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HOW TECHNOLOGY IS CHANGING AGING AND DEMENTIA

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ABSTRACT

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Worldwide, the percentage of people aged 60 and older is expected to double during 2015 and 2050 [1]. As the world population becomes older, we need to find new ways to detect and manage the various physical and mental conditions that occur in older age. This discussion will focus on memory changes, which are one of the major concerns that come with an aging population. Changes in memory frequently start out subtle and may not be noticed for quite some time, but if they progress into dementia, those affected can lose their ability to complete daily activities which are critical to independence. What if your regular use of everyday technologies could provide your doctor with the information needed to monitor your memory for any unexpected changes or to determine if a new medication is helping your ability to function independently?

Effects of Aging

Memory changes begin slowly, which makes it hard for people to identify if they are experiencing a change that is not normal. Because of this, people often wait until symptoms are obvious before seeing a doctor about the issue. A doctor can perform cognitive testing which provides an indication of if a person's cognition is normal or impaired. Doctors can track testing scores over time, but this may not tell the whole story since memory function is

not necessarily the same from day to day. This is where the use of technology comes into play to be able to detect the subtle changes that occur with memory change.

We tend to think of cognitive change as primarily affecting our ability to remember things, but it also impacts physical functioning and behaviours in ways which can be detected using technology. Researchers in this area have shown that motion sensor technologies placed in a person's home collecting continuous data over a period of years, can detect subtle activity pattern changes.

This research has shown differences between people with normal cognition and mild cognitive impairment in many different areas including activity levels during a 24 hour period [2], the trajectory of walking speed over a period of time [3], and night-time behaviours [4]. This level of change detection is being used to monitor how medications and other variables impact a person's cognition and functioning, and has the potential to accelerate the testing of new drug therapies for memory loss and other conditions.

Specialized in-home monitoring systems used in the research studies above may not be practical for everyone for detection of memory changes, but current research is building on these ideas to look at how data from widely used technologies may also be able to detect changes in cognition. For those already using computers, computer use has been found to be sensitive to cognitive change. A difference between people with normal cognition and mild cognitive impairment has been seen in the number and duration of computer sessions [5], as well as in the curvature of mouse movements [6]. Researchers are also looking at how other common habits, such as driving and cell phone use, change as people develop cognitive impairment. In the future, your daily activities may provide your doctor the ability to know quickly if there has been a major change in your cognition.

Major Step in Using Technology

The ability to detect cognitive changes early and monitor the progression of the condition, without a higher time or financial burden to the people experiencing the changes, their families or doctors, is a major step in using technology to prepare for the upcoming age wave. While there is no cure for dementia, early detection and continuous monitoring may allow current drug therapies to slow the progression of the disease, as well as providing the chance to prepare for changes that come with memory impairment.

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