THE NEXT FRONTIER IN HEALTHCARE INNOVATION

Two leading healthcare innovators explain why *home care* is the next area ripe for innovation.

by Kate Steinmann

BY ALL MEASURES, the home is the future of healthcare. Not only will more people receive care in their homes, but many medical procedures that have historically been carried out in institutional settings will be administered in patients' living rooms. This shift is being accelerated by improvements to automation and artificial intelligence (AI) such as chatbots, enabling the notion of 'care anywhere' in Canada and across the globe.

The growing appetite for home care is a response to three main drivers: increasing access problems (wait times), growing patient and family expectations (choice, convenience, quality) and society's inability (or unwillingness) to continue to pay for the costs of delivering healthcare in formal institutions, which are being outstripped by demand.

As of 2016, nearly 730,000 Ontarians were receiving home care services, 63 per cent of whom were over the age of 65. The market for home care services administered by the private and public sectors will only continue to expand as the number of older adults and people with multiple complex medical and social needs grows. For example, by 2041, the number of seniors aged 65 and over in Ontario is expected to double from 2.3 million to 4.6 million.

To better understand this shifting landscape, I recently sat down with Canadian healthcare innovators **Zayna Khayat** and **Chris Ferguson** to ask what's in store for the future of home care and what people inside and outside of the healthcare sector should be aware of. Following are the hightlights of our conversation.

Why is home care the next frontier in healthcare innovation, and what forces are shaping this future?

Zayna Khayat: The future of healthcare is much less centred on institutions. It is rapidly becoming decentralized, dematerialized, demonetized — and, ultimately, democratized. It will be more continuous, more integrated. As healthcare becomes more data-driven, it is also becoming more personalized and proactive and less reactive. Technology is enabling many these changes, but healthcare innovation does not start with technology.

The word I use to encapsulate this shift is the 'homespital'— which is about the fact that most of what's done in a formal institutional setting could be done in the home. Other often-used terms are 'hospital-to-home', the 'house-spital' and 'the dehospitalization of healthcare'. Let's say you've had a C-section or

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cardiac surgery. Traditionally you would have been in the hospital for a few days of recovery. Now, instead of spending those days in the hospital, you are discharged within a few hours of surgery, and the remaining care is completed at home.

The homespital model requires seamless, timely and frictionless communication between the different people involved in keeping the client healthy at home. Virtual care and remote monitoring are two essential digital tools that support this activity. At **SE Health**, we're looking at all kinds of homespital use cases, including virtual reality (VR) as a digital therapeutic for pain relief in palliative care, AI-powered text- or voice-based chatbots to support caregivers and seniors in their homes, and remote blood pressure monitoring wearables.

The homespital will help to alleviate the mounting phenomenon of 'hallway medicine'. The term 'bed-blockers' is sometimes used to describe people using hospital services and beds who could often be taken care of at home. We estimate that 30 to 40 per cent of bed-blockers could be shifted to home care. And some hospitals estimate that up to 70 per cent of what is being done in clinical institutions today could actually be done in the home.

Chris Ferguson: Increasingly, people will be taking ownership of their health and well-being, and that's important, because it means they can avoid getting sick in the first place. There is much more awareness today around the fact that wellness is partly the responsibility of the individual.

You mentioned that healthcare is becoming more data driven. Can you talk a bit about the implications of this?

ZK: In the not-too-distant future, the data patterns from your 'digital exhaust' — including biomarkers such as your voice, your facial expressions, the words you speak or text, your walking cadence, etc. — will be compared to peer-matched patterns from global datasets in order to predict and prevent illness.

The information contained in traditional medical records will soon make up only a fraction of a percentage of the total data stack used by you and your 'circle of care' to make decisions about your health. The new data stack will include elements that are generated largely outside of formal medicine today, such as your sociograph (a chart of your social media activity) and all your various 'omes' — genome, microbiome,

proteome (the structure and physiological expression of your protein complement), physiome (your functional physiology as measured by your fitness tracker, for instance), exposome (all your environmental exposures), anatome (from your imaging data) and more.

Algorithms will support clinicians in intelligently decoding your symptoms and will make a recommendation to you and/or your formal provider about what might be going on. Traditional, analog diagnostic medicine will soon seem crude. With pinpoint accuracy, for instance, we will be able to anticipate a schizophrenic episode, a suicide risk or hypoglycemic episode. This new paradigm of medicine is called 'predictalytics'.

CF: At the **Hospital for Sick Children** in Toronto, doctors and nurses are already using this approach in the pediatric ICU. They can now predict when a baby is crashing before it happens because they have collected enough data over time and can compare that data to what's happening with other patients in the ICU.

ZK: My former boss in the Netherlands, **Lucien Engelen**, recently wrote a book called *Augmented Healthcare* that captures this movement brilliantly. He tells a joke that goes something like this: You're at your house, you hear a knock on the door, and it's an ambulance. The paramedics say, 'We're here to pick you up for your heart attack!' Of course, you're wondering, 'What heart attack?' Their reply: 'The one you're about to have!' It's a real *Minority Report* moment.

Can you discuss the economics of this new healthcare model?

ZK: Labour and capital have historically been the economic drivers of healthcare, forming the basis of an industry that hasn't changed for decades. But that's all changing. I'll give you an example: When we sequenced the human genome, it took 15 years, and cost $3 billion back in 2001. Now, with technology, it takes a single day and costs about $200. By next year, it will cost $35 and will take hours or minutes.

A colleague of mine half joked that it will soon cost more to flush your toilet than to sequence your DNA. The service associated with scraping your cheek cells, putting the swab in an envelope, mailing it and running the sample on an Illumina sequencer is no longer the main focus of the business

model. Now the sustainable business model is about how to use the data that is generated by this process.

CF: And I would say, again: It's not just that that information is now available to healthcare practitioners and the healthcare industry, which is super valuable for all the reasons you've mentioned. It's also that people have access to that information, so they can make more informed health decisions. Historically, the power dynamic has been that your doctor tells you what to do; but increasingly, people have control.

Speaking of technology and society, can you touch on the convergence of technology and the human factor in home care?
ZK: To be clear, when we're talking about home care, we are talking about people who require physical healthcare services. Patients still need humans to dress wounds, manage their IVs and be there to help integrate 'life sucks disease' into the care plan. Our discussion so far has been about moving these services out of institutions and into the home setting. However, unlike in a hospital setting, it's not possible to have staff in a sick person's home 24 hours a day — the economics just don't work, and most clients wouldn't want that anyway. Even if you could achieve it, that human would not be able to integrate the multiple streams of information as effectively or as fast as a machine can. So emerging technologies are about *augmenting* the physical presence — not about taking the humanity out of healthcare.

I call this shift 'digical' because it integrates 'cold' technology with 'warm' care in a seamless physical and digital interplay. My view is that embedding these technologies of augmentation will actually *increase* the humanity of healthcare, because it will free up precious time and energy for caregivers to do the important things that only humans can do. This will allow us to meet the increase in demand for home care and deliver the high-intensity care that people need, want and expect.

In the summer of 2018, SE Health partnered with Bridgeable to improve the home care experience for older adults. What valuable innovations do you think that project produced?
ZK: For our team, it helped knowing that Bridgeable was always many steps ahead of us in the process. As messy and amorphous as the design problem seemed, Bridgeable brought clarity and

helped us land on some actionable, concrete ideas. Identifying the connections between the front of the house (the front lines) and the back of the house (back office) was also very insightful.

Two of our front-line home care workers (Personal Support Workers, or PSWs) were active on the team. They provided tons of insight at every stage, validating ideas and making sure we were on the right track. The framework Bridgeable used allowed us to leverage our PSWs' expertise and get to the heart of what they really need to do their work with effectively, efficiently and with the joy and grace they need and deserve.

Scheduling of home visits is one example Bridgeable helped us with enormously. There's so much more going on than just a better scheduling tool or platform, and that's the beauty of a service design approach: It highlights the connections among different systems, people and environments.

CF: Reframing the problem was key. It wasn't only about fixing scheduling, which is a persistent problem within home care. It was just as much about designing a seamless front-to-back client experience. Scheduling is part of the challenge, but it's just one touchpoint that interfaces between the back office and the front-line clients.

Having experienced the service design approach firsthand, what unique perspective does it bring to the challenges faced in home care?
CF: Service design allows you to zoom out and take a look at what's happening at a systems level — and then, zoom in to different parts of the system to better understand what's happening on the human scale. For instance, it was only once we mapped the experience of delivering and receiving home care that we were able to identify where there were issues in the end-to-end experience.

Service design is part of a great methodology for asking questions, such as: How do experiences hold up over time and across different channels, in different spaces and places (e.g. the Internet versus in person)? Using tools such as experience mapping and service blueprinting, combined with iterative prototyping, allows us to take a more systemic view of things. This was helpful to us because healthcare — and home care specifically — tends to be siloed, with each department working in isolation, making collaboration between system actors difficult.

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Zayna, in 2017 you were Innovation Sherpa in Chief at the REshape Health Innovation Centre in the Netherlands, where you worked on several Dutch healthcare innovation initiatives. I know that you came away with some amazing insights that are inspiring your work here in Canada. Can you talk about that a little?

ZK: The Netherlands is a small country (17 million people and small in geographic size), bordered by multiple EU countries including Germany, the largest country by population in the European Union. By default, the Dutch as a society are scrappy, pragmatic, and they hustle. I believe that these mindsets are also indicative of how they approach healthcare innovation. They don't form a committee to have a task force to make a report of recommendations, and then years later, nothing gets implemented.

Are their problems in healthcare the same as ours? Pretty much. But they're being strategic and bold about tackling those problems. Whether you're a nurse in a hospital or a policymaker in the health ministry, you don't feel like your precious energy and talent is being wasted on trivial initiatives and projects that create churn and spin. I was delighted to be immersed in that environment for a whole year.

For example, the world is learning a lot about the Dutch home care model that was pioneered about a decade ago: **Buurtzorg** is an innovative organizational model that shifts power to the front lines and away from central agencies and management. Cells of six to 10 nurses get attached to a community and they self-schedule visits to the home. They decide and adjust care plans in real time. It's basically a 10,000-person healthcare organization with no management. This model of care is working. It's lower cost, it produces better outcomes, and, most importantly, the staff and clients love it. The model is spreading like wildfire — to Germany, Denmark, Sweden, Taipei, UK and about a dozen other countries.

CF: Europe is definitely ahead of us. I remember the first time I went to Helsinki. I met with people who were doing really interesting projects and saw amazing Scandinavian examples of design being applied to healthcare. I was expecting a utopian approach — they're big thinkers — and then I saw that they were brutally pragmatic. They said: 'In Finland we're aging more quickly than most of the world. If we don't fix our healthcare system, we won't be able to afford to live here anymore.' And that was the driver for change. In Canada, so much of our economy is selling raw materials to the U.S. that we often fail to recognize that we have a real lack of innovation here.

ZK: My major focus over the next three to four years is to bring concepts from the Buurtzorg model to Canada. In 2017, **SE Health** created the HOPE model, based on Buurtzorg, and did an initial validation test with 50 clients with complex challenges in an urban centre in Ontario. We are seeing good results and have learned a lot. A key metric was the joy of our nurses. They said things like, 'This is why I came into this profession'. This year we will embark on a major program supported by a sizable grant to build an institute to train people on this model. Introducing this alternative model into the current fee-for-service transactional paradigm constitutes innovation on many levels—system change, organizational innovation, operational innovation, care model innovation and policy innovation. **RM**

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Chris Ferguson is the founder of Bridgeable, Canada's leading service design firm, and is a co-founder of Service Design Canada, a professional association committed to promoting the practice of service design. He also teaches design at the Rotman School of Management.