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Could smart meters help people with dementia stay independent?

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All homes across Great Britain will be offered a smart meter now or in the near future. Researchers believe this could be a great opportunity for increasing the safety and independence of dementia patients

Natalie Healey

Fri 29 Nov 2019 15.18 GMT



At first, the connection between household appliances and dementia may not be obvious. But look a little closer and you'll start to see why the NHS is exploring this link for insight into how the neurodegenerative disease affects daily tasks.

Smart meters, which are being rolled out to every home in Great Britain over the next few years, will mean no more estimated bills and an upgraded energy system that can better anticipate and balance supply and demand. Energy use data is sent to the supplier in near-real time. It might make you think twice about using the tumble dryer, but this information could also be used to protect those with Alzheimer's and other forms of dementia, say computer scientists Dr Carl Chalmers and Dr Paul Fergus from Liverpool John Moores University.

"We started to realise you can use energy data to build up a picture of normal and abnormal routines in the home, just by looking at the appliances someone's interacting with," says Chalmers.

Using machine learning, the duo built a system that would spot anomalies in a person's energy use. The tool would highlight whether certain household appliances were being used too much, at abnormal times, or not at all.

Nocturnal use of appliances isn't unusual for people with dementia. As the disease progresses, it often affects the body clock, leading to a phenomenon called "sundowning", where patients are awake at odd times of the day. Being up at night increases the chances of wandering outside, putting the person's safety at risk.

The scientists reckon this data could be linked to an app that would notify the patient's carer if their energy use was outside the norm for them. If your parent switches the kettle on at 3am, you'd get a push notification. Likewise, you'll be informed if no data has been recorded for that day, which could suggest a fall.

"This initiative could allow patients to stay in their homes for longer periods. There's clinical evidence that when you go into a care home, dementia actually progresses more quickly," says Chalmers.

"One of our patients has a personal alarm on his wrist. He fell down the stairs one day and spent eight hours at the bottom before someone found him because he forgot he was wearing the bracelet. But a smart meter would know that he usually puts the microwave on and has a cup of tea at five o'clock and those behaviours haven't happened. The alert would have been sent, and he'd have been able to get help faster," he adds.

Working with Mersey Care NHS foundation trust, the team conducted a pilot trial in 2017 with four dementia patients for six months. After discovering that smart energy data could be used to detect anomalies in daily routines, they now want to see if there's a relationship between these quirks and dementia progression by following 50 patients for two and a half years.



Smart meters could also be used to learn routines, so if a patient doesn't use an appliance at the usual time this could indicate that they have fallen or need assistance. Photograph: MartinPrescott/Getty Images/iStockphoto

Monitoring technology for dementia, such as GPS or movement sensors, already exists. But the beauty of this approach is that it piggybacks existing infrastructure and doesn't rely on the patient learning anything new (which is vital for those with memory difficulties). It's non-intrusive – all it would require is fitting a simple card on top of the meter.

But what about data privacy concerns? Could this information get into the wrong hands or be used in unscrupulous ways by private companies? Clearly, the researchers point out, stringent NHS data protection rules would have to apply, but they say the patients they've spoken to don't seem overly concerned about this issue. Data use would be opt-in – it would only happen with their permission.

"One of our patients told us that he'd rather have a little bit of privacy taken away, compared to going into a care home where there's no privacy at all," says Fergus.

"As long as the data's used ethically, what's the problem with putting in a technology that is there to safeguard someone's life?" adds Chalmers.

There's lots of work to do before this initiative can become a reality. The scientists believe we're still eight to 12 years away, while more research is completed and the logistics are worked out. Once the trial is over, and if a correlation is determined, there are plenty of questions that the NHS will have to figure out, from when to prescribe this monitoring to whether it's cost-effective.

"If you can pinpoint that there's a correlation between appliance use and progression of dementia, then that's a world first," says Fergus. "Consultants think they're going to have a much more precise measure of the patient and be able to know exactly at what point it becomes infeasible for them to stay in their own home."

Part of Britain's commitment to creating a more sustainable, low-carbon future includes making our energy network "smarter" – implementing digital tech to make our energy system more responsive to increased demand and variable wind speed. By collecting data on our energy use through smart meters, our network can better understand, plan for and balance out peaks and troughs in demand, making it easier to integrate renewable energy sources.

This article was paid for by Smart Energy GB, a government-backed organisation tasked with informing Great Britain about the smart meter rollout.

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