

## COVID-19: The Internet of Things and Health

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The COVID-19 pandemic has inspired a range of Internet of Things (IoT) innovations to help stop the spread of the virus. This is a Health and Wellbeing sector-specific edition of COVID-19: IoT and Cybersecurity looking at the use of IoT devices and AI in Assisted Living environments.

Past editions are found on the [PETRAS website](#).

Care homes have seen the highest COVID-19 morbidity and mortality levels among all segments of society. A lack of special surveillance systems was indicated by the [European Centre for Disease Prevention and Control](#) as one of the causes for underestimating the disease burden and mortality rates in assisted living facilities<sup>1</sup>. Assisted Living is a complex activity and [solutions in the sector](#) can aim to :

- Support people living in their chosen environments by increasing their autonomy, self-confidence and mobility;
- Preserve the health and functional capabilities of older people;
- Promote better and healthier lifestyles;
- Enhance security, preventing social isolation and creating networks of support;
- Support other stakeholders in the ecosystem, like carers, families and care organisations;
- Make more efficient investments into an ageing society.<sup>2</sup>

A few technologies that can help monitor viral transmissions and assist with social distancing in assisted living facilities are mentioned below.

### Overview

- Assisted living facilities have seen the highest levels of COVID-19 morbidity and mortality in this pandemic
- The lack of special surveillance systems was indicated by the European Centre for Disease Prevention and Control as one of the causes for underestimating the disease burden and mortality in assisted living facilities
- Technologies that can help monitor viral transmissions and assist with social distancing can address fall detection and prevention, location and contact tracking and tracing, temperature monitoring, fighting isolation, telehealth, and visitor management

### Fall detection and prevention

In the US, [SafelyYou](#), a spinoff from the Berkeley Artificial Intelligence Research Laboratory, has developed an artificial intelligence-enabled camera system which can detect falls in patients with dementia. According to the company, there has been a 'staggering [20% increase in falls](#) for residents in memory care communities' amid COVID-19 distancing measures.<sup>3</sup> Once a fall is detected by the cameras, a staff member is notified immediately, and measures are taken to prevent similar incidents. During the pilots, this system has recorded 40% less falls and 80% less fall-related ER visits<sup>4</sup>. This is an important development, as the company predicts that a lack of physical activity during lockdown means residents' muscles have likely weakened, and [falls will increase](#)<sup>5</sup>.

### Location and contact tracking and tracing

In the US, [CENTRAK](#)'s new TruView™ solution uses advanced infrared technology and Active UHF radio frequency identification (RFID) devices for real-time tracking of patients and staff, both indoor and outdoor. The tracking devices include

bracelets, pendants and other wearables and they are integrated with security controllers, electronic health records, and building systems<sup>6</sup>. The system can prevent wandering for patients with dementia and Alzheimer's, and supply [contact tracing in case of an infectious disease outbreak](#) allowing the senior living communities to manage risks and respond to emergencies<sup>7</sup>.

Contact tracing within care homes has been implemented to mitigate the spread of COVID-19. [CarePredict](#) has developed its contact tracing platform in cooperation with senior living communities and in addition to contact tracing, it can provide location and path tracing<sup>8</sup>. Other companies offering contact tracing are [Viri](#)<sup>9</sup> and [Quuppa](#)<sup>10</sup>.

In May 2020 the US [Brivo](#), specializing in cloud-based access control and physical security platforms, launched a kiosk-based visitor management solution that can identify and screen guests, notify arrivals, print identifying badges and view visitor logs. The system, which can be deployed in care homes, can also be modified to include health questions related to COVID-19 and record data that can later be used for tracing visitors who would later test positive for COVID-19 or have been in contact with such an individual.<sup>11</sup>

#### *Temperature monitoring and facial recognition systems*

The Dublin-based company [Global Security Devices](#) announced in July 2020 that it was adding facial recognition and temperature screening to its access control systems. The console can be installed in the lobby of a nursing home and all staff or visitors need to be temperature-screened before gaining access to the building<sup>12</sup>.

#### *Fighting isolation*

When an assisted living facility is quarantined residents can use engagement platforms to fight loneliness and boredom. Such a platform is provided by the US-based [iN2L](#). It offers interactive videos and games that are person-centred, and have social, cognitive, spiritual, physical and emotional dimensions<sup>13</sup>. The system also offers on-demand video visits and asynchronous text to maintain communication links with family and healthcare teams.

The Heriot-Watt University in Edinburgh opened the [world's first laboratory](#) studying assisted living in July 2020, which can be accessed and used remotely by researchers. It focuses on developing technologies

such as wireless sensing, microwave and embedded systems, signal processing, machine learning, the Internet of Things, and human-computer interaction to assist independent living. The range of services could include from monitoring vital signs to assisting with communication and social connections. The project will 'initially support key priority groups in the UK whose conditions have been compounded by the social isolation measures necessitated by the COVID-19 pandemic. These include those with multi-morbidity conditions, disabilities, and those in acute stages of mental ill health.'<sup>14</sup>

The US senior living community Maplewood Senior Living announced in April 2020 the [introduction of robots in its homes](#)<sup>15</sup>. The autonomous robots developed by [Temi](#)<sup>16</sup> have computer screen faces, sensors and voice commands and they can connect residents to their doctors and relatives, carry packages, and even tell jokes. The managers of the care homes [report](#) a positive impact of the robots in easing social isolation<sup>17</sup>.

For residents who cannot go outside, devices that simulate sun light such as [Valkee Light Therapy Device](#) can help fight depression and a reduction in Vitamin D associated with lack of exposure to sunlight<sup>18</sup>. The devices can either be wireless and double as headphones and further connect to a specific app on the mobile phone or be completely stand alone. The products are the [result of research](#) (not all done in a placebo setting) in collaboration with Oulu University in Finland<sup>19</sup>, and has a European class II(a) [medical device certification](#).<sup>20</sup>

#### *Telehealth*

The use of telehealth technologies is becoming essential during the quarantine of care homes. Companies such as [Thrive](#)<sup>21</sup>, [MeMD](#)<sup>22</sup>, and [Softbank Robotics](#)<sup>23</sup> have deployed telehealth technologies to provide telehealth access and services for the residents of senior living communities. In addition, companies such as [Tunstall](#) in the UK have developed remote health monitoring for people shielding alone at home<sup>24</sup>.

In other telehealth developments in the UK, [VirginCare](#) launched video consultations and virtual support in the Primary Care, School Nursing and Health Visiting Services<sup>25</sup> and NHS England and NHS Improvement's plan during the pandemic for rehabilitation services recommends prioritising [tele-swallowing](#) (a remote identification, assessment and management of dysphagia) for Speech and Language Therapy during the pandemic<sup>26</sup>.

## Endnotes

- 1 <https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-long-term-care-facilities-surveillance-guidance.pdf>
- 2 <http://www.aal-europe.eu/about/>
- 3 <https://www.safely-you.com/single-post/2020/04/22/7-ways-to-prevent-falls-in-memory-care-during-covid-19/>
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