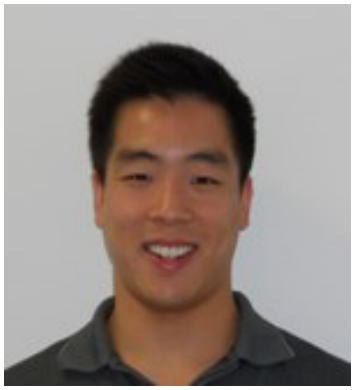
Perspectives on Home Healthcare

As devices continue to move out of hospitals/doctors' offices, what new technologies will further this movement? What are the healthcare implications of this trend?

Kevin Quinley
Vice President, Risk Management Resources, Berkley Life Sciences LLC

Migration of medical technology from clinical settings to the home and other non-clinical environments may be prevalent in the areas of pain management, diagnostic monitoring, and medication delivery. This trend has benefits in the arena of cost control and freeing up medical professionals for higher-level tasks. However, this transition also contains perils. Specifically, it has healthcare implications in the realm of risk and risk management. The onus of operating the technology safely, effectively, and in accord with intended use falls increasingly on relatively untrained lay individuals. This may heighten the possibility of errors, misuse, and adverse outcomes. In turn, this may create a recipe for more product liability claims and lawsuits against medical device manufacturers, with patients—and personal injury attorneys—alleging defective design, failure to warn, and failure to adequately train intended users. This underscores the need for risk management to anticipate and safeguard technology manufacturers against such claims.

Christopher Matsuoka
Process Engineer, Crane Aerospace & Electronics



The human body is essentially one mysterious electronic black box. Unlike our PCs, MP3s, or cell phones, we have yet to understand the full functionality of the human body. Groundbreaking research is being made each day where electrical stimulation may be used to treat autoimmune diseases, neuropathic pain, loss of hearing, and vision loss, for example. As the number of available medical devices on the market increases, the demand to manufacture less expensive and smaller devices will continue to surge. Patients will be empowered with the larger number of treatment options and a greater sense of personalized healthcare.

Consequently, new technology has also been developed in order to materialize the devices of tomorrow. Breakthroughs allowing manufactures to print conductive circuitry on molded plastics, glass, or other materials previously unavailable, for example, will continue to push the design envelopes of future medical devices and will spur the growth of this rapidly emerging technological field.

James Wilson
Senior, Continuum’s Advanced Systems Group

There’s a huge amount of growth in the “lab on a chip” concept, integrating several laboratory functions on a single diagnostic chip. This is an approach that has been talked about for several years. Many of the early efforts were by start-ups that failed for various reasons to get the technology to market. That’s beginning to change.

This miniaturization of technology is leading to greater accessibility to medicine, especially in developing countries. At home, we’ll feel the impact of this approach in the growth of retail walk-in clinics and increases in self-administered diagnostics.

Adherence, however, is a serious implication, as care moves outside the hospital/clinical setting, and along with it, the consistency of environmental constraints and compliant patients.

While hospitalized patients are often accepting of the restrictions that their care might place on them, patients who can be treated outside of a hospital often don't acquiesce to the impediments of a device or a course of treatment. This can lead to poor adherence to treatment and high patient and caregiver dissatisfaction.

Donna Sandfox
Product Manager, Omron Electronic Components LLC

Telehealth devices allow doctors to continue monitoring patients after discharge (shortening hospital stays), and more medical therapies are being conducted away from hospitals and clinics.

Omron is assisting manufacturers of home dialysis equipment to integrate non-invasive blood pressure measurement to monitor patients during the procedure. Implementing home dialysis allows patients to complete their treatment on a more frequent and convenient basis (in some cases, while they sleep) rather than visiting a clinic three days per week; in turn, they incur much less stress to the body.

A truly exciting example of patients leaving the hospital to resume an active life at home is the heart failure patients who have been implanted with an artificial heart while waiting for a donor heart. The improved circulation provided by the device helps their other organs grow stronger during the wait.

The results for these at-home patients are better physical and mental health, more freedom, and an overall improvement to their quality of life. Home monitoring and treatment also lower overall healthcare costs. The implication for device manufacturers is to ensure the user interface of the equipment is simple enough to be operated by non-medical professionals.

Marten L. Smith
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With the increased patient-load pressure on hospital ERs as well as the rise in serious illnesses, such as diabetes and cardiac disease, the trend toward designing smarter medical devices that are used outside of a clinical environment has become increasingly important.

More powerful and cost-effective microcontrollers play a significant role in the current and future generations of portable and wearable medical devices. On-chip integration of advanced connectivity, increased speed, and lower power consumption, along with lower cost, are the key microcontroller features that enable smarter medical devices. Such devices can detect, diagnose, and treat conditions and diseases autonomously, without the intervention of a doctor or medical staff member.

The current generation of automated external (cardiac) defibrillators, or AEDs, is a good example of this trend. Now that smart AEDs can be found in many public facilities, heart-attack sufferers have a much better chance of survival and recovery. Modern AEDs not only instruct an untrained user through the entire process, but also analyze the electrical output from the patient’s heart and determine whether the electrical shock should be delivered. Future medical devices will bring similar capability to other conditions, making effective care more accessible.

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