Cancerworld

Telemedicine in the cancer continuum: Lessons from the Covid area and progress towards oncological prevention

Adriana Albini / 4 July 2022

Although telemedicine was to various degrees already in existence, with the Covid-19 pandemic it suddenly became a must, prompted by lockdown regulations and fear of contagion. Solutions had to be found and implemented quickly, and changes in the delivery of health care had to be put in place overnight, that would have taken decades otherwise. A new panorama in health care has emerged in the past couple of years, with many enticing promises and hurdles to overcome. Now that we have hopefully entered an endemic phase of Covid-19, in-person care is resuming in many areas, but telehealth has proven to have many benefits, and it is most certainly here to stay. It offers reduction in travel time, cost, and burnout for patients, families, and health care professionals alike. It adds flexibility and better allocation of resources, it allows personal and family empowerment and 24/7 remote monitoring. It also encourages the desperately needed digitisation of medical records, and the development and employment of AI and deep learning, so vital for the future of precision and patient centred medicine. Testing, monitoring, treatment adhesion, education, interdisciplinary team consultations are just some of the areas in which telemedicine can be successfully applied. Evidence gathered in the past two years indicates that the highest positive outcomes so far have been in the virtual care of mental illness, diabetes, chronic lung disease, arterial hypertension, and cancer.

Since the 1900s inventions such as the telegraph, telephone, radio, television, internet, have created an interconnected world that has facilitated communication, exchange of information, easier access to goods and services. To a certain degree medicine also took advantage of these innovations. The cover of the magazine Radio News in 1924 depicts the "radio doctor" as a feasible and desirable future reality. The first X-ray remote consultation took place in the 1940s, and remote consultations were also utilised in the military for illnesses and injuries during the war. In the 1950s the United

States invested time and money for research in telemedicine for their astronauts. Of course, phone calls between doctors and patients were and still are common, and they are the simplest version of telemedicine, with their variants "WhatsApp" and "Skype" calls.

Progress in the development and adoption of remote health was very slow indeed before it had to drastically change gear, to deal with the pandemic. So why does the health industry still lag so far behind other industries in its virtual applications? For instance, a visitor to a foreign country can easily access his/her bank account; and media have standardised formats that allow people from all over the world to enjoy their music or picture downloads. There are many logistical, ethical, privacy, psychological and financial hurdles that need to be overcome in the path towards an efficient, sustainable, and equitable employment of telehealth.

Telemedicine is particularly promising for the whole continuum of cancer care, where interdisciplinary teams are often required, and screening, monitoring, treatment adherence and psychological support are regularly needed, often long-term. In collaboration with [ASCO (American Society in Clinical Oncology)](), in 2021 SPCC launched the [first phase of the "SPCC Telemedicine in Cancer Care Project"](). A series of four webinars promoted the topic of telemedicine, examining its potential, limitations, barriers, challenges, and also new frontiers, such as AI and machine learning. The second phase of the project started with a conference held online on 6-7 May 2022, that saw the participation of world-renowned experts, some of whom already involved in the 2021 phase of the project. The focus of the conference was on how to overcome barriers and limitations, and address new challenges through the sharing of best practices on telemedicine applications. The ultimate goal is to create the best conditions to implement and integrate telemedicine applications to improve the cancer care pathway truly and effectively, for patients and their relatives, but also for health systems, in terms of cost-effectiveness, efficiency and sustainability.

Starting at the very beginning of the cancer continuum, how can telehealth help with **prevention**? Of course, prevention of a disease has an innate paradox:, the prevented pathology does not appear. It often requires a persistent behavioural change, the specific rewards of which are… invisible: if it works it cannot be seen. This form of prevention is called **primary prevention**. In cancer, it consists in the avoidance of known carcinogenic factors, from environmental and occupational hazards to tobacco cessation, changes in diet and increased physical activity. In the live discussion part of the conference, many suggestions were made on the subject: health care professionals can promote healthier lifestyles through social media, and in fact, it is very important that they are careful and deliberate about the content they post on those platforms. We could also add that fitness and diet videos gained popularity during the pandemic, creating a stronger community; and the so-called gamification of health can help adherence to exercise and diet goals in those populations with access to wearables, such as smart phones and watches. A simple system of competition and "rewards" can stimulate adherence and a sense of achievement. Screening is an important part of prevention, and telemedicine can facilitate it in many ways with education, online questionnaires, community platforms for patients, and rapid and efficient consultations between professionals, to detect potential health issues and act promptly.

More dramatic, is the impact that telemedicine can have on **secondary prevention**, which involves screening before the appearance of signs and symptoms to allow for early detection and treatment and to avoid recurrency. Through telecommunication, patients can be reminded and encouraged to take tests. Available screening data and genomic data can improve precision screening and better define risks as well. We must also remember that telemedicine was first employed for consultations between physicians, who can discuss images and test results to make a prompt diagnosis. This system of teleconsultation can be successfully carried out even in countries with less developed and available technological resources.

Tertiary prevention seeks to reduce morbidity and disability in people treated for a disease, to maximise survivorship and quality of life. In cancer it can concern also the prevention of metastases. Again, telemedicine can be successfully adopted through screening, patient reports, web questionnaires and interdisciplinary teams.

Looking at some best practice examples for prevention/early detection, an interesting case is the **ONCOPADI** platform in Nigeria, presented at the conference by **Alex Filicevas**, President of All.Can International and Executive Director of the World Bladder Cancer Patient Coalition. The Oncopadi Digital Clinic is mentioned among the examples of best practice in cancer care gathered in the All.Can Efficiency Hub. In Nigeria many people with cancer do not seek medical attention until it is in a more advanced stage, there is limited understanding of the disease as well as stigma and fear attached to it. People tend to seek help from religious leaders, often for years, before turning to clinicians. Outcomes in Nigeria are generally poor, with an estimated mortality rate of 80% across all cancers. Also, there are only less than 100 clinical oncologists, mostly based in large cities. Launched in 2017 by Dr Omolola Salako with support from the Sebeccly Cancer Care and Support Centre, Oncopadi is an online platform that focusses on improving access to specialist care and information for patients, and is specifically beneficial at the earlier stages of cancer care and diagnosis.

After an initial assessment, the platform connects people with an oncologist for an hour-long audio or video consultation via the app or telephone. The patient then receives a written summary of their appointment and a referral to their closest oncology hospital or diagnostic centre, depending on his/her need. Oncopadi also houses educational resources for people with cancer and their family carers, including patient guides and information on diagnoses, treatment and living with the disease. In early 2020, a smartphone app version was released to help oncologists and patients navigate the first wave of the COVID-19 pandemic, and limit disruptions to cancer care.

The number of people using the internet as a source of health-related information has steadily increased with time, and online resources can change the patient-professional relationship towards a more patient-centred care. **Christian Ochoa-Arnedo**, Chief of the Digital Health Service ICOnnecta't at the Catalan Institute of Oncology and Professor of Psychology at the University of Barcelona, pointed out that although almost 90% of cancer users search information and health education when they are diagnosed, more than 50% do not feel comfortable to share this information with their health professionals. There is an important gap of communication here that can be filled by internet community platforms and apps directed by health care professionals. Backed by the European Institute of Technology (EIT), OnCommun, of which Dr. Ochoa is Project Director, is an example of such an ecosystem. Its name is an acronym for "online cancer support communities" and its objective is to reduce cancer impact by improving access to psychosocial care and education. Cancer is a very hard transition; emotional distress is common and can be quite intense. Yet only 15% of cancer survivors, if not less, have access to psychosocial care. Educational and psychosocial care access can improve also other aspects in the cancer journey, such as therapeutic adherence, sick leave, time before returning to work, and, of course, quality of life. Better psychosocial support also means a possible reduction in the use of psycho pharma. OnCommun is a digital resource to online screen and monitor patients and to improve the social alliance between patients and health professionals. It has an important role in secondary and third prevention by detecting early signs of emotional distress. It is designed in steps, like a pyramid. At step 1 it includes all patients at the beginning of their cancer journey. If emotional distress is detected through screening, the patient is appraised by videoconference, and moved to level 2, called Campus, where he/she gains access to self-help and guided online videos. If this intervention goes well, they do not need to move further up. Otherwise, they are given access to the next step two weeks after the intervention. This third step is called Comunitats, an online support community supervised by specialists in different oncologic therapeutic areas. An AI algorithm helps pairing the patient with suitable mentors. At all

the steps a videoconference assesses the patients and guides them through the ecosystem. The top of the pyramid, level 4, is an intensive online group training via videoconference. When patients finish their oncological treatments, they can remain in the ecosystem with an optional, light follow-up. But the most important thing is that they can remain to give help and support to other patients that are beginning their experience. The preliminary results of OnCommun are very promising: 95% of patients resolve their educational psychosocial needs in the preventative scales, that is, in the first three levels, and detection time is fast, within 1.4 days.

These kinds of telemedicine resources work best if there is a health professional behind them, they help empower patients, still engaging with them, yet reducing digital paternalism, and creating a more balanced, collaborative relationship.

Cancerworld

Telemedicine and diagnosis

Adriana Albini / 27 September 2022

The adoption of telemedicine and its range of applications grew exponentially in the early days of the Covid-19 pandemic, and the general consensus now is that it is here to stay, albeit perhaps with a more hybrid bias of in-person and remote visits. Telediagnosis, or TeleDx, i.e., the identification of a disease at a site remote from the patient, has expanded to include primary care, revolutionising the way in which patients and doctors communicate with each other and establish rapport. It is still early days to fully evaluate the effect of virtual vs in-person visit on diagnostic error, but there are guidelines for health professionals to conduct effective virtual examinations, and many best practice examples, both in terms of ways to gather information from the patient (from wording of questionnaires to digital records, home environment, and so on) and technological innovations.

The live telepathology system connecting Boston Logan Airport and MGH in action (1968). Considered the first working telepathology system in history.

Blood smear video stream

Urine video stream

Images courtesy of Dr. R. Weinstein
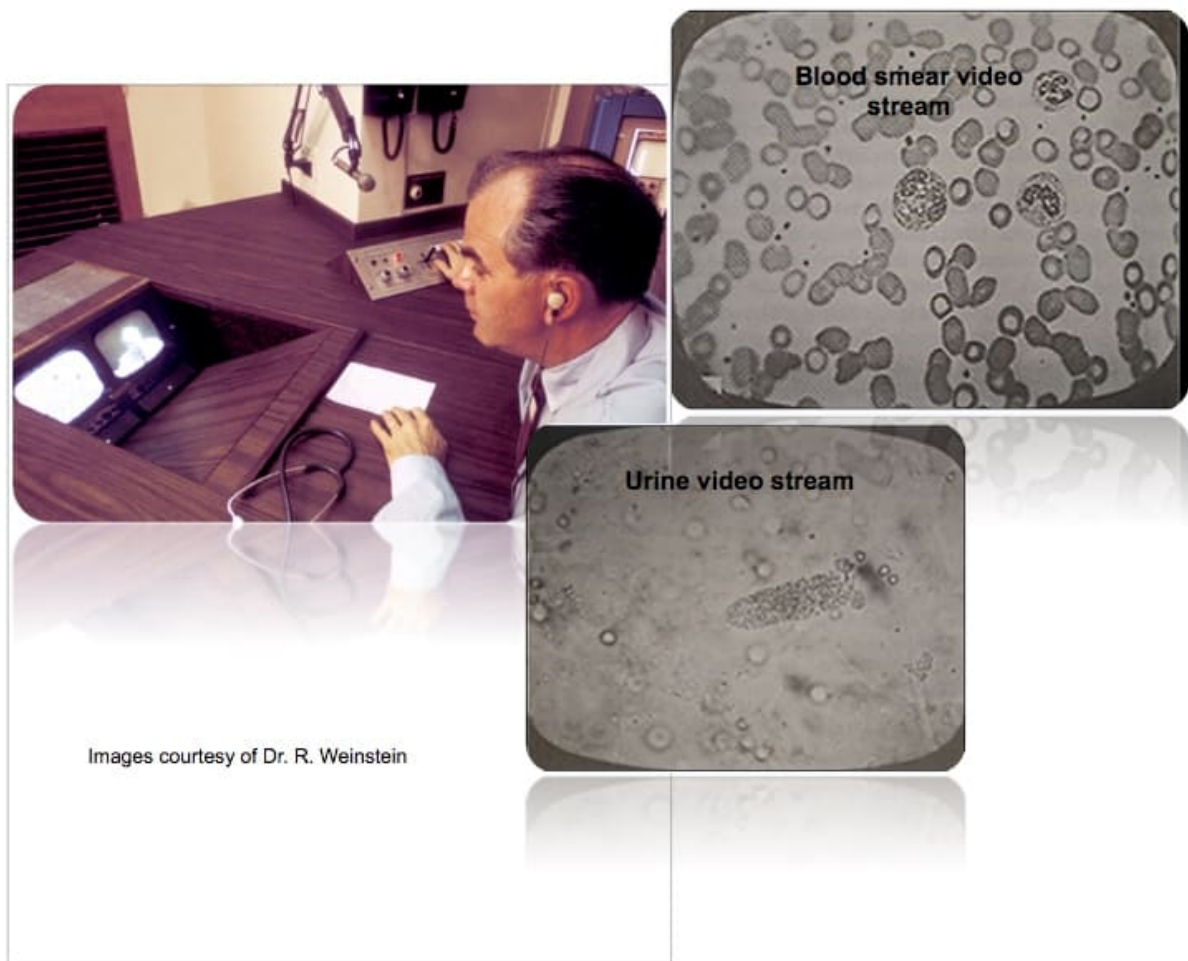
In cancer care, **pathology** plays a central role in the final diagnosis upon which clinicians will develop treatment for their patient, and remote pathology can offer many advantages, such as easier access to pathology experts, consultation among specialists, timely and secure availability of images, and so on. Up until the 1990s, pathologists worked almost entirely within the constraints of the analogue world, with physical glass slides and microscopes. Some attempts were made at capturing virtual images of slides through a tiling method, which was time consuming and prone to error, as it required accurate placing and extensive stitching together of images. But at the end of that decade, engineer Dirk G. Soenksen (founder, and CEO of Aperio) devised a much more efficient system based on a linear scanner, the ScanScope, that allowed for tightly focussed and fast slide image capture, opening a new era for the practice of pathology. Whole slide imaging, or WSI, was first employed in education and research but in recent years, with the improvement of its technology, it has received regulatory approval by the FDA and around the world for diagnostic use as well. The potential for feeding AI algorithms to provide diagnostical support is massive, as virtual slides are accumulating fast and standardised databases are being built.

"Telemedicine in Cancer Care Continuum: implementation and integration", was an online conference developed by the SPCC in collaboration with the American Society of Clinical Oncology (ASCO), which took place on 6-7 May 2022. In his presentation, **Liron Pantanowitz**, Professor of Pathology, and Director of Anatomical Pathology at the University of Michigan, talked about **telepathology in both its non-acute and acute settings**, focussing more extensively on the latter. The term 'telepathology' was coined by Ronald S. Weinstein in 1986, after he organised the first public event of satellite-enabled dynamic-robotic distant pathology, but the very first live

telepathology ever performed dates as far back as to 1968. Massachusetts General Hospital set up a two-way television link with Boston's Logan Airport that enabled doctors at the hospital to remotely study blood smears, urine samples and X-rays for patients at the airport, and even listen to their heartbeat with an electronic stethoscope. However, as in the case of telehealth in general, the adoption of digital pathology had to wait until the Covid-19 pandemic to be widely implemented. To facilitate continuity of healthcare while social distancing, certain restrictions were lifted, such as CLIA in the US, allowing pathologists to work from home and sign out cases.

The first use of telepathology Prof. Pantanowitz looked at was for **frozen section** consultation. There are several challenges when a pathologist is asked to provide an intraoperative consultation. The pathology specimen is fresh, not easy to cut. The frozen section itself is difficult to prepare and is often filled with artifacts. These artifacts not only make it hard to read the glass slides but can compound the problem when using digital images. The turnaround time needs to be rapid. Usually, pathologists strive for less than 20 minutes to provide the surgeon with an answer. And they are under serious diagnostic pressure because if they get it wrong, it is difficult to reverse the surgical decision that has been made based on their diagnosis. Over the past 54 years different modes of practising telepathology have been developed. A pathologist on site can take static images, which is easy but too time-consuming. There is also video microscopy, live streaming from one pathologist to another. If there is no pathologist present on site to read the slides, there are systems such as robotic microscopy, where the pathologist can remotely take control of the functions on a microscope, such as navigation and focus. And there is also Whole Slide Imaging, which is the entire digitization of a slide to be remotely reviewed. Thanks to advancements in technology, hybrid devices are now available from many vendors with robotics and Whole Slide Imaging functions in one scanner.
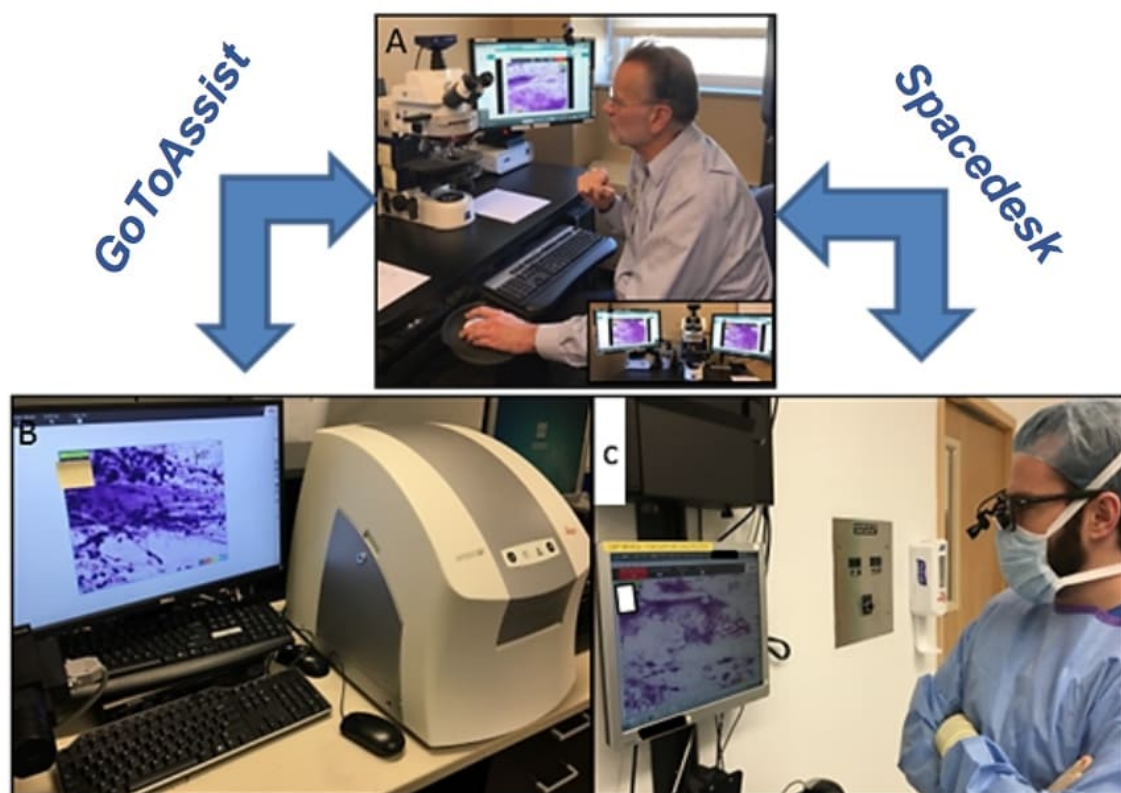

Image courtesy of Dr. Jennifer Picarsic

One of the most common complaints about telepathology is the loss of personal connection between surgeon and pathologist. However, with modern desktop-sharing software, like GoToAssist,

Spacedesk, and others, surgeons can be looped into the frozen section so that they can see what is going on with their cases, which is important for them to remain engaged and to assist with decision-making.

Prof. Pantanowitz then talked about another use for telepathology: **telecytology in the acute care setting**. Rapid On-Site Evaluation (ROSE) has become very popular due to the fact that one proceduralist can now perform minimally invasive diagnostic procedures such as core-needle biopsies. An on-site cytology team then performs an adequacy evaluation, which limits the need for repeat biopsies. Clinical trials for remote cytology showed it to be a more efficient model than on-site, with a diagnostic accuracy comparable to traditional methods. The **advantages** of adopting telecytology for ROSE include the ability to remotely offer ROSE, and thereby maximise small biopsies by reducing non-diagnostic specimens. There is less travel time for pathologists to go on-site, less overall procedural time, and cost saving, as less pathologists are needed for ROSE. Single pathologists can simultaneously perform ROSE at many different locations, and there is more independence for cytotechnologists. Unfortunately, there are also some **disadvantages** in using telecytology for ROSE: less face-to-face interaction with the proceduralists; reliance on personnel on site to navigate the slides and display relevant material; there are an up-front capital investment and ongoing maintenance costs, an initial learning curve, interpretation errors and technology failures. There can also be psychological barriers for pathologists such as technophobia, fear of making mistakes, loss of control and frustration.

The next use for telepathology is for **second-opinion teleconsultation**. Why would one want to share an image? There is a persistent shortage of pathologists around the world, and this is in the face of an increased demand for expert diagnostic consultation. Clinicians also find it useful to share cases and expand their knowledge, and patients themselves recognise the utility of a second opinion.

Mobile Devices

- Smartphones & tablets
- Microscope adapters
- Static & video images
- Few feasibility studies
- Security concerns
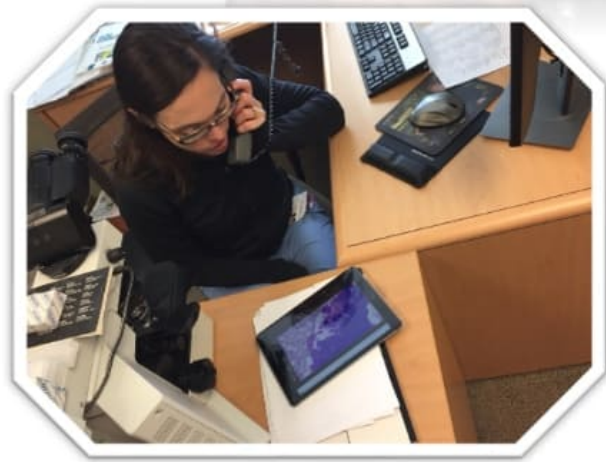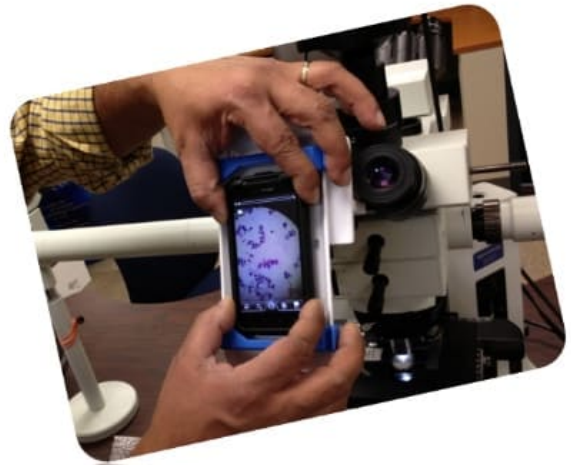
Although there are clear benefits in migrating to newer instruments and updating software in order to take advantage of more seamless, user-friendly features and more accurate, faster systems, teleconsultation can also be carried out with basic, affordable equipment, such as mobile devices. In fact, the success of remote consultation around the world is very much dependent on implementing low-cost and simple technology solutions. Telepathology can be practiced very simply, using a mobile phone. Mobile networks are actually more reliable than land networks or wi-fi and are accessible almost anywhere in the world. For instance, during conflict in Syria, one area that was majorly deficient was access to pathology care. Prof. Pantanowitz's team set up a hut and trained a person to do simple microbiology testing. Pictures taken with a simple camera were then uploaded to different infectious disease physicians around the world, and all of a sudden there was a world-class microbiology lab in the middle of Syria.

The most important factor for innovation is the desire for innovation, when all the stakeholders collaborate towards technological progress. One such hotbed for innovation is Israel. **Ilan Misano** is a biomedical engineer with a second degree in Economics and Management, who works as a technology transfer consultant between Israel and Italy. In his presentation, he talked about the Israeli telemedicine model and showed examples of Israeli inventions in the field of MedTech. In terms of telediagnosis and monitoring useful for cancer care there are some interesting devices for remote testing. For instance, the Sheba Medical Center, one of the most innovative hospitals in the world, developed a **no-needle blood test**, which is being tested by astronauts in space. The device looks like a pair of binoculars or a microscope that the patient brings to his/her eyes. Inside the eye there are some blood vessels that are transparent. Via the reflection of the wavelength sent into the

eye, we can evaluate some of the components that are in the blood of the patient performing the check. So far, this check is only for blood count, but the lab in Sheba is developing the product further, to include more blood tests.

Another important check is the urine test, and we all know how burdensome it can be. You have to urinate in a cup, arrive to a lab, leave the sample, wait for the results, communicate the results to the doctors. **Healthy.io**, an Israeli start-up, invented a simple kit to do a fully remote urine test. The kit contains a disposable cup and a white strip with 10 different squares that are reagent to 10 different parameters. The patient urinates in the cup and inserts the white strip in the cup. The squares change colour based on the amount of that chemical parameter contained in the urine. Then the strip is positioned next to a reference colour board. The patient downloads an app, takes a picture of the colour board with the strip on it. The AI algorithm in the app is able to evaluate the changes in colour in the strip that was inserted in the urine, and to return semi-quantitative results of the urine test. We know how much these parameters are important, for example, for a screening of bladder cancer where the haematuria is very important, so, evaluating how much blood is inside the urine is crucial. The kit is CE certified; the accuracy is lab standard.

Ultrasound sometimes is important to detect the presence of cancer. **Pulsenmore** is another interesting innovation developed by an Israeli start-up. It allows to do an echography from remote. Currently it is focussed on pregnancy, but hopefully, in the future, the system will also be able to detect for example, a cancer. It consists in a device in which to insert a mobile phone, and an application to download. The system is connected to a telemedicine platform that allows the doctor to see the images from remote, and the app shows the user how to move the device.

Binah.ai is a software solution to monitor different parameters from remote without the need of any device besides a smartphone camera. The system isolates a zone in the face below the eye and is able to evaluate minimal movements of the skin and minute changes in its colour, and from that it can calculate the heart rate and oxygen saturation within two minutes. After two minutes, we can also obtain the respiration rhythm, HRV and stress level. Now the company has also announced the feature of blood pressure evaluation, and they are planning to develop more and more parameters.

So, why is Israel experiencing such a flourish of start-ups and innovation? There are many contributing factors. First and foremost, mentality. People in Israel want to innovate. Due to the harshness of the territory and the environment, the development and use of technology is a must. In Israel there are a lot of start-ups, but also of incubators and accelerators, R&D e-innovation centres, venture capitals, entrepreneurs, private investors, etc. More and more multinational companies are opening offices there to see all the innovation that happens, and also to further develop their own products. For example, in the healthcare and medical field, some of the biggest firms have offices in Israel. There is synergy between different actors in the industry and a lot of money is invested in start-ups. The health system also encourages innovation. There are four insurance companies, which offer a basic free package for Israelis and additional services at a premium. So, they are always competing for customers by offering better services. They all have very structured digital databases, which allow to train AIs to support doctors in their decision making.

Once dealt with the set-up investment and learning curve, telediagnosis can be a valuable addition to healthcare efficiency, with reduced costs and travel time, easier access to specialists and team consultations. The digitalisation of data encouraged by telehealth will improve AI algorithms, making them increasingly more reliable as an aid to diagnosis; and remote, at-home testing devices will contribute further towards a patient-centred healthcare.

Cancerworld

Telemedicine on the path to personalised treatment

Adriana Albini / 19 October 2022

Telemedicine has been defined as the use of telecommunications technology to deliver health care to populations with limited access to care. However, its increased adoption in the past couple of years, triggered by the Covid-19 pandemic and the constant development of new technological solutions, are showing a vaster range of benefits for everyone, from financial to quality of life, from timesaving to better allocation of resources, ease of multidisciplinary consultations, monitoring, and so on.

Telemedicine has now been tested in multiple settings and has demonstrated to be at almost equivalent to in-person care in certain situatios. Furthermore, it has the potential to deliver a more personalised care, through AI, patient questionnaires and interprofessional consultations. Because of the complexity of cancer care, which requires multidisciplinary teams, teleoncology has proven particularly successful, so much so that is has been hailed as the fourth (albeit the youngest) pillar of oncology, next to surgical, radiation, and medical oncology (Puneet Pareek et al., JCO Global Oncol 6:1455-1460.) Due to a dearth of oncologists around the world and an ageing population, the possibility of performing remote or supervised surgery and chemotherapy treatment is being explored with good results. In the Queensland Remote Chemotherapy Supervision (QReCS) model, rural generalist nurses administer chemotherapy and other therapy agents under the supervision of specialised nurses from a tertiary centre via videoconferencing. Implementation of QReCS started as far back as 2014. In Spain in May 2022, a breast cancer surgery was performed for the first time, which was remotely supervised by a second surgeon using augmented reality and 5G.

In cancer treatment, beside remote intervention, telemedicine can help towards devising and implementing more personalised, patient-centred therapies, partly because of its overlap with digital health and Real-World Evidence. At the SPCC and ASCO online conference "Telemedicine in Cancer Care Continuum: implementation and integration", **Massimo Di Maio**, medical oncologist at the

University of Turin, Italy, gave a presentation on the potential and the limits of telemedicine from Real World Data to Real World Evidence. **What is the role of Real-World Data and Real-World Evidence in oncology?** We usually consider large randomised control trials (RCTs) as the most solid source of evidence for clinical practice. However, they have a number of limitations, for instance they might ask questions of commercial rather than clinical interest, show statistically significant but clinically not so relevant results, or select patients who do not represent those seen in everyday practice ([Ian Tannock et al., Relevance of randomised controlled trials in oncology, *Lancet Oncology* 2016; 16: e560-567](#)). Such weaknesses are reasons to search for Real-World Data and Real-World Evidence to integrate the results coming from pivotal trials and from randomised control trials.

The FDA definition of Real-world data (RWD) is: "the data relating to patient health status and/or the delivery of health care routinely collected from a variety of sources" (such as electronic health records, product and disease registries, etc.) While "Real-world evidence (RWE) is the clinical evidence regarding the usage and potential benefits or risks of a medical product derived from analysis of RWD." Real-World Data and Real-World Evidence are not just valuable in terms of our scientific knowledge. The FDA and other agencies are increasingly recognising their role in regulatory decisions and regulatory approval of treatments.

In 2020, Di Maio and his colleagues Franco Perrone and Pierfranco Conte, published a review on *The Oncologist* to discuss the opportunities and limitations of Real-World Evidence, specifically in the oncology field ([Di Maio M, Perrone F, Conte P. Real-World Evidence in Oncology: Opportunities and Limitations. *Oncologist.* 2020 May;25(5):e746-e752](#)). Some of the strengths of RWE in the description of treatment efficacy compared to RCT are a lower selection bias, focus on efficacy in special patients' populations, and production of evidence in settings suffering from the absence of an RCT. While among the limitations there can be a lower quality of data sources. Other opportunities are, for instance, the use of treatments within specific geographic and/or economic context which allows to produce pharmacoeconomic data within specific countries and specific health systems different from those where the randomised control trial has been produced.

Another important field of Real-World Evidence in oncology is the **description of treatment toxicity** and tolerability. For instance, description of rare toxicities based on a potentially larger number of patients compared to those enrolled in randomised trials; description of tolerability in a population which is more heterogeneous compared to the randomised control trials; description of tolerability in a special patient population; description of long-term toxicities, as the follow-up in clinical practice can be longer compared to the limited follow-up which often characterises pivotal trials. And, most important, the incorporation of Patient-Reported Outcomes (PROs) into the description of toxicity, which could enhance the description of adverse events from the patients' perspective. Of course, the limitations of RWE are that it is potentially less accurate than RCTs.

What are the challenges for telemedicine in RWD & RWE? Advances in digital health, a proliferation of digital devices, new support tools for medical decision, can all generate big data and hence novel types of Real-World Evidence in cancer care. There are **four main stages** in this process. The first is the **patient and caregiver consent**. The changes in this stage brought by digital technology include new ways for patient consent, for instance in electronic form. There are also increasing opportunities for patient engagement and a more holistic disease and treatment approach. The challenges, of course, are the patient's comfort with data and information sharing; there can be patient concerns over data misuse and security; there may be a selection "bias", because less digitally literate patients could be under-represented. And last, but not least, we are still dealing with multiple interfaces and multiple technical solutions, that should be linked. The second stage is **data collection**. The changes here are new ways to collect data and new data types and sources; location of data collection can be decentralised and closer to the patient, and we have

the ability to collect data 24/7. The challenges are the implementation of the necessary technical infrastructure; maintaining patient engagement in digital activities; there must be patient willingness for all stakeholders to have access to all the collected information. The third stage is **data storage**, transmission, and aggregation. Changes we will observe in the near future are improved server capacity to store high volume, high velocity, and a wide variety of data. We will witness new ways to process data and will be able to link data from digital devices to the patient's electronic health record. This is crucial for a large-scale use of RWE in clinical practice. The challenges in this stage are the very high volume of data to be stored and transmitted; there is still lack of interoperability across multiple systems and technologies; transmission of data requires reliable internet connection; and all necessary requirements for data security, integrity, and harmonisation must be met. The final stage is the **use by stakeholders**. The changes are a wider variety of data sources; additional data will increase clinical decision support. And, to summarize, we will see a transition from population health management to patient-level support. The challenges are: uncertainty over stakeholder acceptability of digitally derived insights; stakeholder's ability to transfer, receive, store and process large volumes of data. Also, inadequate application of digital health could drive up healthcare costs.

The future: remote monitoring of symptoms during routine cancer care

Traditionally, we have measured Patient-Reported Outcomes with paper questionnaires but now the time has come to use remote monitoring, allowing the patient to use a mobile phone or other electronic devices. The flow of information coming from the patient can be implemented in real-time in the Electronic Health Record and generate alerts to nurses and oncologists to manage the symptoms reported by the patient. So, this is not only a way to produce and store data, but also a way to improve the management of cancer patients. The Covid pandemic made the oncology community more aware of the importance of remote monitoring, of the adoption of electronic PROs in cancer clinical practice.

In the meeting Dr Paul Cornes discussed the cost-effectiveness of telemedicine and the post-Covid: "many of the programmes that started during the "lockdown" phase of the COVID pandemic were in fact born as a stop-gap measure. But given the great impact they will probably remain long term".

The advantages of the adoption of ePROs are: systematic check of the clinical trend of important symptoms and side-effects; prevention of severe adverse events needing ER access and hospitalization; efficient screening of patients who need further phone assistance or direct medical intervention; prompt management of medical needs; positive psychological impact on patients and increased patient satisfaction with healthcare services. The challenges are lack of awareness among clinicians of the cost-effectiveness of this adoption, lack of awareness by hospital management of the importance of the incorporation of ePROs into medical health records, the need for education of patients and caregivers to fill in the questionnaires, and for clinicians on how to manage them. This year ESMO has produced the first guideline on the role of Patient-Reported Outcome measures in the continuum of cancer clinical care. This effort was coordinated by Dr. di Maio.

Florian Scotté is Medical Oncologist at the Institute Gustave Roussy, Villejuif, France, and has been a regular speaker at the SPCC webinars on telemedicine. On this occasion he spoke about the pros and cons of **Teleoncology for remote monitoring of treatments**. Remote medical monitoring is the interpretation of data collected at the patient's place of living by a professional and sent to other professionals in order to manage the patient. It can manage anticancer treatment, monitor and manage adverse events, monitor the patient's journey, but also it allows for patient-professional interactivity.

As pointed out by Ethan Basch in 2010 in his article for the *New England Journal of Medicine*,

entitled ["The Missing Voice of Patients in Drug-Safety Reporting"](), there is a gap between patients living with symptoms and the clinician's perception. This gap can be decreased by the use of digital devices. There are discrepancies between the patient's and the professional's perspectives concerning, for instance, side effects and their intensity. The two visions need to be combined in order to provide the best approach. **PROCHE** (programme for the optimisation of chemotherapy administration) was developed at the Georges-Pompidou European Hospital with the objective of anticipating drug delivery and evaluating toxicity profile by a medical call centre dedicated to the oncology unit. A nurse phoned the patient two days before the appointment with a questionnaire. The information collected, together with biological data, was forwarded to the day hospital where the oncologist decided whether to go ahead with the treatment session, adapt protocols, postpone, or cancel. The use of this programme proved to decrease patient waiting time in day hospital, but also to alleviate certain symptoms, such as fatigue, pain, etc.

The next step was the **STAR** (Symptom Tracking and Reporting) study presented by Ethan Basch at the ASCO meeting in 2017. Cancer patients receiving out-patient chemotherapy were randomly assigned to self-report 12 common symptoms via tablet computers or to usual care. Outcomes showed a survival gain for patients under remote monitoring compared to usual care. There was also improved quality of life with remote monitoring, and a significant decrease in emergency visits. The study had a huge impact on the future development of digital health.

The same year Fabrice Denis published the article "[Randomized Trial Comparing a Web-Mediated Follow-up with Routine Surveillance in Lung Cancer Patients]()". The results of that study demonstrated that it was possible to detect early relapse in patients with lung cancers by using symptoms monitoring.

The **CAPRI** (CAncérologie, Parcours, Région, Ile de France) study also compared one cohort on standard of care and another with nurse navigators using a digital device or telephone calls. The study demonstrated increased relative dose intensity, but also a decrease of grade 3-4 toxicities, a decrease in emergency visits and improvement in patient experience.

Remote monitoring of patients with PROs could play an important role towards more personalised cancer care, but information is still limited about the clinical utility and user perceptions of these systems. **PRO-TECT** is a trial evaluating the implementation of PROs in cancer care. To elicit feedback, surveys were administered to participating patients and clinicians. In 2020 Ethan Basch published the first results of the study. While the vast majority of patients were satisfied with the questionnaires and felt that the information they provided was used by the clinicians for care, nurses were still positive, but less keen, with 30% of them stating that they would not use the system in the future. Nurses and patients involved in such a process can have different perceptions, and some of them do not want to use this kind of programme. It is important to understand why in order to improve the system. Nurses, for instance, raised concerns about potential added workload from symptom alerts. As to physicians, most of them actively reviewed PROs and stated that the information was useful. Yet only 20% of them used the reports to make treatment decisions. In daily practice, physicians are still not ready to use digital reports to manage their patients. Again, this is probably due to a clash of perspectives, whereby the way questions are tailored in order for the patient to understand them, can make the answers too vague for the physician to gain enough information for decision making.

Widespread use of Real-World Data and Real-World Evidence needs to overcome many technical, logistical, financial, and educational challenges, and remote monitoring of symptoms with PROs needs to find a formula that allows for all the parties' perspectives to be clearly understood, but both forms of telemedicine will eventually lead to more personalised and safe treatment.

Cancerworld

Telemedicine in the cancer continuum: the two digital dimensions of Continuity of Care

Editorial Staff / 14 December 2022
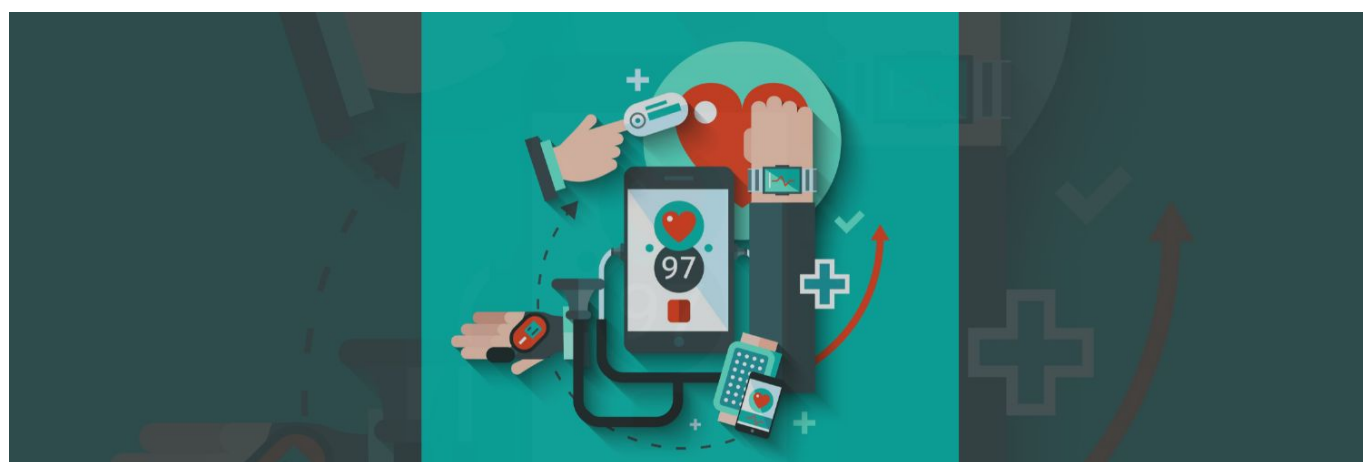
The second phase of the Sharing Progress in Cancer Care (SPCC) project on Telemedicine in Cancer Care started with the "Telemedicine in Cancer Care Continuum: implementation and integration", an on-line conference which took place on 6-7 May 2022 with the participation of world-renowned experts. Held in collaboration with the American Society of Clinical Oncology (ASCO), the second phase of the project focused on how to overcome both barriers and limitation in order to create the best conditions to implement and integrate Telemedicine models and applications over the Cancer Care Continuum. This to have a real and effecting improvement on the cancer care pathway, first of all, for patients and their relatives, but also for the whole health system, in terms of cost-effectiveness, efficiency and sustainability.

In this "continuum" of the cancer care pathway, one of the critical issues (and opportunity) is represented by the continuity of care since it is concerned with quality of care over time. But there are two important dimensions on this. Traditionally, continuity of care is idealized in the patient's experience as a 'continuous caring relationship' with an identified health care professional team composed by different providers who, through integration, coordination, and the sharing of information, are cooperatively involved in ongoing health care management process toward the shared goal of high quality, cost-effective medical care. Continuity of care may, therefore, be viewed from the perspective of either patient or provider. In the second, continuity in the experience of care relates conceptually to patients' satisfaction with both the interpersonal aspects of care and the coordination of that care.

In the first dimension, Telemedicine solutions can address the limitations imposed by the conventional modes of care delivery, namely, time and space, and have a positive impact on cancer care efficiency and integrate processes and models of care management.

The pandemic itself has proved the critical importance of digital health solutions to improve and to advance care and helping to increase access in the constraints that were presented by the pandemic, ensuring continuity of care and safety for patients and for the workforce. And we have seen rapid deployment and expanded use of telemedicine and remote monitoring of symptoms during routine cancer care practices as well, as underlined by **Andreas Charalambous**, Associate Professor of oncology and palliative care at the Cyprus University of Technology, Adjunct Professor at the University of Turku in Finland, and President of the European Cancer Organization, during the opening of the second day of the conference.

Traditionally we have measured Patient-Reported Outcomes with paper questionnaires but now the time has come to use wider in common clinical practice remote monitoring, allowing the patient to use a mobile phone, computer, or other devices. The flow of information coming from the patient and that in real-time can be implemented in the Electronic Health Record and can generate alerts that can be managed by the nurses and by oncologists to manage the problems, the symptoms referred by the patient. So, this is not only a way to improve the quality of care and quality of life for the patient, but also to improve thee management of cancer patients among the health providers.
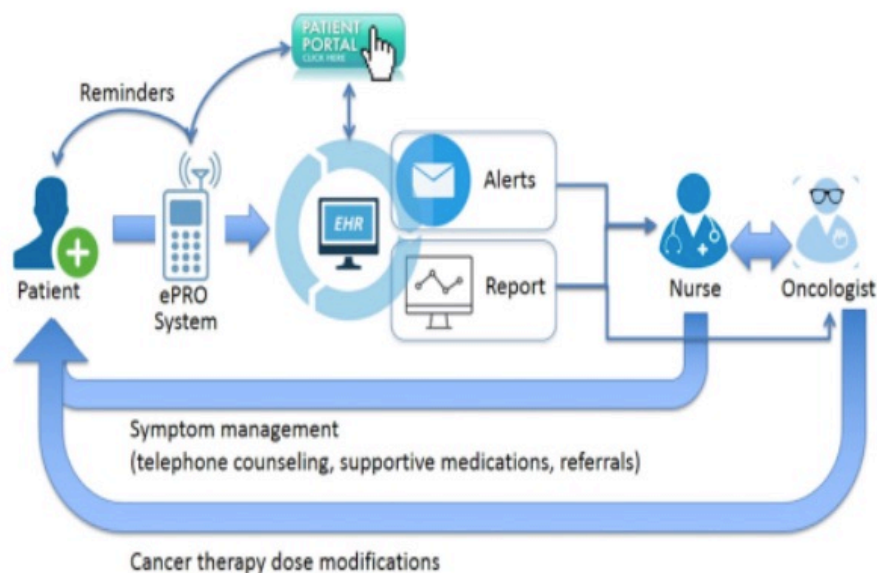
Courtesy of Ethan Basch

However, as **Massimo Di Maio**, medical oncologist at the University of Turin, Italy, showed in his presentation, this kind of clinical technological management approach has many challenges not only from a technical point of view but also, in terms of physicians' involvement and awareness, and in terms of lack of awareness by hospital management of the importance of incorporating ePROs into medical health records. And, last but not least, the need for education of patients and caregivers to fill in the questionnaires and the ePROs, and the need of education for clinicians on how to manage patients' questionnaires, patients' answers, as Remote patient monitoring can be also an important

tool to ensure continuity of care for patients after the phase of active treatment, for example, and it provides a cost-effective means of ensuring the person's needs are being identified and addressed when they no longer have frequent interactions with the cancer care team. And that's why patient-reported outcome measures and data can be really helpful to support care decisions and to make sure that patients feel looked after in the long-term without those frequent interactions.

Digital solutions and the use of patient-generated data in continuity of care can really help with a learning cycle of the system, improving efficiency of cancer care through cost saving on wastage and through opportunities to prevent overtreatment, as presented by **Alex Filicevas**, President of All.Can International and Executive Director of the World Bladder Cancer Patient Coalition, during his presentation on efficiency and telemedicine in cancer care. Regular monitoring of patients using patient-reported outcomes can really help the team make the necessary adjustments to treatment plans or cease given treatment, thus benefitting both the patient and the healthcare system. And we can really utilize these data to improve the efficiency of systems, the efficiency in care, and especially the outcomes for patients.

The second dimension of the continuity of care relates to patients' satisfaction experience with both interpersonal aspects of care and coordination of that care, some ethical issues arise from the use of telemedicine. So that's why the new patient-doctor digital relationship has to be assessed also from an ethical perspective in order to have the better option of care and setting for patients and their health providers, considering the importance of empathy and mutual trust between them. How to deal with the "human side of telemedicine" has been the core of presentation by one of the chairs of the conference, **Sana Al Sukhun**, Medical Oncologist, Director of Al Hayat oncology practise in Amman, Jordan. Currently chair of the International Affairs Committee of the American Society of Clinical Oncology, ASCO. Sharing informed decision-making process and appropriate recommendations improve patient outcome, and usually, this can be achieved through communication, direct communication, history taking, and physical examination is very important to establish this relationship appropriately and help patients improve their outcomes. Nevertheless, through digital communication platforms, even in the best setting where the infrastructure for telehealth is established, for some activities or phases of continuity of care there are potential concerns to be aware of in order to set and manage them in a proper way. For example, the

challenge when giving a telehealth counselling opinion. How can clinicians explain critical issues to patients, especially if they do not have a previous relationship with those patients? They can only provide help to deal with their complaints, control their pain, reduce their nausea, keeping them comfortable, but unfortunately, are unable to provide treatment that could prolong life. That would be quite difficult to discuss in a telehealth visit, if the clinician does not have a previous strong relationship, and a mutual understanding with his patients. It's very hard for physicians to recommend not to do anything and just go on supportive care from a distance, that can be discussed empathetically, with our patients in a face-to-face visit, especially if surrounded by their caregivers. But from a distance, especially for a second opinion or consult most clinicians find it hard to face patients and just tell them there isn't much more to be done to prolong their life. And that's why many societies, including the American Society of Clinical Oncology, in their recommendations when discussing telehealth and oncology emphasize that in-person consultations are preferred for initial consultations to build mutual trust, important whenever we are delivering key-information, diagnosis, treatment plan, when we are changing the treatment plan in cases of relapse or progression, or whenever we are making critical decisions such as to stop cancer treatment and go only with supportive care to palliate symptoms and help patients through end of life decisions. Despite all these challenges, telemedicine is a necessity. We have witnessed its importance and it's helped in the last couple of years during the pandemic. And probably, it is here to stay. That's why we need, as Sana Al Sukhun said at the end of her presentation, to define a morally justifiable trade-off between a less satisfactory relationship between physician and patients and improved availability and access to medical care, also in terms of its continuity.

Cancerworld

Telemedicine in Cancer Care Continuum: Supportive care, Value-based Medicine and Reimbursement of Innovation

Adriana Albini / 20 December 2022

The Multinational Association of Supportive Care in Cancer (MASCC) defines supportive care in cancer as "the prevention and management of the adverse effects of cancer and its treatment." Physical pain and discomfort caused by the disease and by the side effects of treatment are not the only challenges faced by a cancer patient, there can also be occupational, psychological and psychosocial suffering, that might be experienced at any stage of the patient's cancer journey. From marginal but psychologically important interventions, such as treatment to prevent chemotherapy-induced hair loss, to more substantial ones, such as monitoring to prevent recurrence, supportive care can improve quality of life for patients, their families and carers, and make them feel emotionally supported and guided through decision-making and life adaptations. On the MASCC's website there is a quote by Andrew Davies, Professor of Palliative Medicine at Trinity College Dublin, worth repeating here, "Supportive care is about treating the person, whilst oncology is treating their cancer."

So, how can telemedicine improve this kind of "analogue" care, where face-to-face human interaction seems to be the most appropriate way to establish a collaborative relationship between health provider and patient? This has been one of the topics touched upon in "Telemedicine in Cancer Care Continuum: implementation and integration", an online conference developed by SPCC (Sharing Progress in Cancer Care) in collaboration with ASCO (American Society of Clinical Oncology), which took place on 6-7 May 2022. The other main stages of the cancer pathway are the subject of separate reports published on *Cancerworld*.

Beside the physical symptoms, cancer patients tend to experience intense emotional distress, yet

only 15 to 20% of them have access to psychosocial care. And this is an optimistic estimate. We already mentioned in our first report, "[Lessons from the Covid area and progress towards oncological prevention](#)", the project lead by the European Institute of Technology (EIT), described at the online conference by **Christian Ochoa-Arnedo**, Chief of the Digital Health Service ICOnnecta't at the Catalan Institute of Oncology and Professor of Psychology at the University of Barcelona. The name of the project is OnCommun, which stands for "online cancer support communities", and it is an ecosystem which improves access to psychosocial care and education in order to reduce cancer impact. Educational and psychosocial care access can also improve other aspects of the cancer journey, such as therapeutic adherence, sick leave, time before returning to work, and, consequently, quality of life. Better psychosocial support may also mean a reduction in the use of psychopharmaceuticals.

An increasing number of patients use the internet to find information and support, but we want to underline that telemedicine applications and models work best if there is a health professional behind them: that way a collaborative relationship can be established between doctor and patient, based on sound information and mutual trust.

The Covid19 pandemic has shown the crucial importance of digital health solutions to improve and advance supportive care services, and to increase cancer patient access to them. But how can we deal with the economic barriers for telemedicine and telehealth implementation? The current financial crisis, triggered by the pandemic and other world events, offers an opportunity to find and implement solutions to the ever rising and unsustainable costs of healthcare, said **Paul Cornes**, from Comparative Outcomes Group in Britain, oncologist and lecturer at the European School of Oncology, and member of the Task Force Advisory Board working on the Access to Innovation in Cancer Treatment in Europe. In his presentation at the online conference, Dr Cornes mentioned a report published in 2017 by The World Bank and WHO, showing that half of the world's population cannot obtain essential health services. The figures are quite staggering: 800 million people spend at least 10% of their household budgets on health, and for almost 100 million, those expenses are high enough to throw them into extreme poverty. We spend about 10% of the world's wealth on health each year, and middle- income countries are catching up fast, currently at around 6 to 7%. But the increased investment has gone wrong. Year on year, we have been investing in less and less efficient innovation. Even at the peak of the pandemic, non-communicable, chronic diseases, NCDs, such as heart disease, stroke, cancers, diabetes, were still collectively responsible for almost 70% of all deaths worldwide, and of those, the greatest single cause of death is cancer, impacting every country in the world. And these figures are still rising. Without some sort of innovation, we will have to double the number of doctors, nurses, hospitals, clinics, ambulances, scanners, and so on. In the

words of the WISH Foundation, cancer care is not affordable for most patients, many payers, and nearly all governments.

The WHO advises that to overcome the unsustainable nature of healthcare, we must change how we think about medicine, we need to deliver better health with the resources at our disposal. All countries can do something, many of them a great deal, to improve the efficiency of their health systems, thereby releasing resources that could be used to cover more people, more services, and more of the costs.

Value-based medicine (VBM) is part of a new way of thinking about health, called **value-based healthcare**. It is an evolution from evidence-based medicine (EBM), where the focus was on the efficacy of treatments, and the question was, "Does this intervention make you live significantly longer or live better?". In value-based medicine, we ask instead, "Is this worth doing compared to other things we could do with the same resource?"

In a way, physicians and economists are less different than it first appears. Health economists rely just like doctors on quantitative information. They make difficult choices in the face of uncertainty and know that a good decision requires the balancing of the benefits and risks involved. The main difference between them is that physicians are usually concerned with an individual patient, while economists tend to be concerned with large populations. The power of economic thinking is in deciding how best to distribute a finite resource so that we can provide the most health to the most people. Cost effectiveness analysis saves lives and ensures sustainable healthcare for all. The formula we need to apply is **Value=Health outcomes/Costs of delivering the outcomes**. "Outcomes" are the health results that matter for a patient's condition over the care cycle. "Costs" are the total costs of care for a patient's condition over the care cycle. The overarching goal must be more value for the patients, and not cost containment, convenience, or customer service. The aim of a healthcare system is to maximize length of life and quality of life, using the available resources. We could free up a lot of resources and create much more value by developing better systems, for instance in some European countries, better management of cancer patients could increase the outcome by almost 25%.

But how do we get innovation funded and reimbursed? We must undergo a health technology assessment (**HTA**). Innovation will be reimbursed by payers on three conditions. 1) If it addresses a serious unmet and life-threatening need. Countries would have paid almost anything for a functional Covid vaccine only two years ago. 2) If it saves money, and that is a big priority now. 3) If it adds value. Proving these points requires innovators to develop an economic model that demonstrates the effect of a new intervention, such as in telehealth and telemedicine, to submit to the payers. The aim of healthcare is to help people live longer and better. The metrics that we need to look at are these: living longer we call Added Life Years, or **ALY**; living better is Quality of Life, **QoL**. Most patients would like to live longer and better, and so, the metric for the two parallel aims is **QALY**, the Quality Adjusted Life Year. The aim of the healthcare system is to maximise health using available resources and to gain the maximum QALYs for the health budget.

We know telehealth and telemedicine applications have been adopted widely and rapidly because of Covid, particularly in cancer care, in order to improve quality of life for cancer patients. But we must find the right balance between telemedicine assets, applications and sustainability under the lens of the HTA. Economists use the cost-QALY model to assess the benefits of treatment. But how do we show the Quality of Life impact of our innovation? While benefits of Added Life Years or Overall Survival are easy to compare between diseases, Quality of Life measurement can be difficult, as many studies use disease specific scales. A generic QoL scale is needed that allows the HTA to compare the competing demands of treatment for different diseases. An instrument for measuring QoL that has been validated in many countries is the **EuroQol- 5 Dimension** (EQ5D). It is simple to use, it takes about three minutes per patient, and can be directly converted to something called **Value "Utility"**. For example, if we do a study in Britain, we have conversion data that tell us what a certain intervention is worth in a different country. This has significant time and cost savings for the international health technology assessment, which is why within two to three years, it will become a pan-European project. Once the patient has answered the five questions, we can use their score as the starting point from their current therapy, then measure the clinical effect of our intervention in terms of ALY or QoL or both, which gives us QALY. We are now ready to submit this to the HTA board, who will put it on a cost-effectiveness plane. The board will look at four quadrants of decision-making: Higher/Lower Cost difference and Worse/Better Clinical effect. Two of those quadrants are straight forward. If our innovation has worse outcomes and costs more, it will be rejected. If it is better and cheaper, we will get reimbursed. But there are two quadrants that say, "It depends." It depends on how much more money we'd have to pay, or how much better is it than the standard of care. Starting from the position of standard therapy, we could have a new treatment that adds benefit but costs more. We can join that up with a line, which represents the **Incremental Cost Effectiveness Ratio** (ICER). How much would we pay to gain one QALY? There will be a level at which increasing spend is probably good value and the innovation will be deemed worth funding. But there is going to be another ICER level which might be considered too high. WHO's guidelines for good value are that the innovation should cost less than one per-capita earnings per QALY for a country, while above three times, it is probably poor value, and should not be funded. In the middle there is a large grey zone, and each country and health system make their assessment of what that is and decide accordingly.

Making the case for reimbursement of telemedicine with the four-quadrant decision plane shows there are three easy wins: Telemedicine delivers Equivalent Outcomes at lower cost;

Telemedicine delivers Better Outcomes at less than ICER Reimbursement Threshold; Telemedicine delivers Better Outcomes at lower cost. A caveat: reimbursement works in theory, through health technology assessments and the four-quadrant decision plane. In practice, it is more complicated, but understanding those complications will help us steer our way through the reimbursement maze.

In conclusion

Innovative, digital and technological tools or models to integrate and implement into supportive care delivery are essential to overcome the challenges and to avail of telemedicine opportunities in cancer supportive care. As the financial burden of healthcare in developing and established economies is rising, so is the need for an affordable high quality and equitable cancer care. Strategic choices are to be made to preserve national funding for more effective care and treatment. Complex international regulatory, cultural, political changes and issues require a balancing strategic insight with proven management tools to implement new innovative telemedicine, operative technological-organizational models and digital tools in an environment where health care organizations bear an ever-greater responsibility for cost and quality of care.

Cancerworld

## Telemedicine Rehabilitation in the Cancer Care Continuum

Adriana Albini / 24 February 2023

This is the sixth and final report of the online conference "Telemedicine in Cancer Care Continuum: implementation and integration", developed by SPCC in collaboration with the American Society of Clinical Oncology (ASCO). Held in May 2022, the conference opened the second phase of the project on telemedicine in cancer care, which focussed on how to overcome barriers and limitations to best implement telemedicine models and applications for patients with cancer. Telemedicine rehabilitation is a relatively new field, which widens the spectrum of cancer care and offers solutions for a better quality of life to the growing number of cancer survivors. As a branch of telemedicine, it shares with it advantages and limitations. It is therefore a fitting subject for the last report in the series, as it offers a glance into future directions of medicine and an opportunity to revisit some of the themes emerged during the online conference.

Although cancer survivorship rates are rising across the globe thanks to advancements in early detection and therapy, many patients and survivors encounter physical, psychological, and cognitive complications caused by the disease and its treatment. These problems can hinder daily activities or

prevent people from resuming important life roles, such as working or taking care of their family. Cancer rehabilitation can help an individual to stay as active and independent as possible during and after treatment. It can also lessen the side effects and symptoms of the disease and its treatment; and, ultimately, improve one's quality of life. Rehabilitation is becoming increasingly recognised as a critical component of quality cancer care. It is not a separate stage in the continuum and was listed as part of survivorship care in the 2006 Institute of Medicine (IOM) Report, *From Cancer Patient to Cancer Survivor: Lost in Transition*. In reality, it covers such a wide variety of issues and services, that it can apply to the entire spectrum, not just survivorship. The list compiled by ASCO of the problems it can address is quite long, from physical ones, including pain, weakness, fatigue, balance, lymphedema, neuropathy; to mobility impairments related to walking, showering, getting dressed; to cognitive difficulties: mental fog, memory trouble, etc. To this list we can also add psychosocial issues, such as anxiety, stress, depression, social isolation, body image. The types of specialists required are also many. Among the ones mentioned by ASCO: physical therapist, occupational therapist, speech pathologist, physiatrist, cognitive psychologist, dietician, and so on. Together with improved function in survivors, rehabilitation can also reduce the financial burden of cancer to individuals and society. However, the growing influx of oncology patients and longer life expectation call for solutions on how to provide access to professionals for all who need them. Rehabilitation is still a relative newcomer in cancer care and specialist training for medical staff is often only available in tertiary centres, with consequent access barriers. Travel time and costs, higher risk of infection for immunocompromised individuals, limited number of specialists, etc., all point in the direction of telemedicine. Telemedicine can deliver rehabilitative services to patients at home, thus eliminating economic and logistical barriers, and also contributing to better adherence and quality of life.
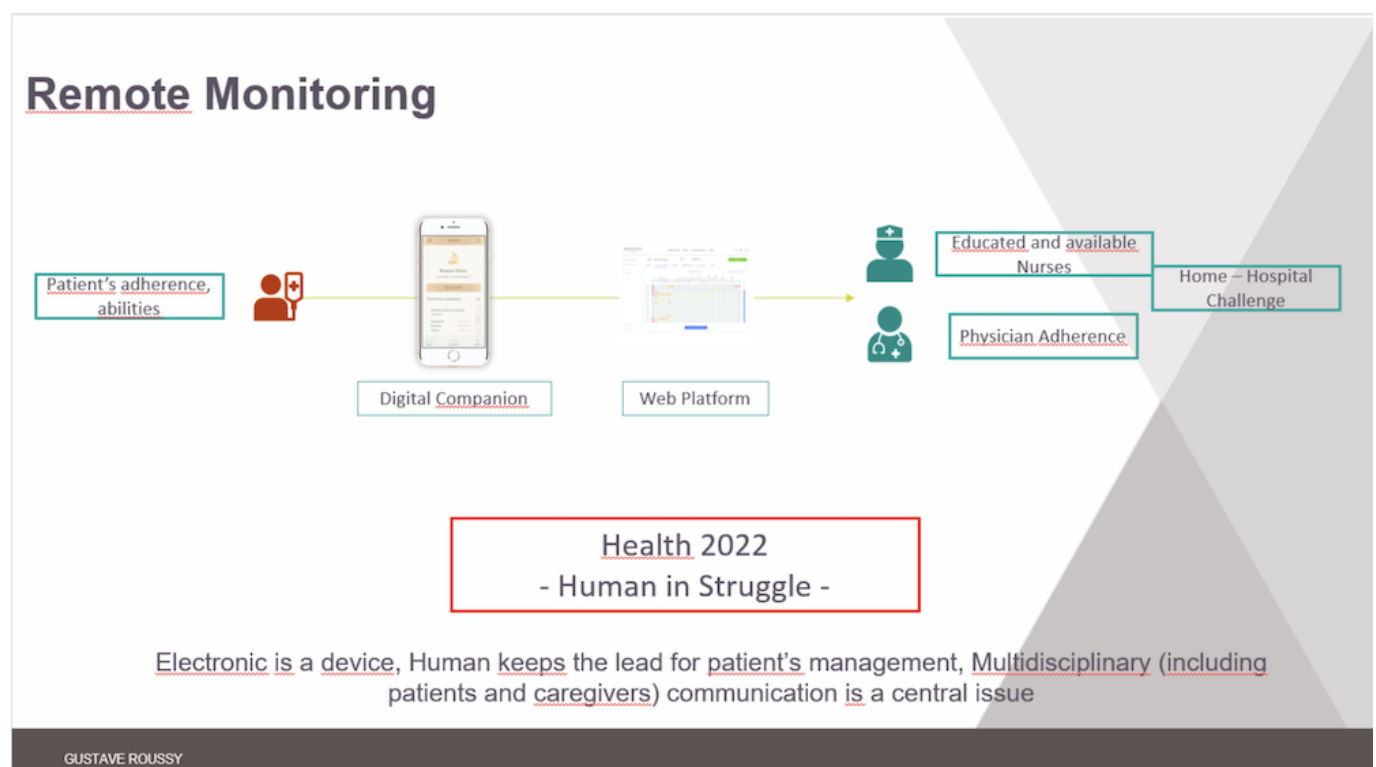
Telerehabilitation (TR) is the remote delivery of rehabilitation and habilitation services through information and communication technologies. Included in telerehabilitation are a wide variety of services, such as "evaluation, assessment, monitoring, prevention, intervention, supervision, education, consultation and coaching" (from *Principles for Delivering Telerehabilitation Services*, American Telemedicine Association, 2017.) As part of telehealth, remote rehabilitation shares with it advantages and hurdles, from trust to IT reliability and literacy, access, patient/doctor relationship, adherence, and so on. And as a recent entrant in cancer care, it still needs to be fully integrated into

the continuum.

At the online conference, a number of interesting platforms and apps were introduced and discussed, which are already providing telerehabilitation services or could be adapted and expanded to do so. **Florian Scotté**, Medical Oncologist at Gustave Roussy, France, talked about the importance and advantages of remote monitoring to manage cancer patient treatment and adverse events. Digital devices can monitor the journey of the patient, but also allow interactions between patients and professionals, and between professionals themselves. Symptoms such as pain, fatigue, nausea, can decrease with remote monitoring, and quality of life improves with reduced visits and waiting time at the doctor's office and in hospitals. (See our report at https://cancerworld.net/telemedicine-on-the-path-to-personalised-treatment/) Dr. Scotté mentioned the study published by Ethan Basch in 2010 in the *New England Journal of Medicine*, entitled The missing voice of patients in drug-safety reporting, and stressed the importance of listening to patients but also of creating clear communication between patient and doctor, in terms, for instance, of formulating questionnaires that are easy for the patient to understand and fill in, but still give enough information to the physician. The Patient Reported Outcomes version of the Common Terminology Criteria for Adverse Events (PRO-CTCAE) for example, is often vaguer than the conventional CTCAE, and that could be one of the reasons why some physicians may be reluctant to use their patient's report to make treatment decisions. Applied to the scenario of telerehabilitation we can see how the creation of a mutually understandable vocabulary is of paramount importance for remote assessment of pain and other symptoms, to carry out instructions for self-testing, and, of course, for long term monitoring and reporting. Also, some neuro-oncology patients might not be able to answer correctly and need caregiver support. Extra help might also be needed by patients who are less comfortable with digital technology due to age, physical impairments, or disposition. In the integration of TR, a wider support network for family carers may be needed.

Sana Al Sukhun, Medical Oncologist, Director of Al Hayat oncology practise in Amman, Jordan, has witnessed the practical and moral dilemmas created by the premature introduction of telemedicine in countries with limited infrastructure and that were not sufficiently prepared to navigate this change. For instance, a new moral debate emerged on how a physician should respond when approached by a patient on social media, who expects immediate medical attention. Also, what happens if the specialist and the patient are in different countries? Can or should a local practitioner follow a second opinion advice given remotely from abroad? Who is responsible for what? Dr. Al Sukhun also reminded us that even in a digitally aware country with good communication infrastructure, such as the U.S., not everyone has internet access. Only two thirds of Americans over the age of 65 have broadband at home, and only 50% use smartphones (see https://www.pewresearch.org/internet/fact-sheet/internet-broadband/). And, of course, the elderly make up the majority of cancer patients. In June 2020 the University of Michigan National Poll on Healthy Aging (NPHA) carried out a survey of U.S. adults aged 50-80 about their view and experience of telehealth (https://www.healthyagingpoll.org/reports-more/report/telehealth-use-among-older-adults-and-during-covid-19). The overall response was favourable, and the advantages of telemedicine in terms of flexibility, less travel, costs, etc. were acknowledged; but when compared to telehealth visits, in-person ones were thought to still offer better communication and quality of care by the majority of respondents. They were especially concerned about the lack of a physical examination. So, how can we develop communication skills and technology to get over this hurdle, and how does no-hands-on evaluation affect rehabilitation programmes?

Remote fitness classes have been around for a long time and gained extra popularity in the past couple of years, as a consequence of Covid-19 restrictions, with pre-recorded or live personal and group sessions. But how can physiotherapy be carried out remotely? Alignment, range of motion,

proper execution of movements, constant corrections are crucial to obtain mobility improvements. To look at a successful example, the University of Queensland, Australia, came up with a solution, eHAB®, a platform that combines video conferencing with remote measurement tools, assessment protocols and so on. Human motion tracking has been used to aid physiotherapy for quite a while, and its introduction within the teleconferencing environment could actually provide better outcomes than traditional in-person physio sessions.

POLICY RELEVANCE: Sustainabily and accessibility
"Better Life for Cancer Patients Initiative" focus in Follow-up care

ⓞNCOMMUN

Cost-utility

		Usual psychosocial treatment	ⓞNCOMMUN
Professional salaries		191,75 EUR	160,39 EUR
Sick leaves		33.616,80 EUR	21.016,62 EUR
Psychopharma		17,87 EUR	16,83 EUR
Transport		23,06 EUR	0,00 EUR
Structural costs		247,80 EUR	150,00 EUR

While the most common mean of remote communication between doctor and patient probably remains the phone call, the types of services provided by TR are best served by videoconferencing, coupled with remote monitoring tools. Many such tools are being developed around the world, but Israel has become a hotbed for med tech innovation. Ilan Misano, biomedical engineer and technology transfer consultant between Israel and Italy, explained some of the ingredients that are contributing to this. The most important component is the environment. There are many start-ups, incubators, accelerators, innovation centres, that attract both researchers and investors, small companies as well as multinational giants, many of which now have offices in Israel. There is a lot of collaboration between different actors in the industry; and the way the Israeli health system is designed, with four insurance companies always vying for customers, contributes to the drive for innovation. Because of its history and location, Israel has always needed to embrace new technologies. The human desire for progress is key to the development and deployment of telehealth. We have already talked about some of the digital tools developed in Israel (see our report at https://cancerworld.net/telemedicine-and-diagnosis/), from home urine tests to no-needle blood tests, to remote ultrasound and so on. The scope of all of these tools will be widened in the future to include more monitoring functionalities for different medical needs. Checking heart rate and other vital statistics is very important also for TR; there are many apps available and many more are being developed for remote monitoring.

The power of health economic thinking

- Helps decide how best to distribute a finite resource

- To provide the most health to the most people

cost-effectiveness analysis saves lives [1]

And ensures sustainable healthcare for all [1]

Ref: [1] Tengs TO. Dying too soon: how cost-effectiveness analysis can save lives. Irvine, California, University of California, National Center for Policy Analysis, 1997 (Policy Report No. 204)

Social isolation and its impact on quality of life, emotional, physical, financial, and so on, drew the world's attention during the Covid-19 pandemic, and a number of studies have also started to be published specifically focussing on cancer survivors (see for instance Yanjing Liang et al., [Social isolation in adults with cancer: An evolutionary concept analysis](#), *Frontiers in Psychology* 2022). The physical and psychological effects of cancer and its treatment can have deep repercussions on an individual's social and affective life, and even on their health outcome. Pain, nausea, fatigue, mobility, mood, self-image, just to name a few, can create barriers that are hard to overcome. How can TR and telehealth in general help, which further reduce in-person contact with others? At the video conference **Christian Ochoa-Arnedo**, Chief of the Digital Health Service ICOnnecta't at the Catalan Institute of Oncology and Professor of Psychology at the University of Barcelona, presented the online resource OnCommun, of which he is Project Director (see our report at https://cancerworld.net/telemedicine-in-the-cancer-continuum-lessons-from-the-covid-area-and-progress-towards-oncological-prevention/). OnCommun stands for "online cancer support communities"; it is a way to activate all the common experiences of people with cancer and provide them access to psychosocial care and education. Only a small minority of cancer patients receive psychosocial care, although such support is vital in many ways, including therapeutic adherence, return to work, sick leave, use of psychiatric medication. An online support community such as Oncommun can improve collaboration between patients and health care professionals. The system has a pyramid structure, with different tiers, in order to give the patient the exact attention required at the stage they are in. Patients are first screened to assess their psychological needs, then they are offered resources to allow them to understand and better navigate their condition. If this is not enough to reduce emotional distress, the next step is access to a community where they can talk with other patients and professionals. If problems are still not solved at this level, the following step is psychotherapy intervention. This type of community system offers a double solution for telerehabilitation: remote psychological therapy with a specialist, but also a social environment where patients feel they are giving their own contribution besides receiving care. When patients finish their oncological treatments, they can remain in the Oncommun ecosystem for optional follow-up, but also to give help and the value of their experience to others.

All the participants to the online conference agreed with Dr Ochoa-Arnedo on the importance of assessing patients early on, to prevent or reduce cancer related issues. This is true also for TR,

where a full assessment during the first visit can help devise a course of action later. At the SPCC webinar Telemedicine in Cancer Care: Monitoring, Follow-Up,Tele-Rehabilitation, Palliative and Supportive Care (see our report at https://cancerworld.net/telemedicine-in-cancer-care-monitoring-follow-uptele-rehabilitation-palliative-and-supportive-care/), Marcalee Sipski Alexander suggested that there should be an evaluation of physical and cognitive impairment at the time of diagnosis. Home environment should also be assessed, together with patient expectations and family carer support. A cardiac risk assessment for exercise could also be advisable, pre-habilitation could be suggested when beneficial, and also the topic of weight and nutrition management should be introduced. Prof. Alexander is the editor of *Telerehabilitation: Principles and Practice*, published in 2021, which provides a wealth of information on the best use of TR in clinical practice for different types of medical issues.

Rehabilitation done remotely at the patient's home allows for better adherence and has economic advantages for the patient, the healthcare system and society at large. Physical therapy, speech therapy, psychological support, exercise routines, weight control, lifestyle changes, all contribute to better outcomes for patients before, during and after cancer treatment. With the help of telerehabilitation patients can lead a more independent, meaningful life, may be able to return to work and social life sooner and perhaps even be less subject to relapses, side effects of treatment and psychological issues. "Healthcare's greatest problem today is finance", suggested **Paul Cornes** from Comparative Outcomes Group in Britain, oncologist, and lecturer at the European School of Oncology. TR lends itself particularly well to be carried out virtually, and it is important that payers and investors fully appreciate the potential of this newcomer.