

## **ASSISTIVE TECHNOLOGIES FOR THE ELDERLY AND DISABLED**

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EMS and home health care personnel are going to soon start to see high tech products in the homes of elderly and disabled patients and clients. Several technology companies including Intel, Honeywell, Raytheon, Microsoft, and many others are working with research universities such as MIT to develop unobtrusive technologies that can assist people in living independently longer while providing real time information on their activities and health status that can be monitored by health care professionals or family members.

Systems are being developed and tested at numerous sites around the country currently that include sensors in furniture, carpet, walls, and bathrooms that would allow someone to monitor the patients location in the home, how long they have been in any location or position, and if they are following a normal routine as would be learned by the computer system. These systems can include cameras to allow someone to visually look in on a sick, injured, elderly, or disabled family member or patient. Through technology transfer from military research, small, nano-tech types of biomedical sensors can be placed in clothing, bedding, or furniture to allow the monitoring center to actually keep track of the persons body temperature, heart rate, heart rhythm, respiratory rate, and even blood pressure. This biomedical information would simply be stored in the system and could be reviewed as needed for trends by the patient's medical provider as needed.

A really exciting and promising area for use of such technology is with patients with Alzheimer's disease and with patients in rural or remote areas that need close medical supervision. For Alzheimer's patients the technology can not only monitor but can become a prompting technology as well. With small LCD display screens placed about the home and technology enabled medication dispensing containers

the patient can be directed or guided to take medication, eat, go to bed, and other reality awareness types of assistive instruction. If the controlling computer recognizes that the patient hasn't gotten up at the normal time it could signal a wake up alarm. If the patient hasn't taken their medication on time, the system would alert the patient through visual and audible signals to take their medication. If required, a real person could then video conference in to help the patient. If that failed, help would be dispatched to the patient. These are just simple examples of what a system could do to improve the quality of life for people.

Patients in remote areas could use such technologies as a method of telemedicine to communicate with their doctor and allow their doctor to observe basic monitored readings from the patient and conduct face to face video conferences. This could be useful in simply 'seeing' the patient in their own environment and allowing for adjustments of some medications and other things.

Another use of these technologies would be to actually help diagnose problems such as Alzheimer's or Parkinson's disease by measuring the patients stride continually and looking for changes. The system could monitor the amount of tremor in extremities when sitting or in bed, or could detect unusual behavior such as standing idle for long periods. Additionally, sensors in the plumbing could monitor various readings in urine or feces and detect changes over time.

What is driving this you may ask, well, the US population is aging and it is expected that there will be more than 70 million people in the country over age 65 by 2030. That is more than double the number from 2000. The technology companies are looking for new markets to expand into as the country becomes saturated with PCs, DVD players, and other consumer electronics causing sales in those areas to flatten out. The cost of technology, especially nano-sensors is becoming exponentially cheaper each year making these assistive systems possible and affordable. Finally everyone has a vested interest in improving the quality of life, especially for the

elderly and disabled and these people naturally want to live independently as long as possible.

Intel estimates that complete systems will likely cost less than \$5,000 within ten years and as little as \$500 in twenty years. The Intel lead consortium is deploying a number of test systems in the coming two years to help perfect the concept. The consortium feels this could turn into a billion dollar industry within the next thirty years. It is a whole new and unexplored use of technology.

I believe EMS would be wise to keep an eye on this developing technology and even throw the EMS hat into the ring so we have a voice at the table. Imagine how much more effective emergency medical dispatch (EMD) could be if patients agreeing to participate had biosensors sending out information and cameras were available so that 911 and even the responding crew could talk to, see, and monitor the patient while responding to their call for help. Patients could keep their system and information private but upon calling 911 could allow the public safety services to tie into their system. This capability would enable the response to be made in the best possible manner, emergent, non-emergent; first responders, no first responders. The possibility exists to make provide much more efficient use of resources and provide better care to patients, all of which saves money and time.

Expect to start seeing assistive technologies in homes and retirement communities in the next couple of years. It will start with simple things first, but this looks like a rapid growth market so look for extensive systems to appear outside of experimental sites in the next three to five years.

I welcome your comments, criticisms, feedback, and ideas. You may contact me at [ejems@cpcstech.com](mailto:ejems@cpcstech.com)

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