



Science and Technology Select Committee

Corrected oral evidence: Ageing: Science, Technology and Healthy Living

Tuesday 4 February 2020

10.20 am

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Members present: Lord Patel (The Chair); Lord Borwick; Lord Browne of Ladyton; Baroness Hilton of Eggardon; Lord Hollick; Lord Kakkar; Baroness Manningham-Buller; Baroness Penn; Viscount Ridley; Baroness Rock; Baroness Walmsley; Baroness Young of Old Scone.

Evidence Session No. 11

Heard in Public

Questions 79 - 94

Witnesses

Professor Praminda Caleb-Solly, Professor of Assistive Robotics and Intelligent Health Technologies, University of the West of England; Stuart Butterfield, Managing Director, Canary Care; Sarah Weir OBE, Chief Executive, Design Council.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witnesses

Professor Praminda Caleb-Solly, Stuart Butterfield and Sarah Weir.

Q79 **The Chair:** Good morning, ladies and gentlemen. Welcome and thank you for coming today to help us. First, because you are so special, the parliamentary television channel has chosen this session to be televised live. That means that if you speak to each other, it might get picked up. Secondly, all this will be live-streamed on the internet, so today we have both.

Before we start, if you do not mind, starting from my left perhaps you could tell us for the record who you are and whether you represent any organisation. Once you have done that, if you have any initial comments to make, please feel free to do so. After that, we will get on with the questions.

Professor Praminda Caleb-Solly: Good morning. I am Professor of Assistive Robotics and Intelligent Health Technologies at the Bristol Robotics Laboratory of the University of the West of England.

I am very pleased to be here this morning to share our experience of developing assistive robotics and to talk about the opportunities that assistive robotics provide in enabling people to live independently. The aim is to offer personalised solutions by understanding and responding to people's current needs and their real-time experience but also their changing needs.

We work in conjunction with smart sensing solutions and think about what value they add to our existing care services. We look at the opportunities that they present in changing how we think about healthcare provision, and we are exploring the democratisation of access to health and care services. In addition, it would be interesting to discuss some of the ethical issues relating to the use of these new, emerging technologies.

The Chair: It looks like you have all our questions mapped out.

Stuart Butterfield: Good morning. I am the managing director of Canary Care, which is a passive activity-monitoring system. Around a home we place sensors that monitor movement, door activity, temperature and light levels, and all the data is made available to carers through our web and mobile apps.

Canary Care has been around for about seven years. Most of our business is through local authorities and is typically for short-term-use cases—more often than not, adult social care assessment. However, we also sell to private consumers and care providers for long-term use-cases. In those cases, it is not so much about the assessment as about spotting trends, such as deterioration, and we will then send alerts to the carers to let them know that something untoward has happened.

Sarah Weir: I am chief executive of the Design Council. We are a national charity that was set up in 1944 as part of the economic renewal

of the country after the Second World War. It was set up under royal charter and we are the Government's adviser on design. Our role is to make life better by design with better places, better products and better processes, leading to better performance, all of which are incredibly relevant to today.

Design has an economic benefit of £86 billion. It is three-quarters the size of the insurance and financial services sector. Everything I talk about today will be about design coming from people at the start. Putting people at the start means that you move from a vertical line of, if you like, "We say", whether you are the commissioner or the entrepreneur developing a product, to the person—the "They say". Then the person gets the product or service and does something with it. You then move that to a horizontal line, where the "you"—the commissioner, entrepreneur or company—listens to the person and the person "says what you need", and then we all act together. Therefore, we co-commission and co-design, which produces a much better benefit.

Q80 The Chair: Thank you. That helps me with the first question. What current technologies are available for older people to live independent lives? How readily are they available, and how much are they used not just by individuals but by institutions where older people might reside?

Stuart Butterfield: This question has landed on my shoulders, so I will have a go. There are lots of different technologies. The primary stuff is traditional telecare—for example, pendant alarms, pull cords and fall detectors. These are used typically in homes for emergency use. They are connected to analogue phone lines and send alerts to an alarm-receiving centre. That is still the predominant equipment used in technology-enabled care.

In recent years, we have seen GPS trackers being added for use outside the home, but the device is still basically the same in that, if something goes wrong, it sends an alert. There are telehealth solutions that are more tailored to specific conditions—glucose monitors, pulse oximeters, medication-dispensing systems and that sort of thing. Then there are things such as Canary Care, which is an "activities of daily living" (ADL) system. It monitors the kinds of activities that go on in the house.

There are also smart-home technologies—things that are not really designed for care but can be used for care. Examples are CO₂ detectors, and smart plugs. Every kind of internet-of-things device in a home could have some kind of care application. There is also telepresence, whether that is for virtual GP consultations or just enabling social interaction. Finally, there is a plethora of apps out there; there is an app for every condition under the sun to help people cope with and to monitor conditions.

On the uptake, I saw a stat showing that there are 1.7 million telecare users in the UK. That figure has not moved for 10 years—it has been pretty much the same. Of those 1.7 million users, the vast majority are still classified as the "button in a box", the "pendant alarm" or the "get

someone there when there's an emergency". What we do not do enough of is prevention and prediction—preventing the worst happening.

Professor Praminda Caleb-Solly: In addition to what Stuart has said, some technologies involving robotic devices are emerging. We see them in use for dementia cases, where they support people who might get overly anxious and troubled. Something that looks like a seal pup—the PARO robot—is being trialled. It mimics pet therapy and the stroking action helps people to feel calmer. It is being trialled and used in a number of hospitals in the UK but is more prevalent in Japan and the States.

We are also seeing robotic beds. Panasonic produces a robotic hospital bed that converts to a wheelchair, so there is no need to transfer a patient from a bed to a chair. Another robotic device is the Kinova JACO arm, which is made in Canada and is used quite a lot by people in wheelchairs. People who have spinal cord injuries and cannot use their limbs have the robotic arm mounted on the side of their wheelchair. If they have head control or can use speech, they are able to be more independent, doing things such as opening the fridge door and pouring themselves a drink. Robotic feeding devices are also becoming available.

If we extend the assistive to rehabilitation, a vast range of new devices offers people the ability to practise certain rehabilitation movements to improve their function.

The Chair: How many of all the technologies that you mentioned are developed, marketed and produced in the United Kingdom?

Professor Praminda Caleb-Solly: Some rehabilitation devices are currently still part of acquiring clinical evidence. The University of Leeds is developing clinical rehabilitation devices for upper-limb rehab. In the UK, we have a socially assistive robot, which was developed at Sheffield Robotics (by the spin out company Consequential Robotics), which is located at the Bristol Robotics Laboratory in our incubator space. It developed the little MiRo robot, which is being used for education now.

I can tell you a bit more about another robot that we are developing, a physically assistive robot that is a very early-stage prototype. We need to see more investment in developing our own robotic systems. Quite a lot of the development has been in Europe and elsewhere.

The Chair: Mr Butterfield, of the different technologies that you mentioned, how many are developed and produced in the UK?

Stuart Butterfield: Canary Care is, for one. It is designed, developed, manufactured and supported in the UK. Lots of them are, some of them are not. Part of the problem with this market is that there are so many different providers. It is a really fragmented market. That is part of the problem for the people who are trying to use these systems. They are basically tools—every one of the things I mentioned is a tool—ranging from: the blunt instrument, a pendant alarm, which does one thing, raise an alert, through to the more technical specialist tools such as pulse oximeters, the output of which someone needs to understand in order to do something useful with it.

Then there are systems like Canary Care, which is essentially a Swiss army knife. It has lots of different use cases. However, it is like any tool: you get the best out of it if people actually understand how to use it. That, for me, is one of the biggest issues that is constantly raised: the lack of staff awareness and staff training to be able to use the tools which the local authorities are buying, the number of local authorities that buy systems that sit unused because they do not have the staff who are able to make the best use of them.

- Q81 **Viscount Ridley:** Ms Weir, you mentioned the importance of user-generated innovation, if you like—listening to what people actually want first. There are some very striking examples in the world of users who have come up with things which the producers did not think of—Nightscout for diabetes is the classic example of a user-generated innovation. Is there room for that kind of serendipity, that kind of bottom-up development in this area, because it feels important that older people should stumble upon—perhaps that is the wrong word—should come across ways of using technology that are more useful to them than anybody has thought of?

Sarah Weir: Yes, there is definitely a place, and it relates to something that has just been said about research and development money needing to go into this area. We ran two programmes, one called Transform Ageing, which was a three-year programme in the south-west, and another called Design Council Spark, which was about people developing things to make life better. Almost exclusively in Spark, the entrepreneurs and people who came up with the ideas came up with them because somebody in their life—a friend, a family member—had a challenge and they were trying to find a solution to it.

One example is extremely simple—you may not even think that this is really technology—and is called Keywing. As people get older, often the mobility in their hands gets less and they are unable to turn a key in the door to get into their garden shed, their house, or whatever. This product adds something to the key so that they have more turning power. It could not be simpler really, and it is not expensive, yet it enables people to still be independent.

There is a huge opportunity for what you call serendipity for things that come to people in later life. Almost everything in Transform Ageing was people in later life coming up with the ideas. They are the ones now running those services and employing people to run them with them. In the south-west of England, that is hugely important because employment is quite patchy. Employment rates are very low, particularly for people in later life, but there is no reason why people in later life should not be involved in these things themselves. We are now seeing how we can scale up some of those things.

I wanted to make another point in answer to the earlier question. It is not just about the technology; it is about the service. You could design fantastic things, which both my colleagues have talked about, but if you do not have the transport systems so that people can find those things, the health systems that understand how to use them, the care home staff

that are trained, or whatever it happens to be, if all those things are not designed well you have lots and lots of tools but you do not have a toolbox to put them in.

Viscount Ridley: Do you come across a problem of intellectual property here? It has been a problem in other parts of user-generated innovation that the user says, "I'm going to adapt this to such and such", and finds that he has infringed the patent of a manufacturer.

Sarah Weir: When people came through our Design Council Spark programme, one thing they were taught was how to get IP. I can safely say that there has not been a single instance of what you describe, but they have to be taught and to understand how to do it. That means professional training and learning, which you can do at any age.

Q82 **Baroness Walmsley:** I am interested in the numbers. You mentioned 1.7 million users, which has remained static over 10 years. I think you partly answered this question when you talked about local authority people not understanding and not being trained how to use systems. Are there other reasons? Is it cost? Is it resistance amongst users? Why have the numbers not risen? Have you any idea of what proportion of potential users the actual users are?

Stuart Butterfield: The same report that mentioned 1.7 million said that the expected, or potential, number was over 4 million, which gives you some idea.

In terms of the reasons why, we have talked about local authorities, so let me flip on to consumers. We sell systems like Canary to consumers, and consumers buy technology-enabled care, but they buy it in tiny numbers. The issue on the consumer side of things is awareness: people simply do not understand that those technologies are available. Typically, people come across them only when their loved one has had an unplanned health event. That is the point at which they start to look at what is around and what is available. To be frank, it is too late by then, because that person will typically be unable to look after themselves and will be in a care home or will have died within six to 12 months. Getting systems out there for prevention and prediction is the crux of what it will be about.

Sarah Weir: There is another reason perhaps why the figure has not moved. You could design something that could work for a very wide age group. A lot of people now in their 60s and 70s have already used technology, and, in 10 or 20 years, everybody who is 60 or 70, or older, will have used it. You might be 70 and want an Apple watch just as much as a 20 year-old does. You do not want something grey and boring and that looks as if it is for an old person, because that is not how you see yourself. If people had a different mindset and thought about the value of that market, the figure could change.

Q83 **Lord Kakkar:** I want to pick up on the question of prediction and prevention. Clearly, as these systems are more broadly adopted, there will be the capacity to generate a huge amount of data. Are those data

being marshalled and collected in a specific way? Are they being subjected to sophisticated data science—machine learning and artificial intelligence—to help us to develop algorithms that will understand the trajectory for a particular individual and whether there may be impending deterioration, so that there can be early intervention?

Stuart Butterfield: Individual companies are doing it. There is no central repository for all that data. The data is siloed. The kind of data that we collect is activity data; we have no health data and we know nothing about the people whose data we are processing. Linking those datasets together so that you can have health data and activity data would allow you to do something about specific conditions. Without that, it is garbage in, garbage out; you are not dealing with enough data to make sensible conclusions. That has to come together. But there is no central depository; there is no place where that is happening.

Professor Praminda Caleb-Solly: We have been using publicly available datasets in addition to collecting some. Those, as Stuart said, do not have the additional information. But what they do have, and we need to curate and think about this more, is adequate data for us to be able to develop, as you said, the machine-learning algorithms that can recognise changes in people's behaviour.

We have been looking at being able to map an activity without having additional information about it—so using unsupervised machine learning algorithms that can extract automatically repetitive patterns of behaviour—and looking to see how these change over a period of time.

Once they can be linked together with a person's healthcare records and their day-to-day activities, that adds a lot of value. One of the advantages of an assistive robotic platform that can communicate with a person is that it provides an easy-to-use interface to enable discussion about things with the person in a more natural manner.

A socially assistive robot, for example, might be able to ask you how you are feeling in the morning and use that to augment the data that has been collected. It could use the sensors that Stuart talked about to identify that the person has not slept very well the previous night and to find out from the person, and get them to think about, what they did the day before and how their condition might be affecting their sleep, for instance. We can generate a lot more richness in relation to individual issues.

Sarah Weir: It is also about the wider community. Yes, of course you can have the data on the thing per se, but on the point about how well you slept last night, we need to think about the housing you are living in, the community you are living in, what the air you are breathing is like. That data needs to be gathered, and that long-term, qualitative research is not being thought about. There is a need to join together place, products and process.

Q84 **Baroness Young of Old Scone:** I am very interested in the barriers to the uptake of technology. Is there sufficient thinking, particularly among commissioners, local authorities and others, and indeed in private

households, about the relative costs over time of what might seem to be an expensive solution at the beginning? I know that other forms of smart watch are available, but Apple watches do quite a lot along this line, in a fairly accessible way, with a bit of training for an older person, but they are bloody expensive—

Sarah Weir: They are very expensive, yes.

Baroness Young of Old Scone: Sorry, expunge that from *Hansard*. They are very expensive. Is there any attempt within local authorities to help individual families think through the comparative economics of an up-front acquisition versus paying £3.99 a week for a pendant that provides no service at all?

Sarah Weir: There is, but it is very patchy. We discovered through Transform Ageing that we would bring together commissioners—senior chief execs of local authorities, commissioners of services, designers and people in later life—who would never sit around a table together. The scales fell from the eyes, particularly of the commissioners, when they realised that because they were not actually talking to the people using the services, they were designing services that would not be appropriate. The chief exec of the commissioning side of things in Cornwall said that it had completely changed how they would commission services from now on and how they would reach out to retailers, to people way beyond the local authority, and think about how things came together. But it is patchy, which is why I said that we need to think about things in a more holistic way, and in a lateral way.

In terms of government policy, we have a social care Green Paper, a social housing White Paper, a planning White Paper and the response to the Building Better, Building Beautiful Commission, which we have been heavily involved in. All those things need to be thought about in the round. That might all sound quite big, but then you can get down to the person in Torbay who is going to make a decision about something set within that wider context. The Government are talking about levelling up. One way of doing that is to really understand what people want.

Q85 **Lord Browne of Ladyton:** The first question was about design, initially to explore what is available and variations in use. This is intended to be a complementary question that focuses on what is on the horizon and what technologies and related services are being developed.

Over what timeframe can we expect them to be ready for use and deployment? Which appear to be the most promising for our focus, which is on maintaining independent living for older people? What are the barriers? Inevitably, the question ranges wider and you have already discussed some of it.

Professor Praminda Caleb-Solly: I can share a bit about the potential of emerging technologies and the timescales. To give an example, we recently completed the development of an early-stage prototype of a modular physical assistance robot. That was through a two-year Innovate UK grant, at £2.1 million, and we have two working prototypes. These

prototypes are proof of concept, to show how, within a home, using the infrastructure of an existing ceiling hoist track system, we can develop a mobile robot that can help you to get out of bed and walk. It is a modular robot, so you can change what we call the end effector, the tool at the end of it, to be able to do other things—to pick up your tray from the kitchen and take it into the dining room.

In the next stage, following our two-year prototype development, we are looking at the safety of the system. A key barrier to the use of these technologies is their reliability and safety. Will they continue to work in crucial situations? What happens if something goes wrong? Going back to Sarah's point, what support services need to be in place to pick up on that?

In terms of the technology becoming available, those issues have to be addressed alongside thinking about the skills of the future health workforce. The review conducted by Eric Topol on care workforce skills is something we need to consider. We could develop all these future technologies, but if our occupational and physical therapists do not have the skills to understand or modify these things as they are put into service, we will not see them emerging. The timescales depend on how much investment there is.

The other barrier is the willingness of various care providers to work jointly with us to integrate these and trial them as part of their service delivery. If we continue to develop things in labs or in our organisations without actually seeing commitment to co-produce—not just with end users but health and social care providers—we might not be developing the right thing to achieve the intended purpose.

The Chair: What do these devices cost?

Professor Praminda Caleb-Solly: As with any new, emerging technologies, the initial cost of the one-off exemplar is quite high. I will give the example of one particular assistive robot that grew from a European project looking to invest in developing a product that would be available and marketable, the LEA walker. The company folded, unfortunately, at the end of last year, having sold only 75. Each robotic mobility device was much like a walking frame, but it allowed the user to avoid obstacles and helped with navigation. For people with Parkinson's, it provided a beat to prevent freezing. It cost approximately £8,000.

What needs to happen more often is for health economists to be brought in to look at the cost benefit: how much does it cost for care? Also, we have an acute shortage of care staff; you might have heard the statistic before from Skills for Care that there are 110,000 vacancies in adult social care today and 40,000 for nurses, et cetera. It is not just about these technologies working alongside staff; it is also about filling in the gap for staff. That is another barrier that will prevent development.

Lord Browne of Ladyton: This is really interesting, of course it is, but do some of these technologies need custom-built environments? If you require a hoist rail, does that not need to be in a custom-built environment? Most houses that I know of could not support a hoist rail—

it would pull the ceiling down.

Professor Praminda Caleb-Solly: You can get standalone frames, and one has to think about their function. One key reason for people having to go into residential care is that they have mobility problems transferring from the bed to the chair to the toilet and back. The price of retrofitting these types of technologies has to be weighed against the benefit they bring in allowing somebody, as long as possible, to live independently in their own home and stay in their community.

In addition, some new retirement villages are already having ceiling hoist systems installed. Being able to leverage and build on that infrastructure is to our advantage. The hoist system is one solution to the problem. It is a pragmatic solution that can be made available more quickly and easily because it has already been tested to ensure that it can support weights of up to 200 kilograms, which is what these systems need to be able to cope with.

Q86 Lord Hollick: I have a couple of points to put to Mr Butterfield. First, you made the point that some of the equipment that you sell is made available to people too late in life. To what extent are GPs familiar with what you offer, and to what extent do they make recommendations?

Secondly, your Swiss army knife has many functions but, from what you have said, very few are used. Is that because your company does not provide the training, or is it because local authorities are resistant to the training? What is the problem?

Stuart Butterfield: On the first question, GPs are not really aware of technologies like activities of daily living, (ADL) monitoring. Part of the problem is that if the data was available they would just panic anyway. The last thing they need is to have another source of data. That is one of the big issues surrounding these kinds of systems: someone has to monitor them, someone has to look at the data and do something about it. If an alert goes off, someone has to respond. Who is that? GPs typically do not want to get involved in that kind of thing. We have tried projects with GP looking at their "frequent flyers". We have tried putting those systems in so that we can keep them away from the GP, but someone still has to monitor them to make sure that that is happening.

In terms of why no one uses the Swiss army knife, first is the issue of familiarity. The use of technology for assessment is well known in adult social care. It has been used for 20-odd years for short-term assessment. That is a familiar use case and it is still primarily the one for which Canary Care is used. Longer term, in the vast majority of cases the pendant alarm is used. It is a button-in-a-box, long-term use case. Very few people use Canary Care for long-term use cases. Why is that? Again, it is about understanding. It is a case of trying to get councils to move from saying, "We've used a system like that for short-term assessment", to explaining how it works to the family.

Lord Hollick: Do you provide training modules to councils and care homes?

Stuart Butterfield: Of course, but if a council is using it for short-term assessment, the council wants to know how to use it for short-term assessment. The family may or may not be involved in that assessment period. Sometimes they are, sometimes they are not—there are pros and cons—but, once the assessment period is over, the council's involvement is finished. If there has been no signposting and no engagement from the family, handing that over to a family for a long-term use case is incredibly difficult. Typically, if we are lucky, the family will then come to us and purchase a system and use it long term, and then we deal with them directly.

Lord Hollick: So your customers are local authorities, not families.

Stuart Butterfield: For short-term assessment, it is the local authority, which will recycle those systems every two or 13 weeks or however long the assessment period is. At the end of that period, the authority will take the equipment back. If the family has been involved, engaged and can see the benefits, they might go on to pay privately, but moving into the private, pay, market is really difficult.

Sarah Weir: Perhaps I could add something to that for Lord Hollick? I have a slightly different take, which is that £500 million a year could be saved for the NHS by preventing people falling in their homes. A lot of them will go to their GP. Some of the minor adaptations that can be put in do not cost a lot of money. One thing that costs the most when fitting a stairlift is chasing the wiring into the wall. When you build new houses, if you just put a plug at the bottom of each set of stairs, you would not then have that cost.

There are other very simple things. To people with dementia, black mats seem like a hole in the ground. The Co-op has led a big project on this. If the mats are a different colour, people do not fall as they do not think that they are falling into a hole. Sometimes it is just about looking at things slightly differently.

Lastly, the disabled facilities grant has been shifted a bit. Lots of local authorities have used the money rather differently for small things to get people back home more quickly. Sometimes we can get stuck on it all being about billions and millions. If you start with the person—with something that feels real—you can scale that up.

Stuart Butterfield: Perhaps I could come back to Lord Browne's question about technologies and give you a small number of bullet points on things that are happening now or will happen in the very near future. One big one is the digital switchover. The analogue phone system will be gone by 2025. That means that the millions of pendant alarms that are out there and all those pull cords that rely on the analogue phone lines will go. This is a massive challenge, and opportunity, for the telecare industry, because it means that all devices will now need to be digital. Local authorities, care providers and everyone else are looking at that. If we have to switch anyway, why do we not start looking beyond the pendant alarm to all the other technologies that are available? There is massive panic within the industry about the digital switchover.

I have already mentioned AI and machine learning. We have talked about that, so I will not go into further.

5G is on the horizon and has the potential to have a massive impact on the care industry. At the moment, one question when deploying a care system short term is whether there is a broadband connection in the house. The last stats from the ONS in 2018 showed that only 59% of one-person households where the householder is over 65 have broadband. 5G has the potential to provide those kinds of service connections to those properties. It is potentially huge. There will be a question later on about households and new house builds. Some work needs to be done there.

Q87 Baroness Young of Old Scone: We have talked about some of the barriers. There are two things I want to cover. First, because of the transfer from local authorities to private payers, in your view is there currently a socioeconomic gradient between the haves and the have-nots in terms of access? Secondly, what do we need to do—by way of policy shift, or whatever—to safeguard the privacy of people in their homes when they are monitored by systems?

Professor Praminda Caleb-Solly: I will deal with the privacy question first. We need to take a different view when we talk about these technologies. I go back to a point made by Stuart. One anxiety created by having these technologies in your home is that you are going to be monitored by somebody, and GPs not being available to look at that data is an additional problem.

We need to change the conversation on this issue. It is not about monitoring—as in surveillance; it is about you being able to self-manage and support yourself. If you take that view, the data is your own. It is between you and the system that will help you to interpret that data and perhaps offer you real-time support. For instance, if the machine, which learns things through sensors in the home, finds that there are issues with a person visiting the toilet too often—that might be a sign of a urinary tract infection, for instance—that information can and should be passed to a healthcare professional, but it can also be discussed with the person to find out what the underlying issues are. The intelligent-help companions or assistive robots offer that ability to keep information private.

We need to think about it in that way. We talked about people not knowing enough about the technology to make decisions. We also have to educate people on what the data is, what it means and what the impact is if the data is shared. Who benefits and how are they affected? How will services in the future be denied or made available, depending on information such as how much activity you do around your home?

Sarah Weir: May I pick up on your first point about the haves and have-nots? You are right: there is a gap. You heard last week from the Centre for Ageing Better, which has done quite a lot of work on this. We did a report with them called *The 100-year Life*. There are children born now who will live to 100 because of the advantages in healthcare and

everything else. Only 93% of our current housing is accessible and fit for purpose for people to live to 100 in. We want to keep people in their home so that they do not end up in the care system, which Stuart just talked about.

Less good housing is disproportionately lived in by older people and by people from lower socioeconomic backgrounds. There is a widening gap. That is part of the wider system that I have talked about—poor health, poor diet, lack of fresh air, lack of places to walk safely near your home, and lack of transport.

A lot of things need to come together. The Chair asked about policy changes. If the policy papers that I mentioned earlier could be thought about in the round, with R&D starting now on what these things are, we could be ready and have the evidence. It is fair to say that we do not have good enough evidence, particularly on things like housing, to enable us to say categorically that this is why something should change.

Q88 Lord Borwick: First, I declare my interests in the housing industry as a housing developer and housebuilder. Can I ask about augmenting existing housing stock as opposed to building new housing stock? Part M has done a lot of the work that was originally done by the Rowntree Foundation in the lifetime homes specification, but it is still at level 3, which is only required in London, I think, and not elsewhere.

The problem, as you mentioned, is that the vast majority of houses are not adaptable, or not easily adaptable, for old people, while older people do not buy brand-new houses, which tend to be bought by younger couples. The thing I found interesting about this is that many young couples have babies and have similar access problems to people in wheelchairs—there are similar monitoring requirements and requirements for turning circles.

If, as you mentioned, we organised the power at the bottom of the staircase, and the wider doorways and the drainage systems somewhere on the ground floor, a lot of these houses could be adapted much more easily than they are at present, yet the market does not seem to want to demand this other than in the social housing field. Are there other things that we can do to make this part of the planning permission so as to encourage the developers to do this voluntarily and at no cost to the Government?

Sarah Weir: Yes, I think there are. As you know, the Building Better, Building Beautiful Commission report has just come out. We were heavily involved in that. We are also involved in a project called Home of 2030, which brings three government departments together, with developer involvement, to look at some of the issues that you have talked about.

There is a bit of a mindset shift, because although people buying houses tend not to say that there is anything wrong with them, that is often because that is what is in front of them—they buy it and that is it. They are not thinking about the NHS saving £500 million a year if people do not fall in their homes in years to come, and in a way why should they?

That is for government working with the private sector collectively to think about.

Some of the private sector is doing that. Urban Splash—a regeneration company—is working with a big Japanese home maker called Sekisui and thinking seriously about this. You can make minor adaptations to existing housing, some of which will not cost a vast amount of money. We have an inclusive design programme, online and offline. We have been training thousands of people through it in how to think about exactly your point. If you are a mother or a father with a buggy, you have the same requirement as for a wheelchair. Mobility uses are very different. Some of the big developers—Legal & General, for example—are looking at this seriously. Newcastle is setting itself up as a place that has some of the best housing stock in the country. There might be a bit of a shift, but a bit of push and pull is needed.

Professor Praminda Caleb-Solly: Another thing that we have not talked about—we have talked about private homes and residential care—is the big growth in residential villages, to which people can move in their retirement and where they can have their homes adapted to their needs and know that there will be help at hand when the time comes. There are other solutions than having one home which you will stay in for the rest of your life.

Again, we need to think about in-home adaptations and, going back to the point about transport and accessibility, the need for people to get out and about, particularly if they live in rural locations. That also needs to be considered. You might have the best adaptations in your home, but there is an issue if you cannot leave the home, or even if you can—I came across a startling statistic about the number of public toilets that are closing down across the country. These are other issues when we think about—the whole-system approach to addressing needs for the ageing population.

Lord Borwick: There is always a slight tendency to try to adapt for people who are disabled. What we ought to do, surely, is design from the very beginning for people who will become disabled—in other words, all of us. As you say, you cannot get people to pay extra for something that they have not seen yet, so something from the Government—in stamp duty or in planning permission—has to make people want to do this, because it is economically sensible for the whole country in the long term.

Sarah Weir: There is a role for the Government. If they built in a mandatory requirement for accessibility standard M4—accessible and adaptable dwellings—in new homes, that could really shift things, although I accept that we would struggle to do that in all our existing stock. I worked on the Olympic Park for seven years. The homes built there had all these things built in—the wider doors, for example—for exactly that reason. Someone is not going to arrive and think, “That’s a wider door. Why is that there?” But in 10 or 20 years, they might need it for all sorts of differing reasons. If you just put it there in the first place,

it is just there and that is how it is—and there is always a plug at the bottom of the stairs.

- Q89 **Baroness Manningham-Buller:** Among the subjects which this Committee is looking at is whether the Government's healthy ageing grand challenge will be achievable, and the barriers to its being achievable. The evidence that you have given us already begins to address some of those questions, but I would like all of you to give me two or three priorities. In other words, is this a realistic aim as we stand? If it is not, what two or three things would you each like to see, from the range of things that you have mentioned, that would help the Government to achieve it? This question is asking you to pinpoint some top priorities for doing that.

Sarah Weir: I am not certain that I can say it is realistic, but it needs to be monitored closely—it needs lots of people looking at it and thinking intensively about it. That is the first thing. We are bidding on three aspects of the grand challenge. It needs to be more innovative. I will give you three examples. The first is the disabled facilities grant which I mentioned. You could open that up and use it much more imaginatively, so that you could get speedy adaptations for small things that can get people more quickly back into their homes if they have been in hospital or whatever it happens to be. The second thing is to bring more players together—retailers, supply chains, designers. They do not often sit in rooms together to think about this thing in a whole way.

Baroness Manningham-Buller: Who will bring them in?

Sarah Weir: As a national charity, we can bring them in, because we are a sort of agnostic convenor. That is why people trust us to do that. We are not saying that it should look like X, Y or Z; we open the door for people to sit round the table, then we help to translate their language one to the other. Often, they do not understand each other's language. If you are a designer, you are here; if you are an engineer, you are there; if you are a construction worker or whatever it happens to be, you are there. We can help them to see how, together, they can create something more innovative and imaginative.

Baroness Manningham-Buller: You can have three things.

Sarah Weir: I have had my three.

Baroness Manningham-Buller: I think that was two, but thank you for not being greedy

Stuart Butterfield: I will not take long as I do not have more than one. For me, the issue is essentially having the right people to understand the tools. Ideally, local authorities would have a telecare team. Every authority would have a dedicated team of people who understand the technology, how the tools are used and all the different use cases—not just adult social care assessment but all the different services that are provided across all use cases—short-term, long-term, reablement and hospital discharge. You name it, there are a dozen use cases for the technology, but it is simply not being used. It is there; we are just not

using it.

Baroness Manningham-Buller: Are you seeing that being done anywhere?

Stuart Butterfield: Yes, in local authorities that have dedicated telecare teams.

Baroness Manningham-Buller: Can you give us a sense of the proportion that do?

Stuart Butterfield: There are not as many as there used to be; they are disappearing fast. Obviously it depends on the commissioning model. Some commissioners will commission services independently and will buy individual services from lots of different providers. Some will go to a single service provider and buy everything through that provider. But ultimately it comes down to whether the commissioners are just commissioning for short-term adult social care assessment—that is, a long-term button in a box—or whether they get the bigger picture. If the commissioners do not understand the bigger picture of what can be done, they do not buy the services that can meet the need.

Professor Praminda Caleb-Solly: For me, there are three key priority areas for achieving the aims and ambitions of the healthy ageing programme, and they involve skills development. First, higher education organisations, such as our universities, are proactively looking at developing new programmes of study. We are in the process of putting through a new postgraduate programme on health technologies that will be available for the continuing professional development of physiotherapists, occupational therapists and so on. They will be able to come and learn about these new and developing technologies and work with us in informing the development and design of those technologies.

The second way to achieve those aims is to make sure that there is allocation within the funding to enable the team to buy the time of healthcare professionals to commit to the design, development and realisation of the technologies—particularly evaluation, quantifying and developing an evidence base.

We could also use technology for storing use cases—for instance, developing a system that allows people to incorporate their shared understanding and experience of what works well for which types of individuals and which conditions, and, more importantly, where it does not work well and what to look out for. I am thinking of a knowledge base that has been accumulated with a wealth of experience within digital practice.

The third area is questioning the ambition of independence and how that is interpreted. I wonder whether we can change the conversation so that we talk about interdependence. We are social beings—we like to be with and support each other. We need to open up the conversation on independent living so that we think not only about a person having to cope on their own but about how society and other types of social initiatives can be used to support that person. There are really good examples that show how intergenerational programmes of living and

support, as well as other social initiatives, are developing. Therefore, it is important to consider interdependence.

Baroness Manningham-Buller: And skills and knowledge base. Just to pick up on Ms Weir's point about consulting the elderly in the first place, how does that fit in? The way you describe discussing it with health professionals and so on, I do not see where the individual fits in.

Professor Praminda Caleb-Solly: The individual fits in through our work with the health professionals. In order to evaluate any of the technology that is being trialled or even to start the initial discussions, we have to go through ethics committees to access the patients. If we recruit from the general public, as we have done in some of our projects, we get people who are already able and willing and who have the right mindset. The people we are not getting to are those who will benefit most from the technology but who currently are not facilitated, or able, to contribute. They are in their homes because they cannot get out of the house. So we access these people and bring them into the conversation through their healthcare providers.

Sarah Weir: "Seeing is believing" was going to be my third point. It is necessary to show examples of how this is changing things using ethnographic research. We did that a lot with Transform Ageing. People in later life themselves did research with other people and brought back the results. That was shared with the health professionals and commissioners, and it made for a completely different conversation.

Professor Praminda Caleb-Solly: If I may, I will add another example of a live project that we have—a Knowledge Transfer Partnership with the ExtraCare Charitable Trust. We are developing new ways for retirement village residents to get experience of the technologies. We have market stalls with try-before-you-buy schemes. Residents are given the technology and supported in using it for two weeks to see how they get on with it. That enables us to understand the problems that they have. If it works for them, they become spokespeople for others. That cascade learning is an important way of achieving more penetration of this technology.

Q90 **Lord Hollick:** Baroness Manningham-Buller's question takes you on to the question of where public money should be spent and what the priorities are. In order to have that debate, you need to be able to say what the cost-benefit analysis is and what the priorities are—whether it is government money, local government money, the NHS or whatever. Is that work done? Is there a cost-benefit analysis in relation to society, and particularly in relation to the NHS, and obviously in relation to the well-being of older people, that will enable the Government to use their money in a far more guided, prioritised way?

Sarah Weir: Not in a systematic way, which is why I said earlier that the R&D budget should focus a lot on STEM—technology and engineering—but it needs to focus more on the people side. It is inconsistent. To give you one example, West Suffolk's housing service was spending a lot of money on people going into hospital and then going home with care

needs. Those involved wanted to see how they could cut those costs. Every time somebody went into the health service, it cost them £1,000, so even halving that would save them £100,000.

They started this in 2017 and it is part of a programme that we run with the Local Government Association. They are now well on their way to doing that by joining up all the services so that, together, everybody sees how the money can be saved. It is beginning to make a massive difference, but we do not have that across the country. You could do that in every local authority, but you would probably need a bit of government money at the beginning to give it impetus. That is the “seeing is believing” example. If people look at it and say, “That could really work for us”, that will bring in private money.

Stuart Butterfield: There are examples. It is siloed and very patchy, and again it comes down to having people who are capable of doing that kind of work. One of our best examples is Northamptonshire County Council. It has deployed Canary Care across every service—children’s services, adults’ services, mental health and LD services—and not just as an assessment tool.

You cannot get waking or sleeping night care in Northamptonshire without being assessed using Canary Care. It is used for right-sizing care packages, for avoiding care home admissions and for many different things. Essentially, the council produced two reports. The management did not believe the first one, which was produced in 2016, because it came up with across-the-board savings of £8,000 over a year every time they deployed the system. They did the same study again and managed to find a few people whom it did not quite work for, so their management believed them the second time they did it. The savings were basically the same: about £8,000 deploying the system.

So there are financial case studies, fully costed for cost avoidance and cost savings, but they are really difficult to get. These systems are deployed all over the place, but having people with full access to the data who can say what the outcomes are and what the financial models are of the things that are saved is really difficult.

Sarah Weir: But it can be done. It is difficult, but it can be done. It just needs to be joined up.

Stuart Butterfield: Absolutely. You need the people locally who understand the tools, understand the service users, understand the socioeconomic conditions, understand the cost of the service they are providing and have the time to do it.

Sarah Weir: The costs are quite clear. Southwark has been working with people who were not going to their GP. They used a digital technology to encourage them to go online and do some of the tests themselves, and they found that 10% had undiagnosed heart disease.

Then, people will go to their GP. Of course, if they get heart disease, we all know what that will cost and that it will be a killer, whereas if digital technology can be used right across the country so that it reaches people in different ways—these were almost exclusively older people—that could

change things enormously. However, no one is yet doing the cost-benefit analysis of that across the country; they are doing it in Southwark.

- Q91 **Viscount Ridley:** We have talked mainly about how to help people cope with disability in old age and other aspects of old age. Can these technologies actually improve people's health, as opposed to enable them to cope? Our conversation about the housing stock is very pessimistic, in a sense—we are all going to need to be in wheelchairs at some point in our life—and pessimistic about the chances of shrinking the gap between health span and lifespan. Can these technologies help at all in this, or do we just leave that to the biomedical industry?

Sarah Weir: I think that the Southwark example shows that they can. That was a simple technology; people are not going to the GP, but with a digital technology they see that there is something wrong with them and then they go to the GP, sort out the heart problem and then have a healthier life. So, yes, I think it absolutely can. Thinking about where people are living, in the retirement villages that Praminda talked about earlier, there are health benefits to being able to walk outside your house, your flat or wherever you are living, to having clean air, some greenery and someone to talk to.

One thing about being healthier goes back to the point about us being social beings. It is about communicating with each other. As human beings, we still love that. Something like touch might seem incredibly small and insignificant, but if people do not actually ever shake someone's hand or touch them to make sure that they are okay, they will get isolated and very depressed. If you can go out and about and there is a bench you can sit on and you can see people—these things are simple—you feel happier, and if you feel happier you are healthier. This is about mental health as well as physical health.

Professor Praminda Caleb-Solly: I agree with all those points. We are looking to see how the technology could help to be your personal trainer and your champion to motivate you. It is all well and good having the advice to exercise adequately, to move enough and to eat well, but generally it is difficult to follow that guidance. Using the technology to understand how best you can be supported as an individual, for an assistive robot to know the opportune moment to recommend when to get up and do a few marching exercises around your living room, can make all the difference.

Quite a few of us wear wearables to monitor how much we walk, which helps to encourage us. It is about how we can capture the information and make it available to people in a way that helps them better understand themselves, and how we can link it to people's aspirations; it is not just about being healthy, but helping me to go out more, to socialise in the local book club or go and play with my grandchildren. Perhaps I can support my family in doing other things.

Another opportunity, which got missed out, is the use of robotics technology to allow people to support others. For instance, by using tele-operation, if I am able to support somebody else remotely—you

mentioned telepresence—that is another opportunity to support each other through technology.

Viscount Ridley: Is there a danger of unintended consequences, though? If we make homes more wheelchair friendly, might people stop using the stairs and therefore become more dependent? Alternatively, if we use robots to monitor them, they may end up more lonely. We are saying that in theory it should be the opposite, but is there a risk of unintended consequences?

Sarah Weir: Yes, I think there is, and your point about stairs is incredibly well made. Going up and down stairs is still good for most people. Obviously, if you are a wheelchair user that will not be the case, but generally it is. Those stairs, or steps, can be built into your inside environment and/or your outside environment. That goes back to places you can go to that might have a few steps. In fact, I saw somebody yesterday who is 84 and who said that he has found ways around London without steps. There is one bit with some steps built in, because he knows it is good for him still to do some steps, but not so many that he gets completely puffed and out of breath. So I think it is a mixture.

Stuart Butterfield: It can definitely be used for improving health. I guess the classic case is re-ablement, where someone who has been discharged from hospital either goes into a dedicated re-ablement facility or they are re-abled in their own home. They are given tasks to do, activities of daily living to perform—can they cook, can they toilet, can they clean themselves? Technology-Enabled Care (TEC) systems are used to monitor their ability to do those activities and to chart their progress through re-ablement. There definitely is evidence that tech can improve health.

Sarah Weir: And tech can improve kitchens—that is another point I should have made. Rather than being retrofitted, kitchens can now be designed so that they have surfaces at different heights. There are all sorts of things you can do, and you can use it throughout your life. That keeps you healthy and active, and cooking is a very sociable activity. The more you can continue to do it, in some way, the better. That tech is already happening.

Q92 **Baroness Walmsley:** We all know that the healthy ageing challenge aims to give us five years' extra healthy life by 2035, but it also aims to reduce inequalities in healthy ageing. Do you think there is a risk of technology actually widening the inequality? Could you focus on ways in which it could actually narrow the inequalities? What I have in mind something that we have not said much about this morning, which is keeping people's homes warm enough.

An old person could have a house full of widgets, but it could still be cold, and that is not good for them. It is not good for babies or housebound people of any age, including sick people who have to have bed rest. Are there ways in which technologies can monitor the warmth of the house or improve the warmth of the house so that it is suitable for an old person, because when we talk about inequalities, fuel poverty is a real thing and

it gets worse as people get older and their income comes down? Can you say something about that?

Stuart Butterfield: Yes, in a word. TEC systems are used to do exactly that right now. Canary Care can be used to monitor the temperature in a house. Too hot is just as bad as too cold. If it is too hot for prolonged periods, you are at risk of dehydration and at higher risk of a fall. If it is too cold, you are at risk of hypothermia. It could be something as simple as a dementia sufferer leaving a door open unexpectedly. If you can spot that, either because you can see that the door is open, because you have a sensor on the door, or because you can see the temperature in the house plummeting, you can either send an alert to someone who can go and do something about it or, in the more joined-up case, send that alert to the house heating system and it automatically raises the heat.

Professor Praminda Caleb-Solly: One concern people have is that they are wary about how much money they have to spend on heating bills, et cetera. The technology could be used as part of smart automation by looking to see where the person is not and where they are likely to go next, by being able to track their patterns of behaviour and activity during the day and by adjusting the heating so that it optimises the use of heating and where heating is made available. That is one way it could help to redress the balance between having the whole house nice and cosy and warm but being more effective about where it needs to be warm at what time of day.

Sarah Weir: Cost is a huge issue—you are quite right to raise that inequality. It is a mixture of using the technology and perhaps using more old-fashioned things, as Lord Borwick will know, such as cladding, double glazing and that sort of thing, so you are keeping the heat in without making it so sealed that you are not getting any fresh air at all.

Cost is definitely an issue, which is perhaps where some of the work on R&D could go, to examine which things really make a difference. Because, again, we do not really have evidence at the moment, to go back to Lord Hollick's point, to show the cost-benefit analysis. We might know it intuitively, or feel it, but in today's age that is not really enough.

The Chair: Where does the UK stand compared with such countries as the USA, Germany or Japan in developing technologies that help older people?

Professor Praminda Caleb-Solly: In terms of robotics technologies, there is a way to go yet. We have been conducting a trial of driverless cars, particularly looking at older people's needs in terms of how they communicate.

The Chair: How do we compare with those countries?

Professor Praminda Caleb-Solly: We are behind. We have a lot of catching up to do, but we are leading in the consultation that we do with people as we design these technologies. We are more sensitive and responsive, taking into account ethical perspectives in the design and people's lived experiences. With some of the other countries that have the technologies already, perhaps their level of consultation has not been

as good as ours. At the end of the day, we should have a higher level of user acceptance, given our approaches to developing these technologies.

Stuart Butterfield: In somewhere like the US, their deployment of tech is higher, but I suspect that is mostly to do with the differences between the health services in the two countries. People in the US are more used to looking after their own health rather than relying on the national health service. They are more ready to deploy these kinds of systems.

Sarah Weir: In Europe, places like Germany and Holland are probably ahead of us in how they use tech and integrate it into housing of all sorts, whether it is expensive housing or cheaper housing.

The Chair: Where are the barriers for the UK?

Sarah Weir: Some of it is money, some of it is cultural and some of it is about a change in how we link people together, rather than everyone doing everything separately. If there is a tendency towards everything being done downwards, vertically, and no one is doing the across bit—AI is very much an across bit, as is design—you get a different result. If everyone just keeps doing things the same way they have always done it, nothing changes.

Q93 **The Chair:** The Government's wish, through the grand challenge, is to promote technological development for older people. What would your answer to the Government be?

Sarah Weir: To encourage different groups of people to come together to discuss what technology means—

The Chair: Is that just a chat show?

Sarah Weir: No, it is not just a chat show: technology means something different to every person. You get them into a room, work out what position they are coming from and then see how you could do a project with people doing things together. It is a "seeing is believing" moment: you see something different coming out the other end. It is not just chat, it is doing.

The Chair: That is the way to have a leading, technologically developing country.

Sarah Weir: Yes.

Stuart Butterfield: My advice would be to use the technology that is available, not to develop more of it. I have sat in so many Innovate UK meetings and grant-funding sessions where there is money available to develop new stuff but no money available to use the stuff that is there.

Sarah Weir: And to show people how to use it.

Stuart Butterfield: Indeed.

Professor Praminda Caleb-Solly: I would suggest offering sustainability. Early innovation is great, we develop some exciting ideas, but then we fall into a situation where funding is not available to see it

developed as part of a sustained service provision. That is where the point you were making is important.

- Q94 **Baroness Young of Old Scone:** The panel has just very kindly answered the question I was going to ask, which is: if there were a policy change to get that implementation funding, what would it be?

Sarah Weir: If everybody had to get into a room together and use the technology in their bit of the world, their bit of the business, wherever they are, it would happen.

Baroness Young of Old Scone: That is like asking everybody to sit in a circle, hold hands and think beautiful thoughts. What is the thing that will drive that? What change could we recommend to the Government? Is it a separate funding stream for implementation that then brings people together, because that is the only way they can get it?

Sarah Weir: I think you could do it within UKRI. The R&D budget is there. You could do it if you just focused it. I am not sure we necessarily need another funding stream.

Stuart Butterfield: I could not agree more.

Professor Praminda Caleb-Solly: Giving health and social care professionals the opportunity, the space, in their professional life to be able to, or to have to try to, evaluate what is already there and reflect on how this could augment or improve their services is going to be crucial. Everybody has to get involved, but they have to be enabled by their employers, by the system, to have the opportunity and the time to do this.

The Chair: Thank you very much, all three of you. It has been a most useful session and we appreciate your coming. You will get a transcript of the session, and if you have any comments or corrections, please let our clerk know. If you have any other thoughts about something you might have liked to tell us but you did not get an opportunity, feel free to write in.