Opportunities and challenges for telehealth within, and beyond, a pandemic

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The COVID-19 pandemic is unlike any previous pandemic. The ubiquity of international travel, the ease of transmission of the virus, and symptom variability have resulted in an unprecedented rate of spread. The need for physical distancing has also led to the rapid adoption of telehealth solutions globally.

Telehealth is the provision and management of health care in which individuals (often working with family members) manage aspects of their care with remote support from health-care professionals (appendix). Care is most commonly digitally mediated but supported by direct communications. Individuals might be based in their homes or care facilities. The digital capture and selective sharing of data facilitate surveillance at regional, national, and international levels. Telehealth also facilitates epidemiological research that informs future health-care delivery.[1]

Telehealth has direct and indirect roles in reducing the spread of infections by enabling physical distancing, tracking symptoms and outbreaks, and supporting policy makers in anticipating needs and deciding appropriate and timely interventions.

The pressures to adopt telehealth solutions to support self-management have been growing, largely because of the increasing number of patients with chronic diseases surviving to old age thanks to the pace of medical innovation.[2] Paradoxically, this success has created a growing challenge for health-care systems, with more complex care requirements resulting in greater costs. Nevertheless, change was slow before the COVID-19 pandemic.

The pandemic has forced individuals and health-care systems to review what is possible and desirable and to adapt models of care to the rapidly evolving situation.[3] Many countries have seen a shift towards telephone and video consultations.[4] Patients have been sent home with devices such as pulse oximeters and instructions on self-management to minimise the load on health-care systems. Some hospitals have introduced robots and tablet computers to facilitate physical distancing while monitoring and communicating with patients.[5] Many of these changes will remain after the pandemic and will be enhanced in the future.[3] For example, robots that disinfect areas without any human contact have been introduced into hospitals in sub-Saharan Africa in response to the pandemic. For individuals, the pandemic has led to improved computer literacy and access to technology to facilitate physical distancing. These changes are removing barriers to telehealth and creating an important opportunity to rethink its roles.

Technologies to support telehealth are proliferating and include wearable devices, smart phones, and instrumented (smart) homes. Smart homes can be equipped with environmental and personal sensors that are interconnected using the Internet of Things. These devices can monitor patient health and send messages to responsible clinicians when emergency situations are detected. The cost of these devices is falling, and an almost unlimited amount of data can now be stored and analysed. Novel methods of capturing, curating, and analysing data are being developed.

However, telehealth is not just about technology; delivery of telehealth also requires changes in working practices and curating data. Previous barriers to telehealth have included the need to change work processes. A key reason that telehealth solutions have been adopted during the pandemic has been to enable work without physical presence at the workplace to protect patients and health-care professionals.[5]

Telehealth can have a positive effect on patient safety and outcomes.[6] Nevertheless, telehealth comes with risks including exacerbating the digital divide, poor software engineering, and security breaches. Future telehealth platforms must be secure, reliable, and flexible enough to accommodate regulatory, professional, and health-care organisations' requirements. These platforms should all be updated regularly.[6]

To realise the full potential of telehealth, patients and professionals must trust digital systems to keep health information private and secure.[5] The latest data security and encryption systems must be deployed to protect patient privacy. Patients need to be aware of the privacy choices they are making to ensure data security and avoid disclosure of sensitive personal information. In determining policy on data sharing, the interests of the individual need to be balanced against the interests

of the population, recognising that different cultures typically value these interests differently.

To optimise digital inclusion, telehealth solutions must be easy to use and maintain; this includes the availability of good internet communications. Organisations must consider the needs and practices of migrants as well as settled residents. Inclusion also requires affordability for individuals and health-care organisations, which might require strategic changes in funding models.

Early adopters of telehealth have traditionally been remote communities with insufficient access to traditional care providers. Outcomes and experiences of telehealth are dependent on design details and factors such as health literacy, digital literacy, and the quality of integration with clinical care pathways. Discussing virtual primary care services, Wharton and colleagues[7] noted that "evidence of their effect on clinical outcomes and quality of care is scant". However, the main value of telehealth might not be immediate improvements in clinical outcomes. Rather, those improvements might follow from improved processes that deliver more cost-effective health care.[8] Telehealth solutions should be applied internationally to achieve real economies of scale.

To realise the long-term benefits of telehealth, organisations need to collaborate and learn what works well, where, when, why, and how. Governments need to support the health technology industry in developing and testing novel telehealth solutions that are simultaneously safe and agile. Industry needs to work with professionals and patients to ensure digital inclusion, data security, and solutions that are intuitive, flexible, and tailored to users' needs. This tailoring will help overcome resistance to changing established work processes. The burden of care imposed on patients and their families must be considered, but new knowledge and competencies can be empowering for clinicians, patients, and carers alike. Just as COVID-19 has accelerated digital literacy, so too telehealth can accelerate health literacy.

In envisioning a telehealth-enabled future, one must remember that many clinical conditions require physical examinations or interventions, and that care is a human and relational activity. To date, investment has been insufficient in developing technologies that work for clinicians and patients and adapting health-care systems and lifestyles to fully exploit these technologies. The COVID-19 pandemic represents a real opportunity and incentive to develop advanced telehealth solutions that can transform health care and people's lives, both locally and internationally.

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