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Digitally-Enabled Remote Care for Cancer Patients: Here to Stay

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ABSTRACT

Objective: Digital Technology has become a pervasive, even ubiquitous part of our daily lives, affecting almost every aspect of our lives. Although the uptake of digital technology in health care has lagged behind other sectors, today, digital health is already becoming a cornerstone of developed health systems all over the world. Hence, the question is not whether we should adopt digital technology in health care, but how to do it most effectively. Digitally enabled remote care, or telemedicine has been available for many years but large-scale adoption has been slow. COVID-19 has caused a quantum leap in this area and particularly in the area of chronic disease and cancer care. The objective of this article is to briefly review the literature on the use of digitally enabled remote health care, in general and in cancer care specifically, with a focus on nursing practice, and to define the questions that need to be asked to guide effective implementation.

Data Sources: Review of the literature and the experience of the authors.

Conclusion: There is increasing uptake of digitally enabled remote care. A growing body of evidence suggests that care delivered via telemedicine can be both safe and effective, in some cases with better outcomes than conventional face-to-face care. However, tele-oncology has not yet become standard practice. Digital health solutions need to be integrated into the patient pathway and in health care team practices for optimal supportive care in oncology in line with appropriate guidelines. Training education and formative evaluation are required to guide effective implementation. Formulating the right questions to ask is a critical starting point.

Implications for Nursing Practice: There is very little debate today about the centrality of the role of the oncology nurse in coordinating care, guiding the patient, and providing ongoing support. Mobile technology provides an opportunity for monitoring and support through a minimally burdensome, maximally accessible approach. Moreover, smartphones and applications allow for repeated evaluation of adherence and symptoms in real time, ideally enhancing care for patients. However, even with the growing acceptance of "nursing telepractice", there are challenges and barriers to overcome to mainstream digital health into oncology nursing practice. Telemedicine services go much further than simply digitizing traditionally analogue health care processes and services, they fundamentally reorganize processes, procedures, and services. Thus, in addition to training and education, nursing tele-oncology demands a service transformation.

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Introduction

An editorial in *Lancet Oncology* in 2018 warned: "As we enter this new world of digital health, we must not allow ourselves to be dazzled by the exciting technologies suddenly on offer and their role in health care needs careful consideration. This is a new field, and it needs close scrutiny to ensure that it is appropriate for the health sector, is cost-effective, and, above all, does not compromise patient safety".^{1(p999)}

Too late—the train has already left the station and is well on its way. Digital technologies are here to stay and already used in the

health sector. This was true before COVID-19, and has dramatically accelerated as a direct result of the pandemic, particularly in the area of remote care.

Digital Technologies: Already a Way of Life

More than 4.57 billion people around the world now use the internet, close to 60% of the world's total population. This number is still growing, with the latest data showing that more than 346 million new users came online in the 12 months to July 2020, equivalent to an average increase of almost 950,000 new users each day.

Most internet users (91%) use mobile devices to go online. As of July 2020, there are 5.15 billion unique mobile phone users in the world today, according to the latest data from GSMA Intelligence. The

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total number of unique mobile users around the world grew by 121 million in the past 12 months and is currently growing at a rate of 2.4% per year. However, hundreds of millions of people have also upgraded from “feature” phones to smartphones in the past 12 months. The latest data from Ericsson show that the number of mobile subscriptions associated with smartphones now exceeds 6 billion, accounting for 74% of the mobile handsets in use around the world today. Smartphone use is currently growing at an annual rate of 8%, with an average of more than 1 million new smartphones coming into use every day.²

The other development pushing the envelope, is the development and uptake of wearables. Whether it is a Fitbit or Apple Watch, wearable technology has grown immensely popular. According to Statista, the number of connected wearable devices worldwide will rise to 1.1 billion in 2022, a significant increase from the 526 million reported in 2016.³ The most successful wearable devices on the market right now are smart watches and health and fitness tracker with earwear projected to become the most dominant category in the future. In fact, more than 270 million units of earwear are forecast to be shipped in 2023, much more than any other wearable category. Wristwear (watches and wristbands) are projected to reach almost 180 million units by that time.⁴

Health Care Joins the Digital Revolution

Smartphones, tablet devices, and related applications (apps) are already being used by doctors and nurses in the clinical setting. A multicenter survey studying, “The ownership and clinical use of smartphones by doctors and nurses in the UK” by Mobasher et al⁵ found that 98.9% of doctors and 95.1% of nurses owned a smartphone, whereas 73.5% and 64.7% owned a tablet device, respectively. Also, 92.6% of the doctors and 53.2% of nurses found their smartphone to be “very useful” or “useful” in helping them to perform their clinical duties, whereas 89.6% of doctors and 67.1% of nurses owning medical apps were using these as part of their clinical practice.

For example, a growing number of health care professionals have adopted WhatsApp in their daily work to share information with peers and patients.⁶⁻¹⁰ In a recent survey in Victorian hospitals in Australia, communication app usage was widespread, largely consisting of WhatsApp in 85% of instances.¹¹ Although it is perhaps tantamount to the Dutch boy putting his finger in the dike, a number of health jurisdictions have banned the use of WhatsApp for clinical communication purposes because of security concerns. In the United Kingdom, its use is not considered concordant with the recommendations outlined in the latest NHS guidelines.¹² In the United States, WhatsApp is not considered Health Insurance Portability and Accountability Act (HIPAA) compliant.¹³ Nonetheless, its use by clinicians and between clinicians and patients continues to grow, driven by need. Giordano et al¹⁰ in 2017 published a systematic review article on WhatsApp Messenger as an adjunctive tool for telemedicine. It was concluded from their review that WhatsApp is a reliable, cost-effective, quick, and user-friendly tool that improves patient-related awareness and communication within the clinical health sector. An empirical investigation of individual and organizational determinants to use WhatsApp in a hospital by De Benedictis et al¹⁴ show that WhatsApp is widely used in the Hospital, and that its use is mainly because of the perception of numerous advantages and benefits reported in clinical practice.

Telemedicine/Telehealth

This paper focuses on digitally enabled remote care, also referred to as Telemedicine or Telehealth, including but not limited to voice or written digital communication and remote monitoring by Patient Reported Outcomes and wearable medical devices. The focus will be the practical aspects of how to effectively implement digitally

enabled remote care, rather than its effectiveness compared with face-to-face care. The questions raised will not address whether these methods are effective or beneficial, but to how to make them effective and beneficial in order to improve and expand their use.

Telemedicine solutions meet a natural demand in the digital age. In recent years, societies have been going digital and patients expect more from health care systems.¹⁵ Patients are increasingly interested in digital health technologies and are broadly in favor of their health data being used to create new knowledge for better treatments and their management within health systems, so long as privacy is safeguarded.¹⁶ Christian Otto, MD, MMSc, director of tele-oncology at Memorial Sloan Kettering Cancer Center noted¹⁷: “Those who do not engage in virtual care are going to fall by the wayside, and those who do provide digital platforms will succeed,” he said. “The patients are going to go where the convenience is”.

The Organisation for Economic Co-operation and Development (OECD) issued a special report on Telemedicine this year (2020). They noted that the use of tele-monitoring has increased in recent years in OECD countries, but few programs are established at national or higher levels. Countries show a steady increase in the number of health care institutions and patients using telemedicine, as well as the volume of services provided. A quick search of PubMed, an archive of biomedical and life sciences journal literature, using the term “telemedicine” returns over 8,500 studies, just in the last 5 years: an average of just under five publications every day for the 5 years prior to the study. Yet, despite this astounding growth in research and experimentation, rates of telemedicine use remained low, and telemedicine programs (beyond tele-radiology) struggle to make it past pilot stages at the local level.¹⁵

Studies on telemedicine interventions have shown clear and significant benefits for patients but have encountered difficulties demonstrating cost-effectiveness. Five reviews concluded that, although telemedicine interventions could be cost-effective, or cost saving, poor quality and paucity of cost data limited the ability to arrive at a definitive conclusion.¹⁸⁻²² Analyses of the cost-effectiveness of telemedicine interventions usually take a health system perspective, they tend to miss important cost categories that would make the economic case for telemedicine more favorable. Telemedicine services need to improve health care quality and meet needs of patients, which are key dimensions of people-centeredness. That is the standard for any other health intervention or technology and it is no different for digital health technologies such as telemedicine applications.¹⁵

COVID-19: Accelerating the Transformation

The COVID-19 pandemic has been a game changer for telemedicine. According to a study by McKinsey²³ in the United States, COVID-19 has caused a massive acceleration in the use of telehealth. Consumer adoption has skyrocketed, from 11% of US consumers using telehealth in 2019 to 46% of consumers now using telehealth to replace cancelled health care visits. Providers have rapidly scaled offerings and are seeing 50 to 175 times the number of patients via telehealth than they did before. In an article by Bashshur et al²⁴ published in May 2020 in *Telemedicine and e-Health*, they noted that:

“With the onset of COVID-19 and almost within days, it has become obvious that:

- (1) A sizeable proportion of outpatient visits in various settings can be clinically managed effectively from a distance, that is, patients with nonurgent conditions can be triaged to telemedicine service without compromising their health or quality of care.
- (2) The requisite infrastructure for connectivity is widely available at both ends of the clinical encounter, most readily through the ubiquitous smart phone. Most health care systems in private and public sectors have already deployed electronic health records, thereby ensuring continuity of care for their patients.

- (3) The necessary logistics can be developed promptly, including the necessary training where needed, staffing, and workflow with minimal disruptions or dislocations.
- (4) Little or no resistance can be encountered to this modality of care delivery since it is protective for providers and patients.
- (5) Government [US] has relaxed all restrictive regulations for telemedicine deployment, including interstate licensing, data confidentiality issues, and most significantly reimbursement."

There has been a similar experience in many countries. The number of articles published in so short a time on COVID and telemedicine is staggering and shows rapid uptake in numerous countries including Singapore, China, France, Israel, and Spain, just to name a few.

Oncology patients have not been neglected, because they constitute a high-profile, high-risk group of patients in the face of lockdowns and restrictions imposed during the COVID crisis. The European Society of Medical Oncology issued guidelines,²⁵ concerning patient care during the pandemic. In breast cancer management,²⁶ for example, it was clearly recommended to switch to telemedicine as much as possible for patients who present new symptoms or side effects, despite being considered high-to-medium priority patients. Shirke et al²⁷(p547) note that "COVID-19 has had a devastating impact on the care of cancer patients. Thus, tele-oncology has become a necessity to improve cancer care. Several organizations have issued guidelines for its use during COVID-19. Despite certain shortcomings, tele-oncology has great potential to help cancer patients during COVID-19 and in the future".

Telemedicine in Oncology Care

Oncology has not been a stranger to telemedicine even prior to COVID, and there is a significant literature base on the use of telemedicine for oncology patients. Aapro et al²⁸ in "Digital health for optimal supportive care in oncology: benefits, limits, and future perspectives" reviewed 66 studies that supported the use of 38 digital health solutions collecting electronic patient-reported outcomes (ePROs) and allowing remote monitoring. They found benefits to patients regarding symptom reporting and management, reduction in symptom distress, decrease in unplanned hospitalizations, and related costs and improved quality of life and survival. Among those 38 solutions, 21 provided patient self-management with impactful symptom support, improvement of quality of life, usefulness, and reassurance. Principal challenges identified were in developing and implementing digital solutions to suit most patients while ensuring patient compliance and adaptability for use in different health care systems and living environments. The authors concluded that there is growing evidence that digital health collecting ePROs provide benefits to patients related to clinical and health economic endpoints and that these digital solutions can be integrated into routine supportive care in oncology practice to provide improved patient-centered care.

For people with cancer, it is extremely important that there are no interruptions to treatments or other vital service. The COVID-19 pandemic may have hastened the use of telehealth services, but many medical and cancer centers (in the US) have been developing and using these services for years. Some recent telehealth innovations designed to protect the health of people with cancer include:

- Emergency department pre-screenings using an app for a video consultation directly with a physician anytime of the day or night to screen patients before they come to the emergency department
- Bedside communication for hospitalized patients using a hospital-issued, sanitized computer tablet so they can stay in touch with their care team and even loved ones who are not allowed to visit
- Remote patient monitoring and caregiver connections that enable distance caregivers of cancer patients (who arrange

transportation to medical appointments, schedule in-home care, order medications and medical equipment, and provide other critical care needs) to be present virtually with the patient during his appointment²⁹

Patients with cancer have a positive experience with telemedicine and find it to be convenient and acceptable.³⁰ For cancer survivors, telemedicine is convenient, provides independence and remote reassurance, reduced burden, and the safety net of connections with health workers.³¹ One of the uses of telemedicine in cancer care is monitoring adherence and side effects of oncolytic oral treatment.³² Oral chemotherapies are increasingly prescribed as an alternative therapeutic delivery method to traditional intravenous chemotherapy. Patients overwhelmingly prefer oral versus intravenous treatment due to the convenience of home administration and flexibility. However, as cancer care is delivered at home, patients and oncology clinicians encounter new challenges such as less oversight and support, poor adherence, and symptom monitoring compared to directly observed infusion chemotherapy.³² Mobile technology provides an opportunity for monitoring and support through a minimally burdensome, maximally accessible approach. Moreover, smartphones and apps allow for repeated evaluation of adherence and symptoms in real time, ideally enhancing care for patients prescribed oral cancer therapies.³³ Paladino et al³⁴ conducted a randomized controlled trial in 2019, using the THRIVE app to monitor Adjuvant Endocrine Therapy adherence and related adverse symptoms. They concluded that a successful web-enabled intervention could be disseminated across systems, conditions, and populations, while reducing costs, improving health outcomes and improving patient care experience.

Sirintrapun and Lopez³⁵ cite numerous articles and studies, which show that tele-oncology has been demonstrated to improve access to care and decrease health care costs. This includes teleconsultations that may take place in a synchronous, asynchronous, or blended format. Examples of successful tele-oncology applications include cancer telegenetics, bundling of cancer-related tele-applications, remote chemotherapy supervision, symptom management, survivorship care, palliative care, and approaches to increase access to cancer clinical trials. Telepathology is critical to cancer care and may be accomplished synchronously and asynchronously for both cytology and tissue diagnoses. Mobile applications support symptom management, lifestyle modification, and medication adherence as a tool for home-based care. Telemedicine can support the oncologist with access to interactive tele-education. They conclude that the potential of technology on facilitating care is tremendous. However, for successes, we must put more focus on appropriate training, education, and reimbursement and look for gaps such as those inherent in the digital divide.

Although the clinical benefits of remote patient monitoring have been demonstrated in clinical trials, achieving optimal supportive care requires strategies that go beyond ePRO apps/systems. Digital health solutions need to be integrated into the patient pathway and in health care team practices for optimal supportive care in oncology in line with appropriate guidelines. How this integration is implemented is debatable, with consideration given to whether the digital tool should be merged into current health care systems in a gradual or a disruptive manner.²⁸

Nursing Tele-Oncology: The New Frontier

Nursing has evidenced a certain amount of ambivalence toward telemedicine. The previously cited study, by Mobasheri MH et al⁵ on the clinical use of smartphones by doctors and nurses in the United Kingdom, They showed that although a majority of doctors already use their smartphones to conduct clinical business, and 92.6% of physicians surveyed found their smartphone very useful or useful in performing their clinical duties, The rate decreased significantly

among nurses, with only 53.2% finding their smartphones useful. Likewise, a study on the use of WhatsApp by doctors and nurses in an Italian hospital¹⁴ showed that, as opposed to doctors, who reported using WhatsApp extensively, almost none of the interviewed nurses use WhatsApp to communicate with patients, only a few nurses report that patients ask them to use this app to facilitate communication and the number of nurses who suggest using WhatsApp to patients is less than 5%.

Recognizing this ambivalence, Jeannette Pols published "The Heart of the Matter. About Good Nursing and Telecare" in 2010,³⁶ citing a study on telenursing within innovative telecare practices for chronic patients in The Netherlands in which she addressed nurses' worry that the implementation of care at a distance or telecare will impoverish patient care by taking out "the heart" of the clinical work. This included the fear that telecare would induce the neglect of patients, and possibly hinder the development of a personal relationship between nurse and patient. Pols' findings showed both the downside and the upside of using telecare.³⁶ Depending on the nature of the solution, it could be either limiting or broadening. For example, the use of inflexible protocols in a telecare device was at odds with flexibility based on nursing judgement, which was limiting. On the positive side, the daily delivery of signs from telemonitoring and the possibility of frequent contacts with the patient brought patient and nurse closer to each other. Instead of once every 3 months, the nurses got information from their patients every day. Pols concluded that good nursing is obviously not a static, a-historical thing and is related to many different local developments, the introductions of new technologies, buildings, different types of patients, organizations, and changing notions. The heart of good nursing may have shrunk when it became clear that not "everything" could be seen. Yet the telecare devices allowed for much more frequent consultations and checks and a closer guarding of the patients' condition by attending to the process of being ill. It made patients and nurses feel closer to one another. The nurses' sixth sense to spot problems was turned into daily monitoring of information produced, but not interpreted, by the patients, who were intensively followed-up with phone calls.

There is very little debate today about the centrality of the role of the oncology nurse in coordinating care guiding the patient and providing ongoing support. In the United States, it has been accepted for years and in addition to oncology nurses who provide direct clinical care, the prevalent concept is that of the Oncology Nurse Navigator. The Oncology Nursing Society booklet on Oncology Nurse Navigator Core Competencies^{37(p5)} in 2013 as well as its updated version in 2017 defines an Oncology Nurse Navigator as follows:

"An oncology nurse navigator is a professional registered nurse with oncology-specific clinical knowledge who offers individualized assistance to patients, families, and caregivers to help overcome health-care system barriers. Utilizing the nursing process, an oncology nurse navigator provides education and resources to facilitate informed decision making and timely access to quality health and psychosocial care throughout all phases of the cancer continuum".

Interestingly, competency in the use of digital tools is not included; the closest is the requirement for basic computer skills. In Europe, the practice of "cancer clinical nurse specialists" (CCNSs) is less well-developed but the concept is the same, the CCNS is conceived of as a nurse who acts as navigator through the cancer care pathway, from diagnosis through to follow-up and end-of-life care, and the cancer CNS is crucial to continuity of care. Ilana Kadmon³⁸ from Hadassah hospital in Israel notes the very positive development of the oncology nurse in Israel. She specifically focuses on the Breast Cancer Nurse (BCN), first introduced in Great Britain. In the 1980s, controlled studies conducted in the United Kingdom showed that women who had met a BCN and received counseling, advice, and emotional support from such a professional, showed lower levels of

anxiety and depression, and a general better ability to cope with their disease.³⁹ In Israel, the Health Plans, responsible for providing their members with the public basket of services under the National Health Insurance Law, have had oncology nurse coordinators for many years. They guide patients from the moment they are diagnosed and throughout their care journey, assuring continuity of care with the hospital and assuring that patients know how to access all the services for which they are eligible. This is consistent with the concept of the oncology nurse navigator, common to an increasing number of cancer centers worldwide.

A review of the literature on oncology nursing as well as the oncology nurse navigator reveals that ongoing monitoring and communication with the patient is a core value, which in most cases reviewed, is done by face-to-face visits and by telephone with no explicit mention of digital technologies.^{40,41} Noteworthy, in the updated Oncology Nursing Society's 2017 Oncology Nurse Navigator Core Competencies³⁷ there is still no mention of skills using digital technology, and only basic computer skills are required.

This recognition of the digital competency of oncology nursing, however, is beginning to change. A recently published article describes the successful implementation of a digital oncology platform in Belgium, spearheaded by clinical nurse oncology specialists.⁴² In 2020, the College of Nurses of Ontario published Telepractice Guidelines, which replaced the Telephone Practice guideline. They note "telecommunication technologies have been integrated into nursing practice. Increasingly, technologies are being used to provide care, conduct consultations with patients or other professionals, and provide education or transmit information over geographical distances."^{43(p3)} They define nursing telepractice as "the delivery, management and coordination of care and services provided via information and telecommunication Technologies",^{43(p3)} citing the American Academy of Ambulatory Care Nursing, 2004, page 20. This may include the use of telephone and cell phone communication, e-mail, video and audio conferencing, and instant messaging (eg, texting, multimedia, online chat). Nursing telepractice encompasses all types of nursing care and services delivered across distances.⁴³

Even with the growing acceptance of "nursing telepractice", there are challenges and barriers to overcome. Aapro et al²⁸ described the benefits and limitations of digital health care solutions for nurses. Benefits included effective time-management including time saving in the analysis of patients' data, contacting patients only when clinically relevant situations occur; increased quality of services with less health care resource utilization; and improved patient-nurse communication. However, there were also limitations including difficulty in dealing with technology, need for specific training to ensure engagement, time dedicated to educating and informing patients and caregivers, and additional time allocated outside patients' visits.

Where Do We Go from Here?

The use of telemedicine in the United Kingdom, comprising video, telephone, and other electronic communication, has substantially risen from ~10% of general medicine consultations before COVID-19 to ~75% during the peak of the pandemic. Likewise, the United States has also seen a surge in telemedicine. Many cancer centers have moved from 40 telemedicine visits per year to 4,000 in a month. Although the number of remote consultations has started to level out to somewhere in between, as countries tentatively tread the slow road back to normality, there are indications that telemedicine is here to stay.⁴⁴ Therefore, the question is not whether to implement digitally enabled remote care for cancer patients, but how to do it most effectively. We need to ask and answer questions like the following:

- At what point in the care pathway (eg, crisis intervention, prevention, engagement, treatment, maintenance, and recovery) are digital interventions most safe and effective?

- Which patients are best suited to which mode of consultation; telephone, video, or face-to-face?
- How do we decide when face-to-face care is required?
- How can we make telemedicine personalized and user friendly?
- How do we maximize the benefits of telemedicine? For the patient? For the family (caregivers)? For the doctor? For the nurse?
- How can we reorganize workflows and processes so that the adoption of digital technology can optimize capacity, access to services, waiting times, and preferred appointment times?
- How can the common elements of the face-to-face therapeutic relationship (eg, empathy, gestures, nonverbal cues) that come from person-to-person interactions be maintained with digital technology interventions?
- How can treatment outcomes be maximized by combining existing treatment options with digital interventions?
- How can social media be used more effectively to bring people with cancer (or survivors) together and help them connect, eg, in their communities, rather than isolating them in their homes?
- How do we maximize the benefits of telemedicine to care providers, such as doctors and nurses? How do we support them in the use of digital tools for remote care?
- What are the unique roles that nurses can play in tele-oncology? What are the unique benefits that nurses bring to the telehealth relationship?
- What skills do nurses need to be effective telehealth carers? How do we facilitate the development of these skills?
- How do we determine what works best and for whom?

Although the focus of these questions is on implementation, it is clear that we need evaluation to guide effective implementation. As Hashiguchi¹⁵ noted in the recently published OECD Health Working paper, "...telemedicine services are both technological and service innovations. They go much further than simply digitising traditionally analogue health care processes and services, they fundamentally reorganise processes, procedures and services."^{15(p36)} It is increasingly clear that traditional research methods such as randomized control trials, although the "gold standard" of clinical research, are not appropriate here. Evaluating digital health technologies like telemedicine requires a process of continuous learning, a mix of methods, and the use of both experimental and non-experimental "real-world" data.⁴⁵ A transition to learning health care systems is needed to reap the benefits of telemedicine and other digital technologies.¹⁵

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