

Smart Health-Assist

Providing better and more affordable healthcare has been a challenge for both developed and developing countries. In Singapore, up to 48 per cent of our disease burden is related to chronic diseases. This proportion is set to grow. Coupled with Singapore's rapidly ageing society[1], this would put increasing pressure on our healthcare infrastructure and resources.

What if, by 2025, all Singaporean residents can access healthcare easily from the comfort of their homes? So that even patients who are suffering from chronic diseases such as cardiovascular, diabetes and chronic respiratory illnesses can monitor their health conditions and receive medical attention when needed? This is the key idea behind Smart Health-Assist.

Illustrative example

Kok Seng, 75, a chronic diabetic patient with congestive heart failure, uses sensor-based home care to monitor and receive treatment for his condition. The retiree has been a diabetic for more than 10 years. A widower, he was active and independent until a recent diagnosis of congestive heart failure. Respecting their father's desire for independence despite his weakened health, his son and daughter-in-law decided turn his home into a Smart Home. Sensors in his home track his health conditions unobtrusively and transmit data to the healthcare professionals involved in his care. This allows Kok Seng to remain independent in his home while his conditions are being continuously monitored and cared for.



Smart Health-Assist uses sensors in a patient's living environment to monitor his or her health. The information is transmitted to medical professionals accurately and regularly. Any deterioration of the patient's health can be detected early or anticipated. This can result in early and responsive intervention by the healthcare provider, and potentially reduce visits at hospitals' emergency departments or inpatient admissions. Given the regular feedback, healthcare staff can better manage their time and be freed up to perform other tasks.

With sensors and other related technological aids, it is more possible that patients with chronic illnesses can live independently. These technologies can also help seniors to age with dignity in their homes, close to their loved ones[2]. Even individuals who have no existing medical problems can also use such aids to monitor their health. Smart Health-Assist is an example of how ICM can enhance people's quality of life, improve work efficiencies, and create new growth opportunities.

Opportunities for the ICM sectors

Moving into the sensor-enabled healthcare space can create new opportunities for our ICM sectors:

Development of Next Generation Sensors

Most commercially available healthcare-related sensors today are designed for discrete use. Yet, they can be intrusive and cumbersome when we need to monitor a patient continuously. We also run the risk of false alarms. Therefore, there are opportunities to develop solutions that are unobtrusive, and deliver better on cost, functionality, design, reliability and usability. These can include network ready-heart rate monitors and blood pressure monitors which come in the form of stick-on patches, digital wrist watches, or sensors embedded in household items like pillows and rugs.

Networking the Homes and Care Centres

An important part of Smart Health-Assist is that the captured data must make its way securely to healthcare providers. Hence we need an IoT infrastructure to transmit data and to allow sensors and devices to work seamlessly within the home.

As Singapore already has a pervasive telecommunication infrastructure, we are well-positioned to implement the IoT infrastructure nationwide. Besides healthcare, a Smart Home IoT ecosystem can also be applied in areas such as utilities or security.

Decision Support Systems and Big Data Analytics

The use of sensors will generate a huge amount of valuable data, which can be used as input to Decision Support Systems ("DSS"). These systems can help healthcare professionals to recommend the right treatment and care plans for patients. This will lead to more consistent delivery of evidence-based care and monitoring of key clinical and service outcomes.

In the area of Big Data & Analytics, data collected by the sensors can be collated with data in national health databases. The large dataset can help gather new insights into disease patterns and potentially contribute to future genomics research.

[1] The “Ageing-in-Place” initiative by the Ministerial Committee on Ageing aims to grant seniors their desire to age in place gracefully and with dignity, within a closely knit community. (Source: 2012 COS speech by Minister for Health, 7 March 2012)

[2] By 2030, the number of citizens aged 65 and above will triple to 900,000 (or 1 in every 5), a three-fold increase from today. (Source: Singapore Population White Paper, January 2013).