specific manufacturer training courses are attended to gain specialized product knowledge, and generalized conferences may be attended as well, though resources can impose limitations on attendance at some of these events.”

But changes are happening throughout the world. In India, Sood has been working to organize training courses on the repair and servicing of medical instruments.

“We are not directly serving a clinical setup, but we have in the past organized training for biomedics with the state governments of Punjab, Uttar Pradesh, Himachal Pradesh, etc, and the Indian Army, manufacturers of medical equipment, and third-party medical equipment maintenance service providers,” Sood says. “The concept of patient safety and calibration of medical equipment has improved considerably, but is not yet comparable to the importance that these aspects of medical equipment get in the developed world. In the private sector, relatively, more importance is given to the role of biomedics and maintaining a structured biomed department that gives due importance to calibration of medical equipment.”

Engineer Rodelio M. Bautista is an officer in charge in the engineering section of Ospital ng Maynila Medical Center (OMMC), a government-operated 350-bed tertiary hospital in Manila, Philippines. He says that medical equipment maintenance and management have always been key issues in hospital operations in the Philippines and have critical impact on the delivery of health care services, mostly in public

institutions.

“Because of the urgent need to have a specialized unit and established systems to answer the problems related to medical equipment maintenance, a few years ago a project funded by the European Commission under the Asua URBS Funding Line Project was launched to address this,” Bautista says.

With NGOs and partners from Italy and Spain, Manila started to develop a citywide medical equipment management system. Last year, selected engineering staff from the Manila Health Cluster (MHC) underwent 10 months of training from a technical school, specific biomedical equipment maintenance training from the University of the Philippines–Philippine General Hospital, and preventive/corrective maintenance lectures from equipment manufacturers and suppliers.

“We are closely collaborating with the Department of Health to organize technical training and seminars for our staff because we acknowledge the need for continuous upgrading of technical skills,” Bautista says. “And we developed a medical equipment policy to serve as a guide in the continuous implementation of medical equipment management. This is one of the milestones of our work.”

Scope of Duties

Just as in the United States, most international biomedes work in departments dedicated to providing support service for clinical work activities. But each country’s biomed job description varies.

Walume says his duties range from performing diagnosis and repair activities on a wide range of equipment to designing PM programs to analyzing major technical problems and devising appropriate solutions. In the United Kingdom, MESU’s 36 staff members are divided into three operational teams based upon core duties. Callaghan is responsible for the day-to-day management of the department together with the management and leadership of the separate teams.

“The response team addresses all customer requests for maintenance problems that can be resolved speedily; the repair team is responsible for any repairs that require more in-depth fault-finding as well as the acceptance of new medical devices into service; and the scheduled maintenance team is responsible for performing routine maintenance on medical devices,” he says.

Developing staff training policies for safe use of medical devices, standardization of

purchased medical devices, maintenance of a medical device library to streamline delivery of devices directly to the wards, and working closely with suppliers or manufacturers to ensure good value is obtained in getting replacement devices and spare parts are other facets of Callaghan's job.

In Bautista's case in Manila, the job of biomedics has changed because OMMC recently built a two-story, 100-sq-m building to serve the needs of the biomedical equipment maintenance activities and serve as a referral center for other institutions.

"We were able to set up biomedical equipment maintenance units and small BMET laboratories in each of the different health cluster institutions," he says. "Testing tools and instrumentations were also acquired to test and evaluate the effectiveness of the repair activities. As a result of our initial work in the field of medical equipment maintenance, last year the in-house repair success ratio was 82%, equivalent to generated savings amounting to more than 5 million pesos."

The Role of Associations

Just as credentials and training are in flux throughout the world, associations for biomedics are still evolving.

"In the UK, one is mandated to join specific professional associations," says Dan Allison-Denteh, MSc, who works as a clinical technologist in London and has worked as a hospital engineer in Ghana.

Allison-Denteh recently completed his membership application for the Institute of Physics and Engineering in Medicine (IPEM), a professional body representing clinical scientists and technologists working in medical physics and clinical engineering in the NHS, the university sector, and industry. IPEM works to establish, accredit, assess, and monitor training schemes for clinical scientists and technologists.

And while currently there is no organized biomedical association in Ghana, Allison-Denteh says Nigeria and South Africa each have an association.

"Through the MET course at Valley View University Ghana, the Nigerian students initiated the formation of a Ghanaian Association and an African Union," he says. "I helped draft the constitution for both groups."

Walume says biomedical technicians in Botswana are likewise in the process of starting a BMET society.

“We are creating a Botswana chapter whose role would be advancement of engineering knowledge and profession and the professional conduct of its members and control on quality of biomed practice,” Walume says. “There is a great deal of information necessary for education and day-to-day practice of various categories of BMETs and professional engineers. It has been my desire and hope to find a way of making such information available on the Internet to registered biomedical professionals or societies.”

Challenges of the Future

In addition to being in a still-evolving niche, biomedics in various countries face issues that can make doing their jobs vastly more difficult, such as dealing with facilities that rely on manufacturers to take care of medical equipment.

“The clinicians on many occasions overlook the role of biomedical with respect to the procurement of medical equipment,” Sood says about the situation in India.

“Involvement of the biomedical is at times a mere formality.

“I receive many requests from budding Indian biomedical asking for the guidance to step into this field, but owing to lack of structured departments where biomedical could be employed in hospitals, there does not exist a highly promising immediate future for these budding biomedics. However, the scene is changing toward the positive side because of bigger and larger hospitals coming up in the private sector,” Sood says. “The other option for these biomedics is to work for the manufacturers as service engineers, but they also would be required to work as sales and marketing engineers for those manufacturers.”

In many other countries, inadequate funding severely affects the performance of medical devices in overall health care delivery.

“In Ghana, replacement parts and accessories are not purchased, and there is no training for engineers and technicians,” Allison-Denteh says.

“Financial constraints are expected to affect the effectiveness and efficiency of our work, mostly considering that we are in a developing country,” Bautista adds. “But we firmly believe that with our commitment to providing the highest level of care to our indigent Filipinos, we can still achieve quality results. We are aware that a great challenge is ahead of us, but investing in the human resources surrounding us will be a great help in meeting our end goals.”

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