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Opportunities for improving oncology care

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Do you want to see my Fitbit dashboard with my heart rate and number of steps the past week? Can I talk to you on Skype or FaceTime so you can see my rash? Is there a mobile app I can use for exercise or meditation? When Charlotte, aged 56 years, came back for her long-term follow-up visit 2 years after her haematopoietic stem cell transplant for acute myeloid leukaemia, she was delighted that she had passed this major hurdle without a recurrence. She had prepared for her appointment by looking at transplant websites for different problems survivors can have, reading papers on graft versus host disease rash, and making a list of her concerns and questions. After all her diligence, she felt overwhelmed and unsure about how to select what she needed from all the information. Allyson on the other hand, aged 26 years, came in for her 5-year follow-up armed with no literature or questions. Her priorities were catching up on her career—delayed by years of treatment—and a budding relationship that had instigated new questions about having kids. She was more than ready to be done with cancer. She was not thinking about her increased cardiovascular and breast cancer risk or about starting her mammograms at age 29 years because she had chest radiation exposure during cancer treatment. I wanted both Charlotte and Allyson to have access to useful tools to help manage the health concerns I knew could arise over their hopefully long years of survivorship.

Digital methods offer tremendous promise to cancer survivors. As with Charlotte and Allyson, cancer survivors have diverse health needs that are highly personal and often exceed those of patients who have not had cancer. For these reasons, survivorship care plans are being implemented for long-term survivors, and, as with all learning, we find that access to information is not enough, survivors need assistance in applying that information to their unique situations and time in life.

Progress in artificial intelligence and machine learning, along with the accessibility of cloud scaling for big data storage and integration of health records, have expanded the potential for personalised medicine. Survivors can receive a plan, track their health data in real time, stay in touch with physicians when they need to, and receive reminders for scheduled visits. We can refer them to social media support to connect with other survivors who share their interests. In the coming years, integrated health information across multiple platforms will

For more on the **ongoing INSPIRE randomised, phase 3 trial** see <https://clinicaltrials.gov/ct2/show/NCT03125070>

For more **evidence on digital health-care interventions** see *J Med Internet Res* 2013; **15**: 37, *Patient Educ Couns* 2015; **98**: 283–95, and *Int J Behav Nutr Phys Act* 2017; **14**: 105

For more on **privacy and data security concerns related to online health care** see https://www.accenture.com/us-en/~/_media/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries_11/Accenture-Making-Case-Connected-Health.pdf

allow patients being treated by multiple health-care providers to have centralised medical records. Vital signs data collected by sensors and monitoring devices could be consolidated for providers with clinical test results. Indeed, we are building interactive, updatable, cancer survivorship care plans that we could only imagine a few years ago, such as the INSPIRE programme—an online and personalised survivorship care plan aimed at improving the quality of life and health care for survivors of haematological malignancy as part of an ongoing randomised trial.

Evidence that internet programmes, mobile applications, social media interventions, and wearable devices improve care delivery and patient outcomes has grown in the past few years. However, a remaining challenge for the implementation of these digital options into health-care systems is the need to synthesise these data and transmit results in a useful format, flagging high-risk results that need rapid responses from health-care providers. Online interventions with cancer survivors have shown short-term efficacy using cognitive behavioral methods to improve physical activity, distress, insomnia, and fatigue, but few studies in oncology have focused on monitoring specific biomarkers related to health status or improving adherence to survivorship care guidelines. Another gap in research on the use of technology to improve health outcomes is in reaching those with reduced access to health care; people who join these studies are usually healthier and better educated than the population at large and are more likely to be white women. By mainly enrolling these patients, studies restrict our ability to find differences between technology-based interventions and usual care. Another barrier to integrating online health programmes or use of centralised records systems is that many patients and health-care providers remain skeptical because of privacy and data security concerns.

Technology will continue to change the way oncology follow-up care is done, and it has the potential to guide care for survivors. Nevertheless, touch-free, all digital, oncology care that is sufficient to meet the specific needs of patients such as Charlotte and Allyson is unlikely, regardless of how many technological devices enter our health-care services, and that is not a bad thing.