

Rapid growth forecast for digital health sector

If only someone developed a smartphone app to separate the helpful from the hype-ful in the fast-growing world of digital health. Every day, it seems, a company releases a new wristband that tracks physical activity, or a wearable sensor to monitor glucose levels, or some other tiny, shiny, smartphone-enabled medical doohickey.

But even skeptics of health gadgets and apps acknowledge that some new technologies show promise. And although there is little evidence that they produce long-term benefits, interest in finding that out is growing among researchers. One thing that isn't lacking, however, is choice.

Digital health exhibits grew by 40% this year at the 2014 International Consumer Electronics Show, the sprawling technology nirvana held annually in Las Vegas, Nevada. There was even a dedicated section called the Digital Health Summit.

The devices and apps generally fall into three categories: fitness trackers (to count steps, calories burned, etc.), real-time monitoring (to track vital signals to assist those with chronic conditions) and "aging in place" (sensor-based systems to improve safety for seniors living at home).

With an aging baby boomer population that is becoming more comfortable with technology and more conscious of their health, the market for health-related consumer electronics appears ready to balloon. In the United States alone, it is expected to exceed \$1 billion in 2014, a revenue growth of 35% over last year, according to Steve Koenig, director of industry analysis for the Consumer Electronics Association, which runs the annual electronics show.

"It really will grow from here," he says. "By the time we get to 2017, we are looking at a \$3-billion market opportunity, essentially tripling in three years."

Much of that growth can be attributed to convenience, says Koenig. In many cases, instead of buying a stand-



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alone device, consumers prefer to plug an accessory into their smartphones and download an app. If the near-ubiquitous smartphone can be used as a medical device, perhaps some simple medical tests that were once performed in hospital could instead be done at home.

"I think, in the long term, a lot of these solutions will be proven to be much more cost-effective in terms of health care costs than today's solutions," says Koenig.

The most developed niche of the health gadget market is the fitness tracker sector. These devices can be clipped onto clothing or worn as bracelets. The data they collect about a user's physical activity can be automatically uploaded to a computer, mobile device and even to social media.

Companies that make fitness trackers are operating on the theory that capturing personal activity data motivates people to be more active. That theory, however, remains unproven, according to Dr. Anne Thorndike, an assistant

professor at Harvard Medical School in Boston, Massachusetts.

More evidence needed

A lot of unanswered questions remain about the effects of tracking one's activity, says Thorndike, who conducted a randomized controlled trial of activity device use among medical residents (not yet published). Does collecting data about physical activity influence behaviour? Will negative feedback motivate inactive people to exercise more or only discourage them further? Will positive reinforcement help active people stick with their fitness regimes?

"Those questions haven't been studied in an academic way, so we don't really know if using these devices is better than not using them," says Thorndike. "On the other hand, the answer is probably that some people will respond well to them and others might not."

Even people who are motivated to exercise more when they use their

fitness trackers may eventually lose interest if the data they collect looks the same day after day. So the long-term effects may be limited. Despite the unknowns, though, the potential for benefit is quite large, suggests Thorndike, and the risks are minimal.

“From my perspective, as a physician who wants to see improvement in health or prevention of obesity, I want to know if this is actually going to change behaviour,” says Thorndike. “Maybe it’s a piece for some people to change their behaviour, and I’m a big proponent of the idea that we need many different pieces to change the obesity epidemic, so this may be one of them.”

The downside of devices and apps that make medical claims, on the other hand, is a growing cause of concern.

Some dubious-sounding apps claim to cure or treat various ailments, including pain, stress and acne. Many rely on sound or light from a smartphone to produce therapeutic benefit, according to a 2012 investigation by the New England Center for Investigative Reporting, which discovered that few medical apps follow established clinical guidelines or undergo rigorous testing.

Makers of new technologies in the “aging in place” category face a different challenge: Who is going to pay for them? There are already high-tech systems that could allow seniors to safely remain in their homes longer. For instance, it is possible to embed sensors in homes to detect falls, number of trips to the bathroom, how often the refrigerator is opened and other indica-

tors of day-to-day activity. Yet the backbone of care for seniors in Canada remains the long-term care facility, says Andrew Sixsmith, director of the Gerontology Research Centre at Simon Fraser University in Vancouver, British Columbia.

“We need new options to help people stay at home longer. That is the best place for their quality of life, and it’s generally the cheapest in terms of health cost,” he says. “I’m kind of baffled why we haven’t progressed on this. ... The technology is there. The need is there. But there isn’t a push from those whose responsibility it is to deliver the services to support people living at home.” — Roger Collier, *CMAJ*

CMAJ 2014. DOI:10.1503/cmaj.109-4708