

UK-Brazil Dialogues in Digital Health

Realization:



UK Government



Supporting:



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Instituto Coalização Saúde, in partnership with the British Consulate-General and Inova HC and with National Medicine Academy supporting, held six important virtual events to discuss topics regarded to Digital Health's universe:

- Use of Telehealth in United Kingdom and in Brazil: an analysis based on evidences
- History of Telehealth implementation in UK and in Brazil – challenges and opportunities
- Covid-19 impact – Telehealth future perspectives
- Using technologies and services for providing Telehealth
- Digital Healthcare in Brazil: challenges and opportunities
- Covid-19 and RNDS impact in using cloud for Health

At these events, Brazilian specialists and United Kingdom representatives shared experiences and showed to attendees their views on the current moment and on Medicine and healthcare assistance future in the post-pandemic period.

This document summarizes what was presented by these events' speakers and was divided into three parts:

Part I

Insights into United Kingdom experience;

Part II

Insights into Brazil experience;

Part III

Covid-19 and RNDS impact of using clouds in healthcare



Realization:



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Supporting:

Organization:

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Denise Eloi (ICOS)

Marco Bego (InovaHC)

Esther Rosalen, Juliana Caires, Danilo Guimarães Santos, Arly Belas (Health team - British Consulate in São Paulo)



Speakers

- Armando Lopes** – director of Image Diagnosis and Digital Services Areas at Siemens Healthineers in Latin America
- Carlos Roberto de Carvalho** – professor of Pneumology and responsible for Respiratory ICU at Instituto do Coração (InCor), in Clinical Hospital of São Paulo University Medicine College (HC-FMUSP)
- Chao Lung Wen** – head of Telemedicine discipline at São Paulo University Medicine College (FMUSP) and leader of São Paulo University (USP) research group in Telemedicine and Healthcare;
- Claudio Lottenberg** – president of Instituto Coalizão Saúde (ICOS);
- Donizetti Dimer Giamberardino Filho** – first vice-president of Federal Council of Medicine (CFM);
- Erno Harzheim** – manager of Salute Clinic and former Primary Care secretary at Health Ministry;
- Eurípedes Constantino Miguel Filho** – professor at São Paulo University Medicine College (FMUSP);
- Fabio Jatene** – director of Cardiovascular Surgery Service and vice-president of Director Council at Instituto do Coração (InCor), in Clinical Hospital of São Paulo University Medicine College (HC-FMUSP);
- Giovanni Cerri** – vice-president of Instituto Coalizão Saúde (ICOS) and president of Instituto de Radiologia (InRad), in São Paulo University Medicine College (FMUSP);
- Henrique Neves** – CEO of Albert Einstein Israeli Hospital;
- Jacson V. Barros** – director of DataSUS, at Health Ministry (at the time);
- Linamara Battistella** – president of the Director Council of Instituto de Reabilitação Lucy Montoro and Instituto de Medicina Física e Reabilitação, in Clinical Hospital of São Paulo University Medicine College (HC-FMUSP);
- Lincoln A. Moura** – associated director of Saúde Accenture Brasil;
- Loy Lobo** – president of Digital Health Council at The Royal Society of Medicine (RSM);
- Marco Bego** – CIO of InovaHC;
- Matheus Zanardi** – counselor of Ise Business School;
- Minal Bakhai** – National Clinical director for Digital First Primary Care at NHS England and NHS Improvement;
- Nav Chana** – clinical director of National Association of Primary Care (NAPC), non-executive director of Kingston Hospital NHS Foundation Trust and senior partner of Cricket Green Medical Practice;
- Rachel Hutchings and Jessica Morris** – researchers at the international and independent healthcare agency Nuffield Trust;
- Rob Wake** – business Development Director at Capita Healthcare Solutions;
- Romeu Cortês Domingues** – executive president of DASA Administration Council;
- Sidney Klajner** – president of Albert Einstein Israeli Hospital;
- Wilma Madeira** – manager of Social Responsibility Projects at Oswaldo Cruz German Hospital.

Commentators

- Bruno Pina** – director of Innovation at AstraZeneca;
- Donizetti Louro** – researcher in Automation Management and IT Group (GAESI), in São Paulo University (USP);
- Eduardo Cordioli** – coordinator and medical manager of Telemedicine, coordinator of Telemedicine Working Group (WG) of National Association of Private Hospitals (Anahp) and Albert Einstein Israeli Hospital (at the time);
- Fabício Campolina** – director of Health Transformation, Johnson & Johnson Medical Latam;
- Francisco Balestrin** – president of Employer's Union (Sindhosp);
- João Alceu** – president of National Private Health Federation (FenaSaúde);
- Rubens Belfort** – president of National Medicine Academy (at the time);
- Wilson Shcolnik** – president of Administrative Council in Brazilian Diagnostic Medicine Association (Abramed).

Presentation

A sight of today digital healthcare

Covid-19 pandemic has accelerated scientific innovation in many parts of the planet. One of the greatest proofs of this was the work that researches had done together all around the world when searching for vaccines to fight coronavirus in record time. However, technological gains for Healthcare market have gone further than that. Two years on, we have also seen a leap in Telemedicine development.

Representing an opportunity to improve population access, expand main health centers' scale, facilitate changes between professionals and reduce costs, today we know that digital healthcare has potential to improve the market quality in general. As proposing solutions that contribute to Brazilian healthcare system equity and sustainability is at the heart of ICOS, we have gathered several of them in this issue.

It was developed from six virtual events performed by Coalizão Saúde Institute (ICOS) in partnership with Britain government, in collaboration with Innovation Institute of São Paulo University Medicine College Clinical Hospital (Inova-HC) and with Medicine National Academy (ANM) and supported by Accenture, during 2021, the height of pandemic in Brazil. In total, 23 experts, from public and private networks, both from Brazil and United Kingdom, have discussed about Digital Healthcare successful projects, in order to continue the debate about Medicine future.

To facilitate comprehension, this document was divided in three parts. In the first one, *Insights into United Kingdom experience in Digital Healthcare*, Britain specialists share experiences of using digital technologies in the National Health Service (NHS) since before pandemic, based on fundamental principles of primary care. As essential pillars for adapting to new reality that SARS-Cov-2 has brought to us, this report quotes the concern of professionals' well-being and the encouragement of creativity and collaboration between units.

As following, in *Insights into Brazil experience in Digital Healthcare*, we discuss important topics, such as ethics in the context of Digital Healthcare, how Telemedicine could be offered (far beyond video calling) and the complexity of this field regulation, as well as the importance of creating a model that can be replicated in all healthcare systems.

Finally, in *Covid-19 and National Healthcare Data Network (RNDS) impact of using clouds in healthcare*, we present a synthesis of the report *Digital Healthcare Strategy for Brazil 2020-2028*, developed by a partnership between Pan-American Health Organization (PAHO) and Accenture, in addition of presenting Albert Einstein Israeli Hospital and Oswaldo Cruz German Hospital experiences when using cloud, among other approaches.

The analysis presented in this issue offers us many reflections. Although we don't have answers for all questions, we already know that Telemedicine is here to stay. It won't replace face-to-face care, but extend care pathways to an unprecedented geographical dimension.

Claudio Lottenberg

president of ICOS and of Deliberative Council of Brazilian Israeli Beneficent Society Albert Einstein



Foreword

It is an honour for me to offer this introduction to the **UK-Brazil Dialogues in Digital Health**, which evaluates the recent collaboration between the UK Department for International Trade and Instituto Coalizão Saúde in Brazil. This report is the result of a series of initiatives which the UK is developing in partnership with countries in Latin America to explore opportunities for collaboration between UK and regional organisations on digital health. We all know how challenging the past years have been, especially for healthcare professionals. The Coronavirus outbreak is the biggest public health emergency in a generation, and it calls for decisive and coordinated action, based on science and evidence.

The pandemic has opened a door in some countries for the use of telemedicine tools, and I know that is the case in Brazil. There are several different benefits that digital health tools can bring in terms of provision of care: reaching a far larger public through the different tools; offering savings to healthcare systems; and improving data collection to support decision making in other areas in healthcare management. All of which make the proper regulation of such services essential. In developing each aspect of these disciplines, the UK and Brazil can learn from each other, making the most of each others' experience and expertise. And we have a long history of collaboration on healthcare: from the time when the British healthcare system (NHS) inspired the creation of the Brazilian system (SUS) to testing a new digital primary care model that provides care to people in remote areas.

The UK is a country with a history of healthcare innovation, with more than 80 winners of the Nobel prize, who have developed research and discoveries in bioscience from the discovery of DNA to the Covid vaccine from Oxford University. Bringing this spirit of innovation, we hope and aim to contribute to the continuing development of healthcare alongside Brazilian partners. Within that aspiration, telemedicine is an essential topic. Innovation needs to reach those who need it, in a way that is sustainable to the healthcare system and ensures collaboration of different actors in this system: government, industry, academia, patients. We want to work with our Brazilian partners on that.

The UK deeply values the fantastic levels of cooperation with key healthcare players in Brazil. Government, regulators, associations, industry, private sector and academia members – everyone plays a key role in our discussions. And I hope this report, drawing as it does on our countries' experiences in using telehealth technology and services through the Covid-19 crisis, will provide further ground and impetus for discussion and exchange of best practices between us.

Jonathan Knott,

Her Majesty's Trade Commissioner for Latin America and the Caribbean, British Consul-General in São Paulo



Introduction

Digital transformation in Health in post-pandemic future

In the last two years, we have witnessed an exponential advance in Digital Healthcare tools in Brazil and worldwide, driven by Covid-19. After Brazilian law 13,989 was approved in April 2020, authorizing Telemedicine practice in Brazil during pandemic, the demand for teleappointments, electronic medical records and digital prescription soared due the need of social distancing imposed by the biggest health crisis seen in a century.

But it's important to emphasize that the concept of Digital Healthcare goes beyond remote appointments. Its central idea is to integrate technology, professionals and patients, in order to increase quality and access to services, and it can be used for training, following-up and treating diseases and performing researches, for example. It can also include social networks, internet of things, artificial intelligence and programming, just to name a few of its different applications.

Nowadays, we are witnessing a gradual return to most face-to-face activities – schools, churches and companies have reopened, as immunization has advanced in all population strata. Healthcare services have also returned to the most of their functions, with necessary adaptations for assuring everyone's safety. Post-Covid-19 world will surely never be the same. But the greatest impact was the unprecedented digital transformation that reached several societies sectors, especially in Health. What can we expect from now on?

This report aims to present themes about Telemedicine universe and to share Brazil's and United Kingdom's experiences in this scenario, carried out during pandemic, in order to contextualize healthcare assistance and its main obstacles today. It's a fundamental and long-standing partnership, encompassing initiatives for both public and private sectors and also including industry and academia members.

We know, however, that many points regarding Digital Healthcare in Brazil remain open and the protection of patients' personal data is of the greatest challenges. So, we point out that this report is not intended to be shown as a definitive document, but as the beginning of an essential debate about Medicine future in post-pandemic.

Giovanni Cerri,

*vice-president of ICOS and president of Innovation Institute of São Paulo University Medicine College (HC-FMUSP)
Clinical Hospital*



Insights into United Kingdom experience

The British National Healthcare Service (NHS)

Rachel Hutchings and Jessica Morris – researchers at the international and independent healthcare agency Nuffield Trust

Constantly improving the use of digital technology (including online medical appointments) has been an NHS goal for a long time. This strategy, called the *Future of Healthcare*, was published in October 2018. In January 2019, an NHS action plan established that, until 2023 and 2024, all patients will be entitled to online medical appointments and to digital primary care.

Regarding the patients' perception of digital services before the pandemic, a survey published by the NHS has pointed out that¹:



63%

said they were willing to have a video appointment with their doctors (for advices about a mild emergency illness);



55%

would agree to make a video appointment with their doctors for advice on a current problem or condition;



43%

would make a video appointment with their doctors for an immediate or emergency advice.

Changes during pandemic

To face the new moment, NHS has adopted some changes in the way primary and specialized care is conducted. Among these changes:

- Major change in face-to-face care to reduce infection risk at healthcare settings;
- Guidance given to primary care in March 2020: screen everyone before medical appointments to be sure of whom needs face-to-face care;
- Guidance about available solutions, information governance and funding.

People had to work collaboratively, with different teams, and innovate to continue deliver services – the so-called “art of possible”. This has been seen in many areas, such as remote monitoring for Covid-19 patients and online rehabilitation programs, for example.

A drop in the number of appointments in Family and Community Medicine was observed proportionally to outpatient and hospital appointments that have taken place by phone.

Figure 1. As long as the number of General Practice appointments has fallen, the Telemedicine has proportionally increased¹

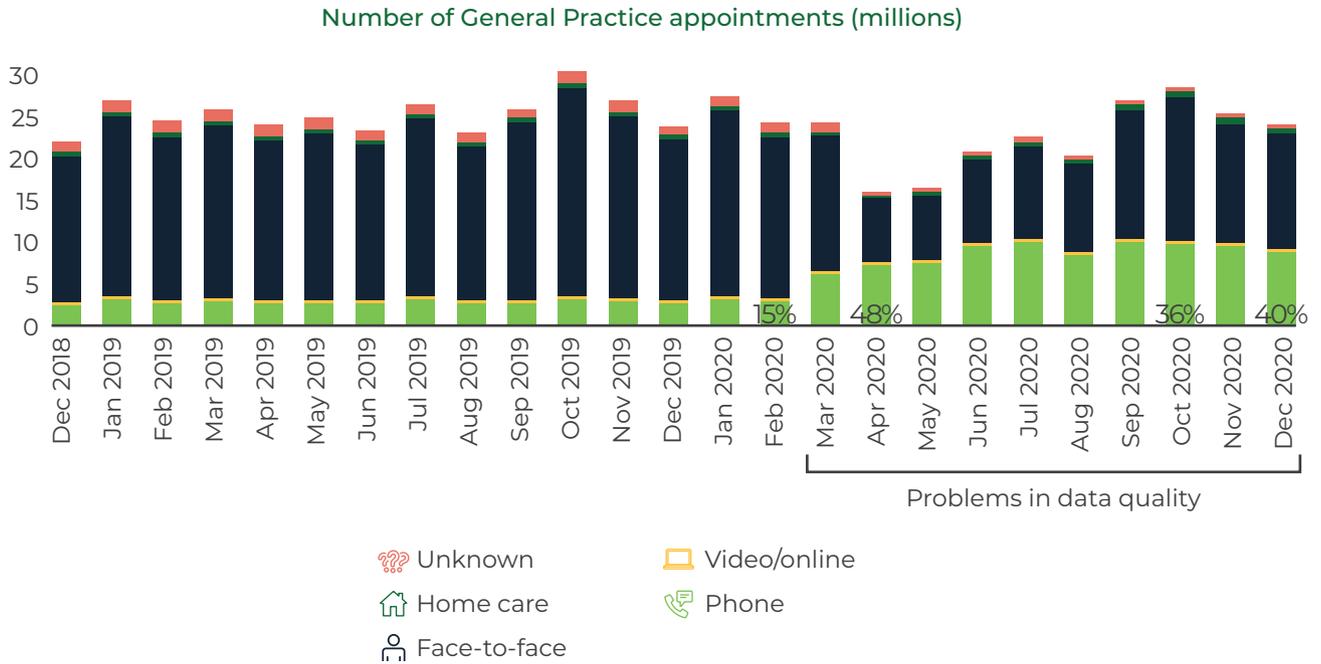
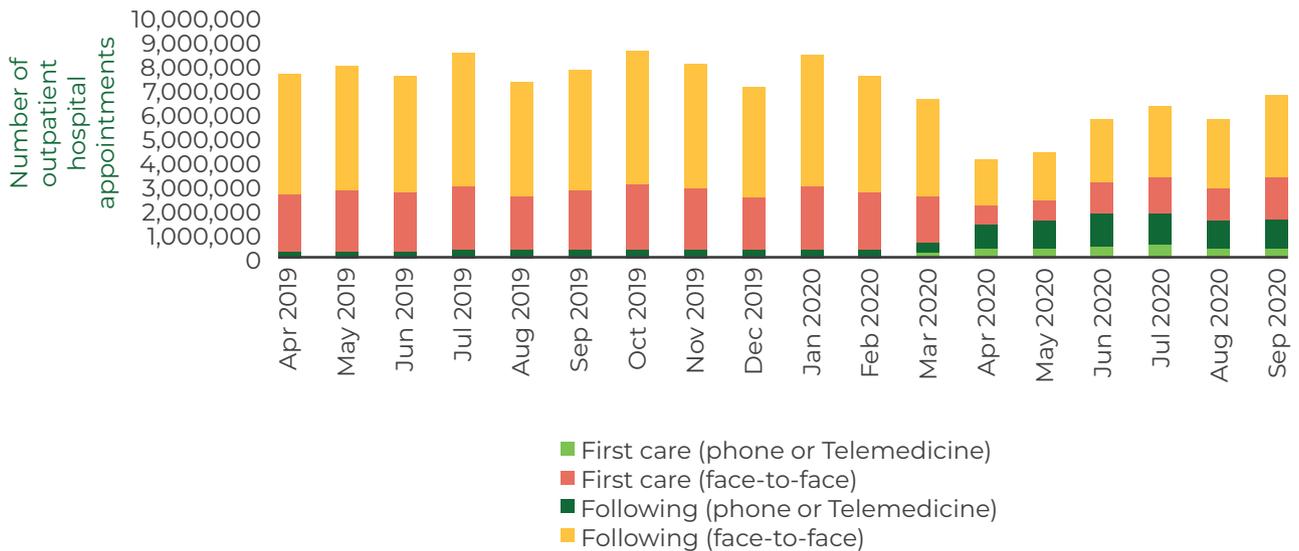


Figure 2. Proportionally, outpatient hospital appointments taken by phone have also increased¹



Analysis of outpatient appointments data during Covid-19 pandemic showed that the percentage of remote services followed a similar pattern across all age groups, sex and socioeconomic status, except for women of childbearing age. In some specialties, such as Image Diagnosis and Obstetrics, remote services corresponded to a low percentage. On the other hand, large increases were observed, with more than 50% of remote services in specialties such as Physiotherapy, Gastroenterology, Rheumatology, Respiratory Medicine and Neurology. Finally, remote services were maintained at the same high levels achieved at the beginning of pandemic in specialties such as Diabetes and Clinical Oncology, but decreased in other ones, such as Ophthalmology and Otolaryngology.

Experience in United Kingdom

Nav Chana – clinical director of National Association of Primary Care (NAPC), non-executive director of Kingston Hospital NHS Foundation Trust and senior partner of Cricket Green Medical Practice

The design and the structuring of any healthcare system must be based on the fundamental principles of primary care, which have become even more essential for all those who seek to understand how Telehealth can help at this level of care. These principles are:

- Contact that is equitable and accessible to all; that is, it shouldn't be a privilege of a few;
- Health coverage, from prevention to diagnosis and treatment, extending it to palliative care;
- Continuity throughout life, especially for patients with chronic diseases;
- Coordination between different levels of care (primary, secondary and tertiary).

Technology functions in primary care

- Management of demands and access offering to make people get advice through self-care technologies, instead of looking for a physician or a nurse;
- Expand of diagnosis possibilities using remote technologies in image diagnosis;
- Use of analytical data to comprehend which population groups are most in need of resources focus;
- Remotely monitoring of chronic patients and health conditions that need long-time follow-up using telemonitoring, for example.

In United Kingdom, as in Brazil, most health problems are associated with social issues, such as housing and security. Issues regarded to the environment in which individuals are inserted represent 90% of what can be seen as a problem related to healthcare and life expectancy, that is, they are social determinants. *“When we talk about health provision, we must think about population health and access improvement, making it to be equitable, focused on the offered value and not on the cost, and the best for everyone we care of”*, said the speaker.

According to him, many governments and health administrations struggle to understand this.

United Kingdom experience in two moments

Before pandemic

“Before pandemic, we hadn’t embraced digitalization, especially in primary care clinics”, said Dr. Chana. 80% of appointments were face-to-face, 12% by phone and the rest included videos and texting. “Physicians and nurses used to say that it got in the way, that it was expensive and complicated, demanding a lot of time and support. Just a few had confidence in using technology”.

Technology use



Electronic medical record:

98%



Electronic prescription (when prescription is sent directly to the pharmacy):

75%



Exams sent by any electronic format:

41%



Artificial intelligence or some kind of automation:

less than 2%

After pandemic beginning

“Since the pandemic beginning, 60% of medical appointments are made by video or phone, percentage that has remained stable over time, and the forecast is that this will remain at 50%, that is, half of patients will be followed-up by video or other digital forms of communication”, pointed out Dr. Chana.

Barriers to embrace technologies have changed in a short time, when British government declared that it was acceptable that physicians and nurses would use this kind of remote appointment to protect patients and healthcare workforce from Covid-19. In three or four days, around 7,500 Family Clinics, that attend a 70-million people population, begun to use remote access (phone, video and texting) as a way to interact with patients and to perform screening for decision making about those who needed a face-to-face appointment, in a change that, normally, would take some years to become a common practice.

Difficulties for embracing these technologies in United Kingdom

- Workforce low knowledge about digital technologies;
- Concern about the risk of committing errors when using new technologies;
- Bureaucracy for acquisition of new technologies with State support;
- Government-imposed barriers to a wider use of these technologies.

United Kingdom population and use of digital technologies

In England, there are around 11 million people – almost 20% of population – that are considered digitally excluded, that is, they don't have access to internet, cannot afford a smartphone, don't have access to a wi-fi and don't know how to use more complex functionalities. This exclusion is a great challenge. "If we are sure that we want to offer an equitable healthcare, we must offer this technology to those people. So, we need to change from a system that is much more focused on reactive care to one focused on prevention, and this system must be based on technologies that support people so that they can live their lives in a fully way, with no need to a face-to-face medical appointment for that. This is the path we are trying to take in United Kingdom in next years", finishes Dr. Chana.

Covid-19 response using digital healthcare in NHS

Minal Bakhai, National Clinical director for Digital First Primary Care at NHS England and NHS Improvement

Responding to the pandemic, all primary care units in United Kingdom were encouraged to embrace a digital screening mechanism for, this way, minimize patients and staff exposition to Covid-19².

Total Triage: multimodal response

NHS has embraced *Total Triage*, which represents a multimodal approach for assisting patients that contact healthcare basic units, and this can take place over phone or through the website, as the objective is to make this action so inclusive as possible. During this contact, attendants fill out a form and, based on established criteria, a response from the appropriated channel is obtained and the next step is defined. As important features of *Total Triage*, Dr. Bakhai pointed out the healthcare professionals' time optimization and an agile care, allowing a very fast response and prioritizing patients needs. Care criterion was converted from a first-come, first-served basis to a clinical priority. This also means that professionals have a much greater flexibility in performing these services. Then, the order can be concluded by texting, by a video appointment or by phone and, if it were really necessary, by a face-to-face appointment to perform a physical exam. There's not an established solution for all patients: decision is taken case by case.

Figura 3: *Total Triage*²



Adapted from: National Health Service (NHS). Advice on how to establish a remote 'total triage' model in general practice using online consultations [Internet]. Access in: 3 Aug, 2021. Available at: <www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/C0098-total-triage-blueprint-september-2020-v3.pdf>.

Surveys carried out in Healthcare Basic Units have shown that most of them would like to maintain distance care in combination with face-to-face appointment².

How patients see this kind of service²

Survey performed with patients that visit Healthcare Basic Units has shown that patients:

- ✓ Are willing to have an **on-line appointment** with their Healthcare Basic Unit
- ✓ Think they have been heard, treated with care and during **enough time**
- ✓ In appointments, acceptance level was higher than **80%**
- ✓ Video appointments are available in more than **99%** of units and phone ones, in **97%**
- ✓ Pandemic beginning: between **100 and 120 thousand** video appointments weekly
- ✓ During pandemic: **35 thousand** video appointments weekly



Lessons learned with Covid-19

The rapid changes imposed by pandemic have shown that professionals can work more collaboratively through the integration of different systems. Pandemic has led the embracement of a very clear national strategy, with well defined expectations and objectives, what affected teams' traditional way of working. The perception of risk and shared knowledge has been expanded.

Another important point was suppliers' role, who were responsive and worked in a very close way with the Healthcare Basic Units, managing to quickly provide solutions to the needs of each one, under federal coordination.

Concern for professionals' well-being, constant feedbacking units' management and encouraging creativity and collaboration among units were important pillars in changing and adapting process.

Systems integration challenge

Improving the accessibility and easing the use of systems, especially for patients, is a crucial aspect, as well as logistical and operational aspects, such as acting in networks when it comes to bidding and acquisitions, reinforcement of standards and purchase process horizontalization.

Transformation journey³

NHS Primary Care department is developing a tool called "transformation journey planner". For this, they are focused on areas that add more value. Clinicians are acting with a general view of where there are gaps in the existent systems and how they can plan for future investments. The goal is to create a national training program and have resources to give support to all employees: both clinical and administrative teams. An important point is that Healthcare Basic Units need this support to be practical and from easy systems to be used; otherwise, returning to traditional systems is inevitable.

The speaker emphasized the need of redrawing journeys with a long-term view for an effective action both in diagnosis and care. She also highlighted the challenge of incorporating in population the use of apps and support tools to really make a more efficient implementation, which leads to digital inclusion and tries to achieve the best results.

Telehealth in United Kingdom

Loy Lobo, president of Telemedicine Council at The Royal Society of Medicine (RSM)

United Kingdom has had technology for remote care for many years. NHS purchased the ability to make safe teleappointments in 2007, but this modality was rarely used. It has changed only because of the pandemic and quickly virtual appointments were embraced. But this doesn't mean that this kind of care will last. Data from United States show that, after a while, having PPE available means that doctors could return to see patients face-to-face and, from then on, Telemedicine and the use of teleappointments began to be reduced.

Teleappointments advantages

Doctors	Patients
 <ul style="list-style-type: none">• They can care of more patients;• Superior gains in their offices;• Less time spent in management;• Error risk reduced by using artificial intelligence and support from other specialists;• Legal protection expansion through tracing conducts and evidences.	 <ul style="list-style-type: none">• Access to guidance and care;• Reduction of waiting time;• Avoid traveling in search for specialized care;• Reduction, in some cases, the costs with care (except in premium or convenience services);• Enjoy a more positive experience.

Benefits potential is directly linked to the service design. Implementation of digital healthcare could be performed 20 years ago. In areas such as entertainment, retail and financial, there have been digital tools for a long time, but it didn't happen in health due to the payment issue, because in many countries it's not known who pays for this service. Still regarding payment, it's important to have in mind the diffuse benefit issue, as those who pay can think they do it for the benefit of third parties.

Interesting cases

NHS Apps Library (www.nhs.uk/apps-library): mobile apps for phones or tablets, deemed suitable for use by NHS and that can help patients. In the website, there are a series of recommendation of how and in which case each one can be used.

Transformation in medical education: a surgeon in United Kingdom broadcasts his surgeries with 360-degree cameras, takes questions from his students and answers them in a transparent board in the surgery room. Usually, a traditional surgery room can have space for from six to eight students that can take part of a surgery, but, in a transmission using augmented reality, it's possible to have a much wider broadcast.

Mobile phone and tablet education platform: a company called Touch Surgery is offering training by using simulations. It's a free app, available for any person anywhere worldwide. The company's business model is based on giving feedback about how to improve techniques of surgeons who use simulations in training. The platform will also be used to train and to develop robotic surgeons.

Digital therapy – Sleepio (bighealth.com/sleepio): Sleepio is a program developed for stressed people that cannot sleep very well. The program can be used on the smartphone and integrates with other wearables devices. A teacher avatar gives advices about how to improve sleep.

Digital therapy – Concept Health (concepthealth.co.uk): it offers, using virtual reality, rehabilitation exercises for people with pulmonary problems. By using a virtual reality headset, there's no need for patients to go to the clinic to exercise: they receive home their devices and instructions are passed by the own device. A remote supervision assesses and gives support to patients. This device is made available by NHS.

Factors that ease new technologies embrace

Administrative measures are necessary to assure that new technologies would be embraced in healthcare system. Information technology structure, for example, has to consider aspects such as data safety (how they are shared and which systems are used). According to Dr. Loy, for new technologies embracement in Health last until next generations, it must be applied at the national level. *“We know that most of our citizens often have difficulties to access the physician of the appropriate specialty without using the digital appointment, which makes it much easier; even so, you still need a doctor for each patient to see. If you use technology well, you can increase the number of patients each professional can see. That's the great challenge”*, said Dr. Loy.

Every 100 people in country:



98,84
have mobile phone

67,47
are internet users

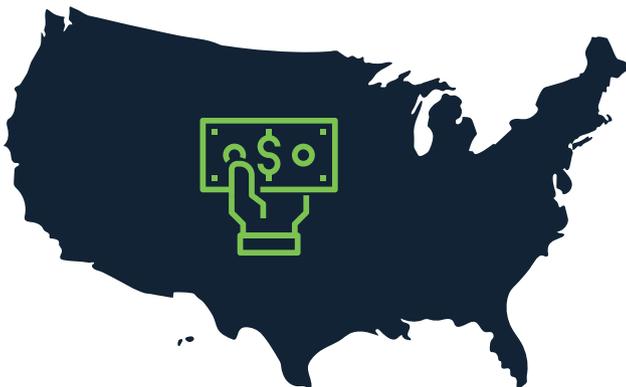
The fact mobile phone has become more accessible is very good for doctors to see more patients, as even in cases hospitalization is necessary, it's possible to offer a quicker care.

Capita Healthcare Solutions

Rob Wake – director of Capita Healthcare Solutions

Pandemic has changed healthcare: challenges had to be overcome and things that previously seemed unimaginable had to be accomplished. Digital healthcare offers great opportunities. But, why has healthcare been changing so much? Because costs keep rising and more challenges present themselves, such as:

- Population ageing;
- Medical advances;
- Patients' knowledge;
- Patients more active with their care;
- Inefficiencies.



Data prior to 2020 indicate:

\$ 3,2 trillion were spent on healthcare systems in United States

But **\$ 1,2 trillion** had been wasted or are resources that could be used in a more effective way

Three points are fundamental due the success of projects in digital healthcare:

- 1
- 2
- 3

- Treating patients with humanity;
- Putting them in the center of care process;
- Having technology and ability to bring all organizations together and to offer all needed care to patients.

Value-based healthcare points to an important change: patients are more active, involved in their treatments, understand their illnesses and easily seek information – by calling or accessing an app or a website in their smartphones. From a primary care point of view, giving support to these patients throughout the continuum of care is fundamental.

About the company

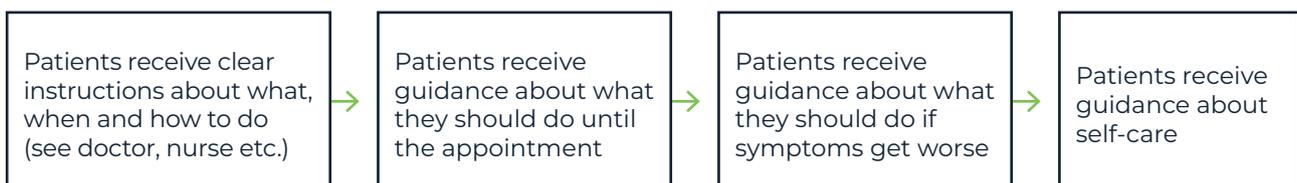
Capita is a British company that is part of FTSE 250 and operates in several areas, including Healthcare. It has been working for over 18 years in digital transformation, supporting screening both in primary and secondary care. This company has projects worldwide and works with NHS.

-  • Savings in primary care, at the moment of project implementation, were estimated at £200 million a year, and the volume of teleappointments with family doctors reached 1.7 million in the same period;
-  • The company works with a large volume of more than 3 million people data processing;
-  • With the pandemic of Covid-19, there was an annual growth of 31%;
- The company has been making great investments in digital platforms and technologies.

Care at the right place, at right time

It's necessary to move towards a system that integrates primary and secondary care and that has a transparent interface throughout the healthcare system. For this, content is critical. It's important to have teleguides, which can be used by healthcare professionals, and webguides, through a call center or mobile softwares.

In Capita system, all patients see questions in the same way. Common symptoms are presented and there are questions that can be answered by patients. Depending on the answer, they move on the next phase, in which decisions are provided by the algorithm and patients are advised on what to do. There are four phases:



Capita's worldwide work experience shows that, through a clinical algorithm interface, it's possible for saving about 15% in unnecessary calls or calls that go to the wrong person, and that's very significant, because it can be faced as an inefficiency – there are, then, opportunities to better redirect these resources.

Insights into Brazil experience

Challenges and opportunities in Telehealth:

Albert Einstein Israeli Hospital experience

Sidney Klajner – president of Albert Einstein Israeli Hospital

Albert Einstein Israeli Hospital recognizes Telemedicine as a way for delivering care based on the acquisition, the adequate and intelligence use of data and the pursuit in achieving established goals by the Institute for Health on population health.

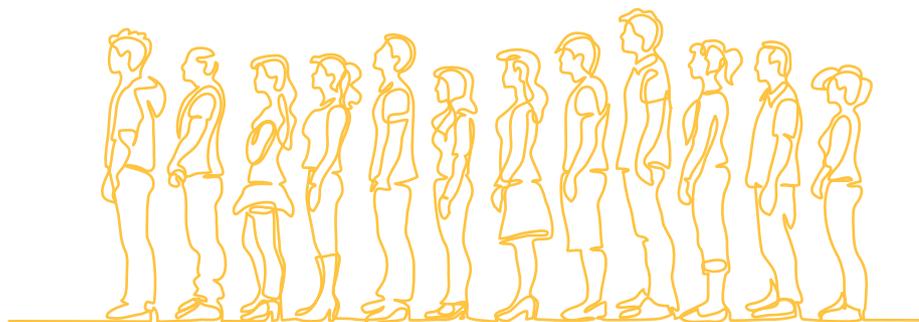
The prevention and management of chronic diseases, the experience with patients' care and the healthcare professional's experience are taken in consideration without neglecting per capita cost reduction and increasing patients' accessibility. According to Sidney Klajner, president of the hospital, *“Those with fever or positive in an exam have seen Telemedicine as a way to receive care without leaving home. Gradually, it has been replaced by patients that should control their illnesses, such as chronic diseases, as well as simple emergency care. They saw in Telemedicine an opportunity, as the fear of acquiring Covid-19 in hospital environment had taken hold – hence, this curve took off, indicating a trend of using Telemedicine not only in São Paulo State, but in several regions in Brazil. People became accessing our Telemedicine Center especially for this teleguidance”.*

In the process established in the hospital, follow-up involves selecting and training professionals due to Telemedicine care peculiarities (especially regarding the limits of this type of care and the protocols on referral to face-to-face care), in risk terms of their safety. Individual reports and monitoring quality tools are periodically used to assess resolute productivity of each professional. In them, proper completion of medical records, prescription standards and adherence to protocols are monitored.

Many projects have been developed by Albert Einstein Israeli Hospital Telemedicine Center focusing on three distinct groups: patients and visitors; hospitals and clinics; and companies and schools.

Teledermatological Center: an example of project conducted by Telemedicine Center

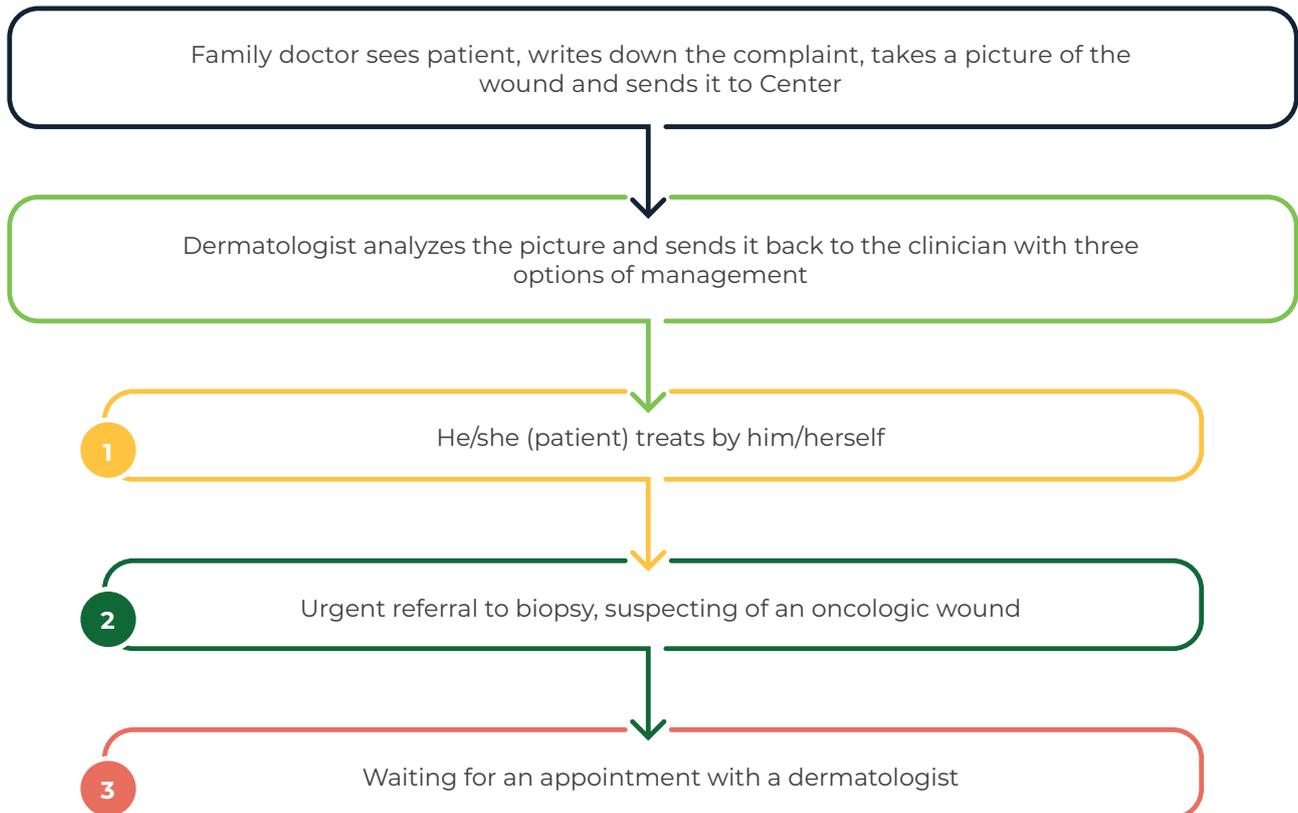
**Before
Teledermatological
Center,
70 thousand
patients
were waiting for an
appointment with a
specialist**



After Teledermatological Center,
waiting was reduced from 12 months to
less than 1 week



How service works



Partnerships

Throughout history, Albert Einstein Israeli Hospital has developed partnerships with Federal Government to enlarge population access to healthcare.

Ministry of Health: by the Health Unified System Institutional Development Program (Proadi-SUS, in Portuguese), some projects have been developed using specialist physicians from hospital's clinical staff. Specialized medical care was offered in 120 cities in North Region (especially in Pará State) in the following specialties: Cardiology, Endocrinology, Rheumatology, Pulmonology, Neurology, Neuropediatrics and Psychiatry. This also allowed, when facing pandemic, to make the hospital platform available to SUS professionals, so that they could perform care.

Ministry of Defense and Ministry of Economy: at the end of 2020, a mission in Iauaretê, in the upper Negro river region, north of Amazonas State, made it possible to offer care in several specialties: Cardiology, Pediatric Cardiology, Gynecology and Obstetrics, Neurology, Pediatric Neurology, Orthopedics, Psychiatry, Rheumatology and Physiotherapy. With some degree of transmissibility, it was possible to cover distant communities, breaking down logistical barriers and providing care capable of avoiding, in many cases, patients' displacement in critical conditions to the capital state. When facing pandemic, all this knowledge was transferred to field hospitals.

Acknowledgment

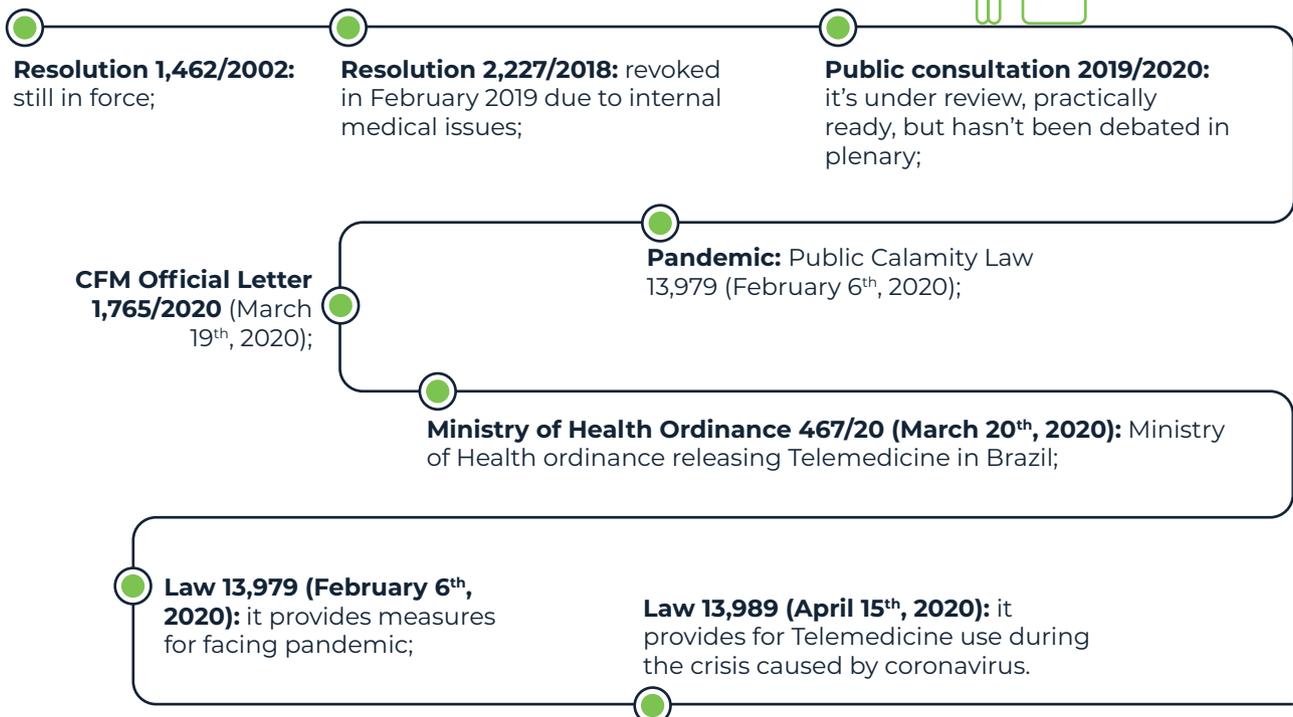
In 2020, Albert Einstein Israeli Hospital was recognized as **one of the 50 best hospitals in world**. “This recognition is associated to innovation and to resources linked to all economy sectors and that are capable of offering many advantages in medical care”, pointed out Klajner.

Telemedicine: the Federal Council of Medicine (CFM) view

Donizetti Dimer Giamberardino Filho – first vice-president of Federal Council of Medicine (CFM);

Telemedicine has arrived in a disruptive way, amid the health crisis of pandemic. It represents an opportunity for improving population access to care and to an integrated care network, especially at SUS. It also has potential to rationalize resources and to improve healthcare quality, transferring knowledge and experiences from a medical service to others, especially from the largest to the smallest ones.

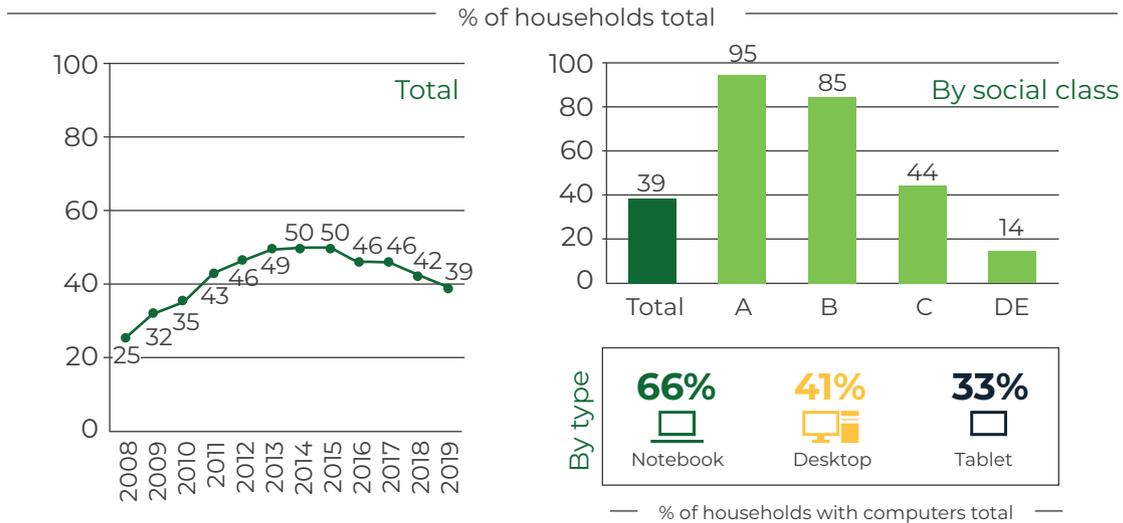
History of Telemedicine in Brazil



New times, new challenges

A study on relational mobility conducted in 39 countries about how people relate to one another has pointed that, among all those evaluated, Brazil obtained the fifth highest value of relational mobility (0,203), the first being Mexico (0,039) and the 39th, Japan (-0,414). The article *Relational mobility predicts social behaviors in 39 countries and is tied to historical farming and threat*⁴ argues that countries located in America and Europe tend to have the highest relational mobility rates; as well those located in Asia and Africa, the lowest ones.

Figure 1. Households with computers⁵

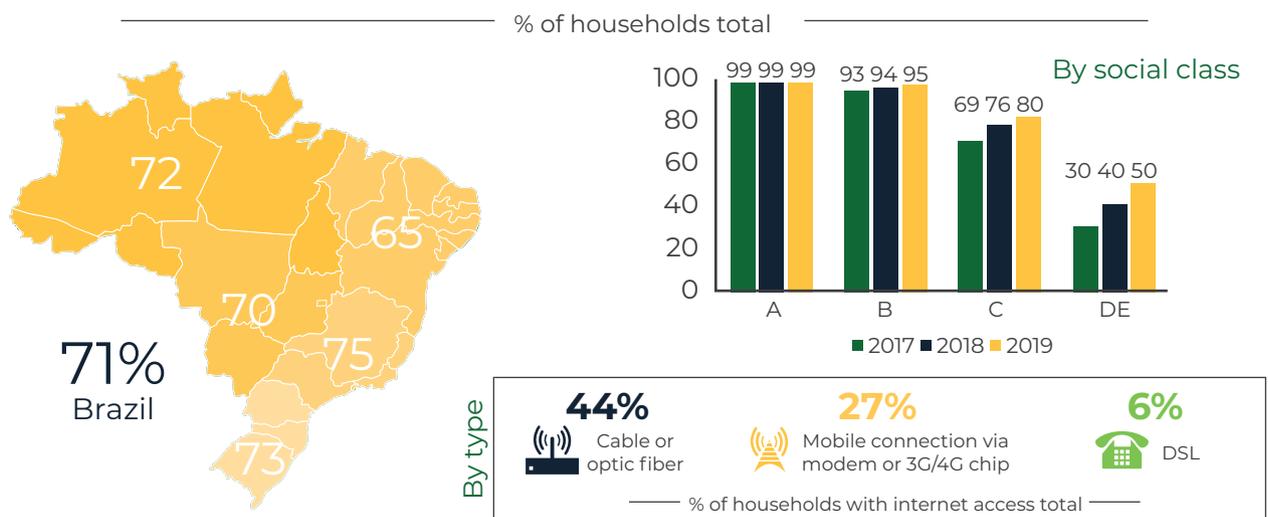


Adapted from: Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação (Cetic.br). Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos Domicílios Brasileiros – TIC Domicílios 2019. São Paulo: CGI; 2020

According to the Federal Council of Medicine (CFM), continental dimensions of Brazil, social inequality and difficulty of accessing internet represent great challenges in implementing care by Telemedicine.

Internet access in Brazilian households in each Brazilian region

Figure 2. Households with computers⁵



Adapted from: Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação (Cetic.br). Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos Domicílios Brasileiros – TIC Domicílios 2019. São Paulo: CGI; 2020

In the North Region, access is reasonable, but this can be explained by the high concentration in capitals. In Amazonas State, for example, more than 90% of the population live in the capital, Manaus. In terms of greater fragility, we can talk about the Northeast states, but national average indicates that 71% of households have internet access.

Healthcare sector in Brazil



78%
of population
depend on SUS

Even with the majority of population depending on SUS, budget is very similar to that of private health

163 million
Brazilians are using SUS
47 million
Brazilians use private care

Public care:
R\$ 228
million



Private care:
R\$ 219
million

According to the survey Medical Demography, Brazil has more than
520 thousand physicians

Using World Health Organization (WHO) data about percentage of Gross Domestic Product (GDP), it's possible to make a comparison between the investment in public health in United Kingdom and in Brazil: in United Kingdom we have 8% – and about 4% in Brazil.

According to the survey *Medical Demographic*⁶, Brazil has more than 520 thousand physicians. In vice-president of Federal Council of Medicine view, Dr. Donizetti Dimer, “*We have a system with a public logic and we also have a great action of the market. These two systems live together, but they are not conflicting*”.

The Digital Healthcare Revolution in Brazil: challenges and opportunities

Claudio Lottemberg – president of Instituto Coalizão Saúde (ICOS)

Albert Einstein Israeli Hospital had its initiatives in digital Healthcare motivated by actions of the Institute for Healthcare Improvement (IHI), which still is the greatest quality tool used in organization programs.

IHI has presented the concept of triple aim, based on three objectives:

1

• Improvement of patient/individual experience regarding to care;

2

• Increase of healthcare quality;

3

• Reduce of per capita costs in healthcare.

When discussing quality tools focused on patient safety, it's first and foremost to place them at the center of care, as everything that is thought in terms of medical care nourishes a patient experience.

The second point is the social impact of this care, emphasizing not the individual experience, but its repercussion on the community – which wants to have access and discusses about the healthcare system.

Hence, we come to the third point: sustainability. This is becoming increasingly more important because we have been following a growing spiral in terms of healthcare costs, as a result of population aging and new technologies increasing.

The fourth point is related to professionals' participation – professionals that work in care –, and this a strongly impacted aspect when it comes to Telemedicine and Digital Health.

An approach related to administrative care issues allows us to observe that most of the services that have been provided follow a carefree logic with waste issues, to the point that some of them believe that about a third of what is spent in Healthcare would be seen as unnecessary expenses. This is a paradigm that can be broken down with digital Healthcare, bringing procedural simplification, transparency and, fundamentally, economy. To understand what it means, it's possible to make an analogy with banking sector: nowadays, the number of professionals that work in it represents about a third of those that were working there ten years ago. The strong technological increment has supported this reduction, although it doesn't mean less services provided to patients – on the other way around.

In Healthcare, by using digital tools, we have opportunity to put resources together, simplifying processes and reducing people's needs, what expands transparency. It also allows to approach very carefully the theme “costs reduction”, which concerns not only paying sources, but society in general (that hasn't been supporting care costs increasing).

In terms of care, we have a huge challenge regarding to equity. Brazil is the fifth one in world in terms of territorial extension, with more than 8.5 thousand square kilometers and 210-million estimated population. Starting from a specific point – distribution of specialists countrywide – today it's not possible, in a face-to-face way, to attend population needs. Offering remote specialists' care brings a series of repercussion in terms of costs and, in a certain way, in patient's experience, reducing waiting time for this service.

In 2020, a Datafolha survey, with 812 people in São Paulo about SUS offered care, showed as a negative aspect a long waiting to set an appointment, exam or surgery. It happens in one of the Brazilian states that have more human and physical resources.

How Telemedicine can be offered

We can think about two models:



Asynchronous models: using e-mail, chats and webservices. These relationship dynamics are already happening, regardless any kind of regulation that would be made, but it is already late, if we compare with other countries situation. In United Sates, for example, regulation has been in place since 1996. In United Kingdom, since 1998.



Synchronous models: with physician's participation simultaneously, a series of relationship mechanics can be used, including voice and image platforms, general or specialist physicians participating and full-time support.

To stablish synchronous teleappointments as a widely used reality, it is evidently necessary to have an adequate regulatory scenario, not only to guarantee data security, but also to provide descent remuneration to those who want to take part of this scenario.

Telemedicine in Albert Einstein Israeli Hospital

The hospital has begun a Telemedicine care process by supporting a restrict group of people. Progressively, patients' access has been expanded through Proad-SUS programs, with an important impulse in Covid-19 pandemic scenario, and with more support for health plan operators, which were in need to find an effective non-face-to-face way of care.

In 2021, Albert Einstein Israeli Hospital already had some million people assisted through its Telemedicine system. Surveys using the Net Score Promotion (NPS) tool show that satisfaction level with Telemedicine care is higher than that obtained in own hospital's emergency care. Therefore, under patient's experience logic, it's extremely positive. Furthermore, about 40% of patients, within 45 days, use Telemedicine care again.

Telemedicine's proposal is not to lateralize face-to-face care

The idea is to prioritize what is, in fact, important and to direct the service to a more adequate care path. We know that emergency rooms don't strictly fulfill their roles. Sometimes, they treat patients that, strictly speaking, would be at or should be referred to primary care centers, healthcare basic units or medical offices. The fact that patients have a communication mechanic with someone that helps them in an emergency circumstance ends up to be something very positive to also unburden face-to-face services.

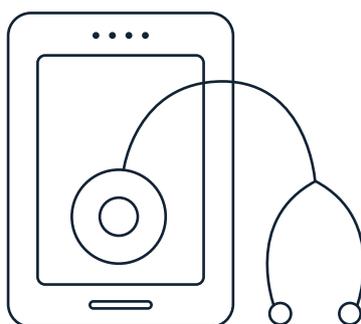
Data interoperability

Current dam techniques correspond to data transfer problem between banks and systems that was seen in the past. It's already a reality in several countries, and great centers in Brazil are already able to interface with databases abroad.

It takes us to an important point: Telemedicine brings another dimension to care activity. Professionals are no longer only physicians at their communities and become second opinion doctors of others ones that work in distant communities. Likewise, patients gain access to other resources. It can represent a strong cultural shock, transforming the understanding of what a community is. Great American hospitals have emerged from this perspective. They have been created to serve their communities and, by their reputation evaluation, they have turned to be a reference for other locations. This is a scenario that is replicated now, with Telemedicine, in a geographic dimension that has never been imagined before.

Is Telemedicine the solution?

“Often, when receiving a technological resource increment, we think it's the solution to all ills. Then, at a given moment, that goes into something we can call a disbelief of the resource itself, until we find a balance point. I don't believe Telemedicine would take place of a medical face-to-face appointment. But we must understand in which context we are looking at teleappointments. They are fundamental to give a direction”, said Claudio Lotemberg. “For a second opinion, it will also have a very significative resolutive role. But, to create relationship, empathy or something that includes confidence between doctor and patient, I don't think it will replace face-to-face appointment”, he added.



From connect Healthcare to biopsychosocial care

Chao Lung Wen – head of Telemedicine discipline at São Paulo University Medicine College (FMUSP) and leader of São Paulo University (USP) research group in Telemedicine and Healthcare

In Brazil, Telemedicine was recognized by a federal law⁸ as a way of practicing Medicine by using remote communication technologies and, therefore, it's a medical issue, used for the purpose of care, research, diseases prevention and health promotion. So, developing actions that include logistic to prevent diseases is part of Telemedicine. The term “Telehealth”, in other hand, is a broader concept, because it represents a combination of all Healthcare professions in remote care. Precisely because it involves different professions, each one with its own regulation, it's difficult to stablish something broad, capable of enabling the regulation of quality, determining good practices, controlling over training and, consequently, measuring care quality, which is evaluated by a technical audit.



Complexity of Telehealth regulation:

Medicine: Resolution Federal Council of Medicine 1,643/2002

Psychology: Resolution Federal Council of Psychology 11/2008

Speech Therapy: Resolution Federal Council of Speech Therapy 429/2020

Physiotherapy and Occupational Therapy: Resolution Federal Council of Physiotherapy and Occupational Therapy 516/2020

Nursing: Resolution Federal Council of Nursing 634/2020

Pharmacy: Resolution Federal Council of Pharmacy

Nutrition: Resolution Federal Council of Nutrition

Odontology: Resolution Federal Council of Odontology

Organizational Telehealth

Organizational Telehealth is an expression used by Dr. Wen to emphasize the need of each institution to stablish its compliance rules and its actions based on the best regulation from each professional council, moving towards:

· Organizing and expediting Healthcare for reduce waste and increase efficiency with no structure increase;

· Promoting e-Care concepts: lifestyle, supervised self-care, diseases prevention, risks and injuries;

· Offering integrative healthcare at home (Telehomecare or Telemulticare).



It means to stop focusing debates about teleappointments for developing a Telemedicine chain and putting it inside the Health productive process. In this way, there's a great educational challenge to be faced: we have to train professionals to have a well-done Telehealth, since graduation time, passing through multiprofessional and medical residency programs, and including the creation of professional good practices' guidance.



Ethics applied to digital health

In its 37th article, 1st paragraph, of the Brazilian Medical Ethics Code, we have:

“Medical care at distance, in Telemedicine model or with other methods, shall be regulated by the Federal Council of Medicine”.

The General Law for Personal Data Protection (LGPD, in Portuguese) and the Internet Civil Mark can also give legal basis for sustaining ethics standards.

Law 13,989, sanctioned by the Republic Presidency on April 15th, 2020, in its fifth article, establishes that Telemedicine care will be ruled by ethics and normative standards of face-to-face care.

A 2007 publication¹, by World Medical Association, defined Telemedicine and advised that all interventions in healthcare should be tested for their effectiveness, efficiency, security, feasibility and cost-benefit.

These regulations have reinforced the idea that Telemedicine is a method of medical care that uses assistive teletechnologies, but is ruled by the same regulations and ethical and legal principles. It is up to the Federal Council of Medicine not only to create a regulation, but also to encourage that everything can be made in an ethical way and, furthermore, that specialties societies also create their manuals, which would determine how to execute good practices in the name of patients' safety. So, it's very important to have the learning of digital ethics in digital Healthcare and Telemedicine.

For Telemedicine services, there are minimum proposed international standards, functionalities for which risks and solutions must be considered. There's no room for improvisation. We must have rules, standards for good practices and ostensible supervision until this culture is created, as we don't have Telemedicine and Digital Ethics as mandatory subjects in Medicine graduation courses.

“Telemedicine and Telehealth are not about reducing costs. It's a wrong thought. Telemedicine and Telehealth are about reducing waste, increasing problems' resolution logistic and expanding health access through Telemonitoring and Telescreening. Reducing costs is a consequence. We must pursuit quality when incorporating a technological element. Our goal is not to have Telemedicine, but to create a connected Healthcare ecosystem”, said Chao Lung Wen.

Telehealth in Brazil and access to Healthcare: present and future

Erno Harzheim – manager of Salute Clinic and former Primary Care secretary at Health Ministry

In the 1980s, a governor of the US state of Oregon asked for a technical group to create a solution for them to have a universal healthcare system in the state. After some work weeks, the group returned and told the governor that he should choose two out of three items: access, quality or cost. Because of the presented financial context and population's size and health needs, they couldn't show him a proposal that would combine these three items inside their financial scope in that political-economic moment.

This dilemma, called the Oregon dilemma, still seems to be present in all healthcare systems worldwide. Health needs, based on expectations of patients, physicians and other healthcare professionals, don't have limit and this equation between universality and integrality seems to have almost no solution by the cost point of view.

However, despite the great diversity countries invest in their public and private healthcare systems, there's a ceiling that no country exceeds, because this investment cannot be unlimited. After all, health is a fundamental issue, but, as a society, it's necessary to invest in other areas to face social and economic determinants. Telemedicine represents a great opportunity to break down this dilemma, due the potential of access capillarity. Furthermore, we can have several devices that can assure quality by measuring the technology, both in the service and in data registering and protection, according to Internet Civil Mark and to punishments provided by General Law of Data Protection (LGPD, in Portuguese). Regarding conducting, Medical Ethics Code determines what must be done so that all physicians are free to practice their profession with autonomy and responsibility.

A new era

We live in a new era in worldwide society, that has already been predicted in the 1990s by Manoel Castalls, in three volumes of the book *Information society*¹. The 21st century is permeated by information technology and communication. There are 70 million households with internet access and more than 214 million smartphones in Brazil². According to Erno Harzheim, *"A small portion of population has no access to any communication technology, but Brazil insists in not applying interventions that would benefit the vast majority of population – it's always based on exception. What we need is to also have another intervention focused in this subgroup, which may be excluded from access, but we can't wait for 100% of population to have access to implement solutions mediated by these technologies"*.

More and more we have devices that will meet the need of a face-to-face physical exam, allowing a physical exam at distance with safety and quality. In a teleappointment mediated by technology, it will be possible to get more support, by artificial intelligence and clinical protocols, for medical decision making than in a face-to-face appointment.

Studies that review the teleappointments' effectiveness reach percentages from 60% to 70% of efficiency in some cases. The others need a face-to-face rescue, whose demand will decrease over time.

The scale that can be achieved with Telemedicine allow us to face the last pillar of the Oregon dilemma, which is the cost issue. It's possible to better fill the time doctors dedicate to care, which sometimes is not controlled by face-to-face care. It's possible to scale the most diverse schedules, which may seem strange by face-to-face care point of view but may not in a virtual point of view.

RegulaSUS: Telehealth in primary care

Brazilian Healthcare Unique System (SUS, in Portuguese) has two great challenges to be faced: access and effectivity/quality interventions.

In 2005, the Ministry of Health's Telehealth Program (later renamed as Brazil Telehealth Networks) started. Several Brazilian universities made contributions, proposing methodologies to take Telehealth actions to Family Health scope: a great network of primary care in Brazil.

By Rio Grande do Sul Telehealth initiative, in 2013, a teleconsulting by phone project started and promoted the discussion about thousands of clinic cases, with a very important impact in resolution in primary care and in the number of hospital admissions. "From this experience, RegulaSUS project was created, which goal was to intervene in waiting lists (of specialist appointments, exams and therapeutic procedures, mainly surgeries), something that would be part of any universal healthcare system, but in Brazil it represents a great Achilles heel", pointed out the speaker.



From 2013 to 2019:

- 215,000 regulations;
- 20 benefited specialties;
- 58 agendas;
- 71,000 clinic discussions between physicians (primary care and specialists);
- 422 cities in Rio Grande do Sul.

Protocols:

- 252 approved by CIB/RS;
- 33 benefited different specialties;
- 85 published by Ministry of Health.

During this period, a significant drop in the number of patients that were in the waiting list, through the project's continuous intervention, could be noticed.

RegulaSUS has influenced the creation of Regula Mais Brasil, a project led by PROAD excellence hospitals, present in five Brazilian capital cities: Manaus, Brasília, Belo Horizonte, Recife and Porto Alegre, with more than 450 thousand regulations in appointments in waiting lists regulation centers – managing to nationalize a local idea. Many initiatives that have emerged in different places in Brazil ended up being replicated in SUS scenario and in private health.

The Inova HC experience

Giovanni Cerri – vice-president of Instituto Coalizão Saúde (ICOS) and president of Instituto de Radiologia (InRad), in São Paulo University Medicine College (FMUSP)

In addition to great social and economic problems, pandemic has accelerated the embrace of practices in digital Healthcare and several initiatives have been incorporated to Clinical Hospital in São Paulo University Medicine College (HC-FMUSP) through Inova HC, which is the clinical complex's innovation system.

Digital healthcare as one of the new pillars of the institution development

The goal was to make digital Healthcare present in all institutes, in patients' care inside the clinical complex and in the relationships HC-FMUSP has with primary care. Inova HC has counted with British Government and Mackenzie University support, which helped to draw a strategy of digital transformation in the institution. Inova HC has this role – to incorporate technologies that could help this relationship.



About Clinical Hospital (HC):

- The greatest hospital in Latin America
- 8 specialized institutes
- 2 auxiliary hospitals – a total of 2,500 beds, 450 in the UCI
- The greatest cancer center in Latin America
- The greatest Cardiology center in Latin America
- More than 1.5 million appointments a year
- 2,000 residents work at the institution annually
- 7.3% of all Brazilian scientific articles about health in the last years have been developed in HC

Innovation: to help transforming and incorporating new technologies, new resources in the healthcare system

Among the challenges, Dr. Cerri said: “We need to improve technology framework. Many think digital Healthcare is important, but they don’t feel able to use it”.

Three great opportunities:



- To strengthen the vision of digital Healthcare as a solution for main priorities in public health;
- To promote an innovation ecosystem in digital Healthcare, creating a safe environment to install these new solutions;
- To promote digital Healthcare skills among Healthcare professionals so that it becomes a culture.

São Paulo University Medicine College is developing a training course to all residents in digital Healthcare.

A digital Healthcare model that can be replicable



Clinical Hospital offers innovation opportunities with impact in national scale in three areas:

- To test innovate solutions to digital Healthcare;
- To help defining trends in digital Healthcare and innovation;
- To be one of the greatest partners in drawing public health politics in Brazil.

Digital Healthcare project

Giovanni presented an example of how HC-FMUSP is building its digital Healthcare project. The goal is to make patient’s journey easy, complete and accessible since the symptoms, using artificial intelligence to help him/her choose the patient’s pathway (which specialty should care him/her), perform the appointment, electronic prescription, contact the pharmacy and payment.

Clinical Hospital as a partner to transform Healthcare system

A partnership with HC-FMUSP has potential:

To create success cases that promote wide embrace of healthcare digital solutions in all levels of care



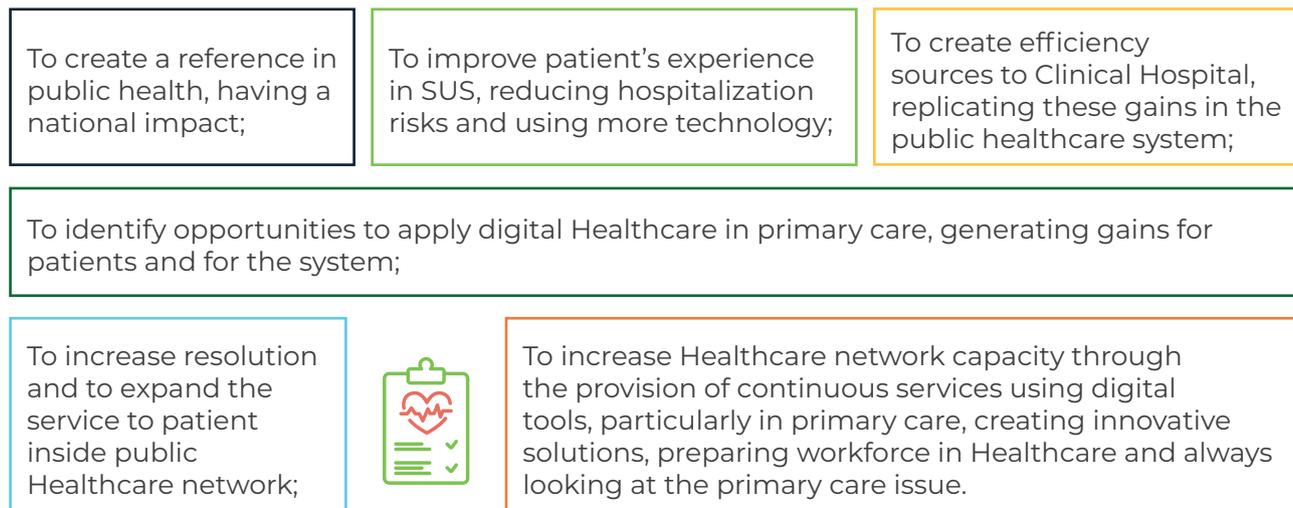
To accelerate implementation of digital healthcare initiatives

To promote a partners’ coalition or to bring other organizations and companies that are interesting in helping in digital healthcare, including an important focus on primary care, which is the entrance door and in which is necessary to invest resources to improve access to healthcare, manly in the country’s remote areas

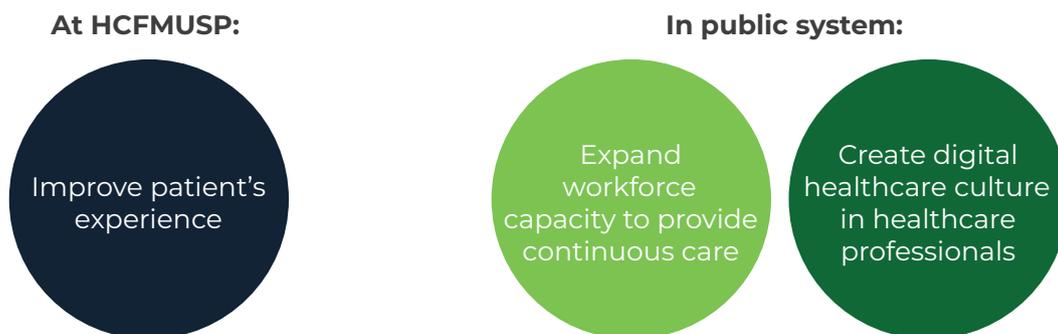
HC-FMUSP innovation ecosystem involves academia, government, civil society, accelerators, incubators and companies. “We see digital Healthcare as a priority to develop Health and that is why the whole ecosystem has to turn itself in the search of digital solutions to improve the patient’s journey”, he highlighted.

Creation of nationally scalable solutions

HC-FMUSP tries to define as impact expectation their digital Healthcare actions:



Three pillars reflect this strategy relevance



Teleconsulting for severe respiratory cases

Dr. Carlos Roberto de Carvalho – professor of Pneumology and responsible for Respiratory ICU at Instituto do Coração (InCor), in Clinical Hospital of São Paulo University Medicine College (HC-FMUSP)

In 2009, we faced the H1N1 influenza, a problem of smaller proportion, but very similar to Covid-19 pandemic. At that time, Dr. Carlos Roberto de Carvalho was already heading the respiratory ICU in São Paulo Clinical Hospital and he found a huge problem in patient care, not only at the hospital, but also in the public system. “We’ve started to study a way to have a ICU network for severe respiratory cases and we learnt with other countries’ experience, especially with United Kingdom’s, which had, during H1N1 crisis, a center to take care of these patients”, he explained.

At the late of 1990s, his group has already published a study that has shown that it would be possible to almost double the survival of patients with severe respiratory failure with no medicines, just by adjusting the ventilator. This action was recognized by important international societies as an event that had changed Medicine respiratory area.

The beginning of everything

The idea of creating an ICU network for severe respiratory cases was presented to the Health Department of São Paulo State, and the first steps were taken with the creation of a unity that would be leader in spreading information. The network evolution has followed slowly until the pandemic was decreed and cases of lung infections, caused by Sars-CoV-2, grew. To face this problem, a care line was set up in March 2020.

The patients' journey begins when they feel the first symptoms at home and goes on until the moment they come back home and need a follow-up for diagnosing possible sequelae or for putting them into the rehabilitation program. Evaluation and treatment protocols for each of these phases were developed.

The Telemedicine role

Remote care is used to properly provide ICU service in Clinical Hospital (HC) beds and to connect with other hospitals in the São Paulo public system. It's also used with patients in outpatient care to monitor their living conditions and to summon those who need to return to the hospital to make exams.

Regarding costs and results



The project base is in the Clinical Hospital and, in other hospitals, a unit is set up at a cost around **US\$1,000**. A platform to connect HC with the other hospitals has been developed. In **18 months**, more than **7,000 appointments** were made to more than **1,000 patients**.

In March 2021, six months of outpatient care were completed for patients who were admitted at the Clinical Hospital in the first semester of 2020.

Training

In public hospitals that are part of the project, there's a first phase of multiprofessional team training (physicians, nurses, physiotherapists and respiratory therapists). A care protocol has been developed and validated, in accordance with the best national and international practices, using protective strategies developed at the end of the last century, to deal with patients with respiratory distress, which is one of the symptoms Covid-19 patients have.

A course in distance education, lasting about ten hours, is available in two platforms: the one from Clinical Hospital Permanent Education School and the one from State Health Department, which is open and free. In addition to the protocol presentation, there's a series of tutorials that train physicians, physiotherapists and respiratory therapists. By the beginning of February 2021, they have already had more than 120 thousand views and more than 3,000 patients have made the training course at the Health Department.

Remote monitoring in Healthcare

Marco Bego – CIO of InovaHC;

The Federal Council of Medicine resolution 1,643, of 2002, in its second paragraph, establishes that “*telemonitoring allows the performance of an act under medical guidance and supervision to remote monitoring or surveillance of health and/or disease parameters*”.

Telemonitoring is something that comes from other industry areas and it refers to measure something from a distance. Although it already exists for a long time in other segments, it's an area that evolves as the need arises. When we think about telemonitoring in Healthcare, it's essential to analyze the need and the appropriateness of its embrace. Some of these analyzes that can be performed when we think about telemonitoring in healthcare involve:

- Healthcare professionals and patients training in the program;
- Infrastructure;
- Usability, because patient must adhere to the process, with data safety and confidentiality, as regulations in force;
- Adherence to the system by professionals and patients.

Regarding regulation and control

Embracing new practices requires training, because it's critical to minimize the potential for errors. It's also necessary to establish rules to penalize who makes a mistake, in proportion of the committed error. However, there's a different issue away from an error, which is bad faith. Those who act in bad faith are not worried with penalties: bad faith doesn't control itself by rules or regulations.

Remote telemonitoring in healthcare requires:

- Data interpretation by a qualified and trained professional;
- Used equipment and sensors must have the proper registration according to regulation;
- Softwares and apps used in the interface and/or in analyzing according to regulation.

Large institutions have structure to test new technologies. Clinical Hospital has instituted a research project through which some works are being conducted and new technologies are being tested. The hospital has even developed works with multinational companies interested to understand more about this subject.

In a simplified way, we can say that telemonitoring involves:



Patients using IoT (internet of things) devices and sensors to make measurements;



Patients, through an app in their smartphones or from a telemonitoring base, connecting devices to internet;



A smartphone app or a telemonitoring base software receiving devices measurements;



Data being sent to an integrated center in cloud;



Staff monitoring patients through the telemonitoring platform, performing appointments and communicating with patients.

Each phase also requires an analysis of results and parameters that are properly taken in consideration at that moment.

Sensors:

Technologies that allow monitoring of physical activities and human behaviors, as well physiological and biochemical parameters during daily life, that is, the person is monitored, but he/she continues in his/her daily life.

Data that are measured more often include vital signs, such as: heart rate, blood pressure and body temperature, blood oxygen saturation, electrocardiogram (ECG), accelerometers (to track falls), weight, volume and follow-up by images.

Currently, sensors can be wearables and be fixed to shoes, glasses, earrings, clothes, gloves, watches or fixed directly to the skin, or even invisible to users, as for example, those also incorporated to the environment, such as: chairs, car seats, mattresses, wheelchairs and other spaces.

Most common uses:

- Fall identification and prevention;
- Monitoring of physical activity and interaction;
- Monitoring of mental state;
- Sport Medicine;
- Weight control and monitoring;
- Education for Public Healthcare.

Management of diseases:

- Cardiac disorders;
- Blood disorders;
- Management of diabetes treatment;
- Sleep disorders;
- Parkinson's disease;
- Autism;
- Depression.

Management of patients:

- Post cancer treatment;
- Stroke patients;
- Patients with brain and spinal cord injuries;
- Chronic pulmonary patients;
- Patients with mobility problems.

Hospital admission and discharge:

- Monitoring inside hospitals;
- Patients in home care;
- Patients post procedures;
- Patients in palliative care.
- Pacientes em cuidados paliativos.

Chronic patients:

- Stable patients with need of care.



In Israel, there are programs in which cardiac patients who are being treated in public health, as long as they evolve, they go to the monitoring system until they return to normal. Entering or leaving the remote monitoring system occurs according to the need and to the attending physician's decision.

Trends of telemonitoring systems

We've had telemetry for many years – why only use it now? Because now technology can provide us greater ease, lower cost and more possibility of storing data.

Digital Healthcare

Telemedicine, wearable technology and artificial intelligence are leveraged if used together and they can create a quality healthcare management chain. It's possible to think about a combined use through which healthcare signals

and data of an individual are generated by wearables devices and analyzed by artificial intelligence algorithms to generate timely conclusions and to allow that Healthcare professionals take decisions at distance, based on data.

The incoming of 5G technology is capable of transform the Healthcare value chain, by using digitalization in healthcare services provision, into a more humanized and personalized Medicine, with expanded access and lower costs. It makes us to think not about regulating what we're doing today, but about what we'll do with the remote care in the near future.

Telesurgery in Medicine

Fabio Jatene - director of Cardiovascular Surgery Service and vice-president of Director Council at Instituto do Coração (InCor), in Clinical Hospital of São Paulo University Medicine College (HC-FMUSP)



Telesurgery definition, according to the Federal Council of Medicine resolution 2,227/2018 (revoked)

“Telesurgery is the performance of a remote surgery procedure, mediated by safe interactive technologies, with an executing physician and robotic equipment in distinct physic spaces”.

One of the most popular and used robots worldwide has three or four arms and has a console behind in which the surgeon stays positioned to make the surgery.

In January 2000, the Lindbergh Operation project began, in an association with Telesurgery European Institute, Computer Motions Inc. and communication specialists from Telecom France.

The first telesurgery in world was performed in 2001, conducted by a surgery team in New York, using Zeus robotic system (intuitive surgical) – at a distance of 14 thousand kilometers. A successful 2-hour laparoscopic cholecystectomy was performed in a hospital in Strasbourg, France.

In Brazil, the first telesurgery was the third one performed in world, still in 2000, by the Syrian-Lebanese Hospital team together with a specialist from John Hopkins, from Baltimore. The AESOP robot was remotely controlled in a varicocele surgery that lasted about 20 minutes.

What is striking is that telesurgery has advanced very little since the 1990s. From then until 2021, 410 articles about this subject have been published. However, if we evaluate the interest in robotic or robot-assisted surgery, we can notice that the growth of the number of publications over the same period has had a geometric progression. There are 19,304 articles, more than 5 thousand only in the last five years. It's possible to say that, because of it, there's a mismatch between the interest of robotic surgery and of remote robotic surgery (or telesurgery).

According to Guilherme Rabelo, manager of innovation at Inova InCor, “*robotic technology has advanced, but telesurgery is dependent on telecommunication infrastructure, which has not advanced in the same velocity. Bearing in mind that just now we're discussing about 5G. We're 20 years late*”, that is, apparently, one of those responsible for the small advance of robotic telesurgery could be the lack of telecommunication infrastructure, which would be a fundamental tool for make this surgery possible.

Market

Globally, there are nearly 6,500 robotic surgery systems, around 5,500 of them are Da Vinci's. More than 7 million procedures with these robots have already been made. There are 126 companies that are developing robotic products for surgeries, that is, there's a great interest, demonstrated by the progression literature has been showing, and there are many robot models, although one of them is responsible for the most of procedures.

Top 10 greatest companies in robotic surgery in 2021:

- | | |
|-------------------------|-------------------------------|
| 1. Intuitive Surgical | 6. Stryker |
| 2. Hansen Medical | 7. Corindus Vascular Robotics |
| 3. Diligent Robotics | 8. Verb Surgical |
| 4. Medrobotics | 9. Zimmer Biomet Robotics |
| 5. CMR Surgical Limited | 10. Myomo |



AROUND 1.2 MILLION ROBOTIC surgeries are performed annually worldwide.

What's the situation in Brazil?



- There are **75 installed devices**, what places **Brazil in the 9th position of installed capacity worldwide**;
- Mostly, these devices are installed in the private system, but there already are some of them in the public system, as at São Paulo Institute of Cancer (Icesp, in Portuguese);
- The cost of a robot is **US\$3 million (in Brazil currency, around R\$16 million)**;
- **13,000 procedures were performed.**

Potential advantages of telesurgery pointed out by literature

- Possibility of providing high quality surgery by highly trained specialists, in places where there's a shortage of these resources;
- Avoid the need of long-distance travels, along with financial burdens and related hazards;
- Capacity building capability, enabling complex surgeries to be performed in centers where they wouldn't be carried out under other circumstances.

Requirements

- Adequate and safe infrastructure;
- Efficient and redundant bandwidth to transmit data;
- Stability of electricity supply;
- Efficient security against virus or hackers;
- Physician operating robotic equipment (remote surgeon) and another physician responsible for instrumental manipulation (local surgeon);
- Local physician must assume responsibility for a surgery intervention in an emergency situation or in case of unforeseen occurrences.

After two decades of innovation, including robotic advances and network connectivity speed, the concept of telesurgery is no longer an idea reserved only for comic books and science fiction movies. The technology available today makes this a potential reality. If correctly done, it can democratize high level care for patients worldwide.

In theory, telesurgery would be something very interesting, but, when we face real world, we find a series of factors that limit the use of telesurgery:

- Latency time (lag between the surgeon's movement and the robot's execution);
- Technology availability, especially in telecommunication (connectivity);
- Lack of training programs and standard protocols (including for equipment maintenance);
- Difficulty in acquiring equipment due the high cost;
- Legal issues, which can vary between states and countries (certification and liability).

Reality versus expectation

From the experience with Telemedicine at Incor, we had imagined that we could advance in the telesurgery issue.

The Federal Council of Medicine resolution 2,227, of December 13th, 2018

“§8º – Teleconference of a surgery act, by a synchronous video transmission, can be carried out for teaching or training purposes, provided that the image, data and audio reception group is composed by physicians”.

“§9º – In the teleconference, the training goals must not compromise care quality or generate an unnecessary increase of time in a procedure that may compromise patient's post-surgery recovery, in compliance with the norms of Medical Ethics Code”.

Surgery act teleconference project

Incor has established a partnership with the Ministry of Science, Technology and Innovations (MCTI, in Portuguese) and the National Council of Scientific and Technological Development (CNPq, in Portuguese) to develop a Telemedicine platform for cardiac surgeries. There are limitations imposed by the Federal Council of Medicine, but it's possible to advance, even if partially.

The project foresees a remote center based on Incor and another remote center at University Hospital of Maranhão State Federal University (UFMA, in Portuguese). Specialists will be based on the two services (Incor and University Hospital) and the procedures will be performed in São Luís (Maranhão capital) by a local team, with Incor specialists' participation.

Digital Healthcare and care along Healthcare chain

Armando Lopes - director of Image Diagnosis and Digital Services Areas at Siemens Healthineers in Latin America

Technology is a factor capable of improving results and organizing resources along the Healthcare service chain, and systems can provide data for following-up, since promotion and prevention to engagement, through diagnosis, treatment and rehabilitation stages.

Having a platform that allow us to organize data and information flows along all Healthcare continuum will allow reduction of costs and wastes and will make data and information available so that we can, for example, build artificial intelligence algorithms that would make clinical decision support easier.

How Telehealth tools can support care continuum

Remote training: is important for the team to be able to extract as much as possible from the equipment, improving learning and physicians' and technicians' reflection about what protocol is better.



Augmented reality: allows experts to interact with professionals to obtain guidance. This makes interaction simpler and more assertive at lower costs for all system.

Patient monitoring:

Lopes presented the example of CardioInfantil Foundation, from Colombia.

“A very simple solution. Covid-19 patients, from home, inform how they are feeling. This information, collected from several patients, goes to a dashboard, that notifies, in an intelligent way, which people whose critical situation could demand a special care”.

Remote scanning: this kind of solution allows a professional to operate distinct devices simultaneously, which represents a way to expand access and to share knowledge without compromising quality. Lopes talked about the importance of launching, in 2020, the In.Lab and one of the first projects in Advid Consortium, which brought together more than 50 institutions and in which artificial intelligence was used to read exams of patients with Covid-19 suspicion. Among other information, images were sent and the algorithm returned an evaluation.

Digital platform: Lopes also talked about the evolution of a digital platform that his company is developing for a customer in Chile. He explained that the project was divided in two phases: the first includes the platform assembly, in way to assure data organization. The second phase will allow specific applications to manager patients in some specific conditions, such as diabetes, and finally it will be replicated in other institutions.

Digital platforms for care

Romeu Cortés Domingues - executive president of DASA Administration Council

DASA has been sending their executives to California and partnering with startups to develop some algorithms. Currently, there are three or four algorithms that can be used in medical practice to help reducing mistakes.

Some countries, as Israel, that has an efficient system with a great integration, had already been searching for solutions to remote care before pandemic, which expanded the interest in digital solutions worldwide.

Conexa experience

Conexa performed more than **2 million appointments in 2020**, allowing access to Healthcare in remote areas. In Brazil, 80% of patients that seek emergency care used virtual care in the period. It shows that it's possible to make a good diagnosis and exam in a remote way, referring to emergency care those who need it – what is estimated at 5%. Conexa estimates that around 20% are referred to seek face-to-face care in emergency care or in an outpatient clinic.

“When you have almost 80% of conditions like fever, diarrhea or sore throat and you can solve it, that's really cool. You have a structured medical record, that allow you to evaluate other risks patient may present, and even integrate with other systems, such as some health plan operators' systems, and other devices, what makes the appointment more complete, examining throat and ear, performing pulmonary or cardiac auscultation. You can monitor a patient with diabetes and this can improve patient's engagement”, explained Cortes.



Potentialities:

- There are platforms that can help managing and following-up chronic patients that present potential to develop comorbidities – and it's possible to share exams and to send lesion pictures, for example, to be evaluated by the physician that is performing an appointment by Telemedicine;
- In small towns, where there are no physicians and diagnosis are often carried out by the pharmacist, Cortes said that pharmacies can be established as places for carrying out teleappointments and it could assure more assertiveness;
- Digital platforms can be a solution to the lack of specialist physicians in the interior of Brazil.

Belo Monte experience

The North Energy, responsible for Belo Monte Hydroelectric Plant, offers care to their employees from specialists from São Paulo and Rio de Janeiro by a digital platform.

Cardiology teleappointment

At the height of pandemic, patients with heart diseases weren't going to follow-up appointments in Manaus. Through a partnership with Brazilian Cardiology Society, this platform was made available free of charge, so that cardiologists who are society members could care of these patients.

Using Telemedicine allows to reduce waste in admissions, surgeries and exams and to make a more accurate quality measurement through NPS tools.

Telerehabilitation in Covid-19 era

Linamara Battistella - president of the Director Council of Instituto de Reabilitação Lucy Montoro and Instituto de Medicina Física e Reabilitação, in Clinical Hospital of São Paulo University Medicine College (HC-FMUSP)

In 2005, a global health survey was conducted and it showed the prevalence of deficiencies, incapacities and limitations resulting from chronic diseases. The study covered 65% of 59 countries' population and limitations in the following domains were related:



Mobility



Personal care



Pains



Cognition



Interpersonal relationships



Eyesight



Sleep and energy



Affection (depression and anxiety)

Participants could also quantify limitations and results pointed out that:



More recently, in 2019, the Global Burden of Disease, in the paper *Global estimates of the need for rehabilitation*, based on health conditions according to age groups, showed what were the estimates for diseases in the need of rehabilitation. The study presented neurological diseases' prevalence, but – especially in productive adulthood – showed musculoskeletal diseases' prevalence. Not looking at global issues can mean a delay in social development, with a great impact on competitiveness.

Expanding access and care of chronic patients, multimorbidities or reduced mobility is a necessity and there are examples that show how much this has already been developed in other countries, as in the case of Tele-AVC 2.0 Network, implemented in Catalonia at beginning of 2013.

Reasons for innovating in care

Numbers presented in the already cited studies pointed out clear reasons for innovating. Serving the entire population in an adequate manner, with quality and resolution, is not a task that could be accomplished by care forms previously established. With Covid-19 pandemic, rehabilitation need has grown. Clinical hospital took part of a survey together with the greatest worldwide rehabilitation centers, aiming to understand what was going on and how it would impact in services' issues and in rehabilitation resources' distribution.

Rehabilitation through care stages

ACUTE

Goals

- Optimize oxygenation;
- Handle secretions;
- Prevent complications.

Resources

- Therapists;
- Physiotherapists;
- Respiratory.

Environment

- ICU.

POST-ACUTE

Goals

- Identify and manage incapacities (in affected functional domains);
- Make hospital discharge easier.

Resources

- Multidisciplinary.

Environment

- Rehabilitation wards/units;
- Post-acute care installations;
- Home care.

LONG-TERM

Goals

- Optimize functionality;
- Minimize the impact of incapacities over independency and life quality.

Resources

- Multidisciplinary.

Environment

- Outpatient clinic;
- Home care.

This paper was published in 2020, at the beginning of pandemic, and from then on, it started to organize itself with this configuration, because it wasn't known that two issues would prevail in the following moment: fatigue and pain, issues for which is necessary to offer quick answers to avoid other health problems happening.

Fatigue has a central component, which is muscular, and a respiratory component. Separating each one of these components to get to the heart of the problem is something complex and depends on a multidisciplinary team's work.

Telerehabilitation performed by remote service, as well as teleappointments, requires the use of a structured platform and an electronic medical record, assuring registry of all recommendations and patients' following-up in an integrated and multidisciplinary way. Telerehabilitation even makes it possible to bring information to family, establishing strategies according to connectivity level, moment and understanding that patients and their families have.

Teleservice in Clinical Hospital of São Paulo University

March 2020: beginning of teleservice

22.089 attendances, including
3.069 teleservices/teleappointments and
19.022 telerehabilitations



Face-to-face appointments: **47.685**,
including **5.316** by physician or dentist and
42.369 by multiprofessional team.

"We've never been so close as teams, and our meetings for case discussion have never been so effective and so close as they are now. Connections allow us to see our patients and to understand their difficulties in a more intensive way", said Dr. Linamara Battistella.

Telemedicine offers the opportunity for returning to a narrative Medicine, in which the talking with patient helps to extract an important part of the story of whom is that person, where they fit in and what their suffering is. Thus, it is possible to first understand, becoming less dependent on exams, and to focus more on patient's need.

Remote performance evaluation is not just for patient to remain remote: it's also important for training remote teams that haven't always had opportunity to live with the care circle. Through it, it's also possible:

- Remotely monitoring patients and offering them a more qualified face-to-face care. Telemonitoring can be used in patients with greater risk of complications and transport difficulties;
- Offering patients' and caregivers' guidance and clarification by a multidisciplinary team;
- Offering hybrid care to patients who receive face-to-face care;
- Making performance evaluation and preventing lesions;
- Providing highly dynamic metrics and monitoring exercise execution in real time;
- Offering self-care opportunity. Through a cell phone or a tablet, patients can control by themselves repetitions, amplitudes, speed, strength and power of their exercises.

Clinical Hospital (HC, in Portuguese) app

HC app has been developed as a response for Covid-19. Through it, patients can watch educational videos and learn about depression, anxiety, stress and more. This tool monitors functionality and forwards customized recommendations for each profile. This action allows an expansion of healthcare self-knowledge, using personalized graphics.

Digital healthcare will change world, but financial, infrastructure, resources, training and cybersecurity barriers must be broken down.

Digital Healthcare and Telepsychiatry

Dr. Eurípedes Constantino Miguel Filho – professor at São Paulo University Medicine College (FMUSP)

National Center for Innovation in Mental Health

The project consists of three modules:

Axis 1:

Transgenerational and Precision Clinical Neuroscience Center

Axis 2:

Incubation Center for High-Tech Mental Health Interventions, Innovation and Entrepreneurship

Axis 3:

Center for Implementation Science and Technology Transfer to Society

As we can see in literature (*Deriving a practical framework for the evaluation of health apps*, in *The Lancet Digital Health*), only in 2018, there were 1.7 billion people downloading digital Healthcare apps and, when they did it, there was a universe of 325 thousand apps covering different health domains.

The US Food and Drug Administration (FDA) and the European National Institute for Health and Care Excellence have created a framework to evaluate these apps and established different levels. Data analysis has shown an existing gap: these apps usually jump from level 1 (technical development and advertisement) to level 4 (evaluation of customer usability) without documenting apps' clinical validity. That is, just a small portion of these apps is submitted to tests to assess their real effectiveness.

One of the gaps found in mental health has become one of National Center for Mental Health Innovation goal: to create an evaluation system for apps to establish a digital Healthcare certification. Thus, clinical trials were carried out with apps developed by institutions that take part of the project.

Apps that have already been developed or that are in test:

Apps for managing and optimizing treatment



Focus: developed by researches from Rio Grande do Sul Federal University (UFRGS, in Portuguese) aiming to optimize and monitor children and adults' treatment with ADHD (attention deficit hyperactivity disorder). This app can gather information from teachers, family members and physicians, something highly relevant when it comes to kids. In addition, in the case of patients with attention deficit, it allows patients to remember to take medication and, after taking them, to report their positive and adverse effects. It also points out to the physician every time patient has taken medication and rewards the patient every time their tasks are performed. The app has a good emphasis in educational cycle and all information comes to physician through a control panel, which allows doctor to have a view of symptoms evolution and to make decisions on a case-by-case basis. It also has great focus on psycho-orientation, so it offers a very rich video library.

Automated Reinforcement Management System (ARMS): app focused on individuals with alcohol use disorder. It was developed by a partnership with Washington State University School of Medicine. This app is based on the contingent management (CM) theory, which

is one of the more effective psychosocial interventions in substance use disorder. ARMS is a CM system electronically provided, based on breath samples (breathalyzer) collected by cell phone. Negative samples for the presence of alcohol are rewarded with Amazon.com vouchers. It's an environmentally responsive and patient-adapted reinforcement. This app is a designed platform to be integrated to the electronic medical record in primary care. The user receives messages three times a day asking for a sample. The breathalyzer, by a Bluetooth connection, allow this information to be sent by phone. The system has an identifier (to recognize if it really is the patient) and a geolocation system. As an app connected to the electronic medical record, caregiver also receives information about the user evolution.

Digital apps for screening



Comvc: it was designed to scale our work with around 25 thousand HC employees, in a way to possibly be scaled countrywide. It asks the user to response about their state, with options such as “anxious, depressed, with insomnia”, among others. Once the user finishes this first assessment, app allows them to do a syndromic analysis of how they are and other symptoms presented because of Covid-19 scenario and, then, promotional videos about health are offered, such as how to deal with anxiety and other mental health related topics. It also offers an overview of their clinical condition and, when a certain risk is presented, the user is referred to access our support lines or, in case of those who were out of Clinical Hospital, they can access another project – Telepsi Covid-19.

Telepsychotherapy



Telepsi: led by UFRGS, it offered support for professionals in distress, which could call the Ministry of Health's Dial Health and, by this way, join a project of telepsychotherapy. This project aimed to take care of emotional problems of Healthcare professionals involved in the Covid-19 context through psychotherapy methods based on scientific evidence. This project also offered a training platform so that professionals could be trained, in order to scale up the care. Professionals had access to manuals and received training and, when approved, a certification.

Preliminary results (from May 17th 2020 to February 1st 2021)

- 4,596 registered people;
- 1,788 people served by TelePsi;
- 2,634 psychotherapy sessions and 528 psychiatry sessions, including:
 - Anxiety – 51%;
 - Irritability – 19%;
 - Depression – 18%;
- 750 certified professionals.



Implementing

Cognitive Behavioral Therapy (CBT) via internet: today, 50% of what is tested in clinical trials about efficacy ends up reaching general audience and takes more than 20 years to be implemented. Thus, a cognitive behavioral therapy project via internet was developed in the Brazilian cities of Indaiatuba and Jaguariúna, in collaboration with the Karolinska Institute (from Sweden), aiming to create an accessible and scalable platform for treating several mental disorders via internet. Used protocols have established an appointment via internet, with no visually contacting the professional, only by messages, which gives the condition for each professional to attend in a time from 10% to 25% that would be needed to care each patient in a conventional way. This project has involved all Healthcare Basic Units (UBS, in Portuguese) in both cities. For the beginning of its implementation, depression, insomnia, generalized anxiety disorder and obsessive-compulsive disorder were established as targets. In ten years, the goal is to care mental disorders and to have a platform similar to the one Swedes have throughout Sweden.

National Center for Innovation in Mental Health is a project that has been developed in partnership with São Paulo University (USP, in Portuguese), São Paulo Federal University (Unifesp, in Portuguese), Rio Grande do Sul Federal University (UFRGS, in Portuguese) and UniEduk Educational Group, investing R\$20 million in total. The idea is to match this investment with São Paulo State Research Support Foundation (Fapesp, in Portuguese) support.

Covid-19 and RNDS impact of using clouds in healthcare

Coalizão Saúde Institute, in partnership with Accenture Latin America, held in June 22nd 2021 the digital panel *Covid-19 and RNDS impact of using clouds in healthcare*, aiming to present Healthcare Digital Strategy for Brazil (ESD28) and to discuss Covid-19 impact in the National Health Data Network (RNDS, in Portuguese) advance.

The panel was attended by renowned specialists and industry authorities, who discussed about national platforms for innovation, information and digital healthcare services in a scenario of accelerating the use of communication technologies, as a result of Covid-19 pandemic.

National Healthcare Data Network and digital Healthcare strategy for Brazil

Jacson V. Barros - director of DataSUS, at Health Ministry

The report Digital Healthcare Strategy for Brazil 2020-2028, developed with Pan American Health Organization (PAHO) and Accenture support, materializes the concept of a national healthcare data network. This initiative has changed Brazil position in world scenario and led DataSUS to be invited by the World Health Organization (WHO) to discuss about vaccination against Covid-19 and by PAHO to discuss about information exchange, mainly in people transfer in South American countries. The Ministry of Health's goal is to make RNDS recognized as a digital platform for innovation and healthcare information throughout Brazil, benefiting users, citizens, patients, communities, managers, professionals and Healthcare organizations.

Priorities for 2020-2028: seven great axes



1. **Governance and leadership for digital healthcare strategies (ESD, in Portuguese):** to assure that ESD-28 be developed under the Ministry of Health leadership, but, at the same time, be capable of incorporate the actively contribution of external players that are participating of collaboration platforms.
2. **Information in three levels of care:** to induce the implementation of politics for computerizing healthcare systems, accelerating the embrace of electronic medical records systems and the hospital management as an integrative part in services and healthcare processes.
3. **Healthcare improvement support:** to make RNDS offer support for the best clinical practices, through services such as Telehealth and apps developed by the Ministry of Health or by a collaboration platform.
4. **User as protagonist:** to engage patients and citizens for promoting healthy habits embracement and managing their health, their family's and community's health, besides helping in the building of information systems they will use.
5. **Human resources training:** to train Healthcare professionals in Health Informatics as a research area and to make Health Informatics as a profession.

6. Interconnectivity environment: to allow the National Healthcare Data Network empower collaborative work in all Health sectors, to put technologies, concepts, standards, service models, politics and regulations into practice.

7. Innovation ecosystem: to assure that there's an innovation ecosystem that make the most of the Healthcare interconnectivity environment, establishing itself as a great laboratory for open innovation, subject to guidelines, rules and politics that the first priority has established.

User must be the main goal of every technology application. An ordinance, published in 2021, which defines CPF (Brazilian citizen register) as the individual unique information, exemplifies the importance to offer simplicity for citizens. Populational groups that don't have a CPF, such as children, are an exception and will be treated from this perspective.

National Healthcare Data Network (RNDS, in Portuguese)

RNDS is a network that will connect players and data countrywide, establishing the concept of a national platform for innovation, information and digital Healthcare services. Thus, it's not an information system, but a mechanism for connecting any information system.

Previous projects have been designed under the concept of centralizing all data and setting up a large electronic medical record from the Ministry of Health. In 2018, the Court of Auditors understood that this kind of project should be improved and, because of that, they were interrupted, but they served as basis for developing RNDS, which will be a great technological framework – a great blockchain network – composed of a structure divided into compartments for each federative unit, proportionally to their population size. Each network compartment receives data from several members of the healthcare system and share it when necessary. From the structure definition, it was necessary to look for ways to materialize this network, making it useful for whom needs it: citizens, Healthcare professionals and managers.

ConecteSUS

This is a governmental program to materialize digital Healthcare strategy in Brazil, empowering Healthcare information exchange among all Healthcare (public and private) network points, allowing care continuum and transition. ConecteSUS includes two great products:

ConecteSUS Citizen: it allows citizens to have their clinical history and to access, in the palm of their hands, several SUS (Healthcare Unique System, in Portuguese) services, such as results of Covid-19 exams, digital vaccination card and medicines dispensed by the Popular Pharmacy.

ConecteSUS Professional: it's an interface composed by existing information in RNDS. When accessing the app and identifying themselves, professionals can access the history of that citizen who is being assisted.



This initiative follows provisions of five decrees:

- Decree 8,936, of 2016, which deals with Digital Citizenship platform;
- Decree 8,638, of 2016, about digital governance strategy;
- Decrees 9,723, of 2019, and 9,094, of 2017, that deal with services simplification and CPF use as a unique key for identifying citizens;
- Decree 9,756, of 2019, which provides for the unification of government digital channels.

To make RNDS feasible, the following strategies were adopted:

- Strengthen of data sharing culture in Healthcare, in a safe way;
- Use of the Ministry of Health's own database to fill in citizens histories;
- Creation of mechanisms to disseminate message standards, aiming at a simple and flexible interoperability;
- Embrace of already existing taxonomies.



RNDS and the cloud: perspectives and opportunities

Lincoln A. Moura - associated director of Saúde Accenture Brasil

Cloud storage presents itself as an excellent mechanism to combat the lack of interoperability and to reduce internal and external fragmentation. It's a resource that was initially used to reduce costs, because it allows to take advantage of a company infrastructure in scalable way but controllable, but it also became to be integrated within organizations, allowing systems to convey. However, cloud's main advantage will show up when it begins to connect all Healthcare organizations in a more effective and efficient way.

Interoperability between systems allows integrating citizens' healthcare information, rationalizing information distribution and improving bidirectional information flow.

Main business priorities in Healthcare cloud

1. **Healthcare in virtual home retail:** to develop service models, operating in a constantly evolving service continuum;
2. **Direct engagement with customer:** to engage customer, personalize care and improve interactions;
3. **New business models in optimizing clinical operations:** to generate fuel for growth and cost reduction while expanding revenue sources;
4. **Analytics and new technologies:** to invest in data and technology for, based on data, managing and assuring organizations;
5. **Lack of clinical staff:** to create a future workforce, attracting and retaining the best talents.



These priorities are feasible through modern technologies, made easier by cloud.

Considering its advantages and potentialities, why is digital Healthcare so late worldwide?

- Absence of standards to exchange information;
- Syntactic, semantic and operational;
- Messages' security and exchange;
- Access and consent – General Law of Data Protection (LGPD, in Portuguese);
- Legal assurance;
- Some players don't want to share data;
- Healthcare sector complexity.



The defined strategy proposes a pathway and defines priorities for guiding new projects that could be developed in terms of digital Healthcare.

Pandemic has boosted digital Healthcare through important changes in habits, anchored in expanding access to communication technologies and breaking down barriers, such as embracement of videocalls and Telehealth popularization. The lack of preparation to face Covid-19 (patients, beds, vaccines, equipment and professionals) has generated the need of proposing national and global strategies to face future pandemics.

Albert Einstein Israeli Hospital experience in using cloud

Henrique Neves - CEO of Albert Einstein Israeli Hospital

Pandemic has made everyone notice that taking very quickly decisions in an environment of great uncertainty demands the ability not only to have this information, but, from them, to foreseen certain trends to take decisions. The cloud helps data to be organized in an intelligent way for whom use it – and using it as part of an inevitable process.

Benefits of using clouds

On a value scale, normally costs savings are typically looked at a justification for embracing clouds, but the greatest benefits are achieved as you move up this ladder.



First level: consolidation of several data centers, that are normally distributed in more than one place;

Second level: reduction of costs or operating expenses;

Third level: increase of scalability, as it is possible to speed up decisions about increasing capacity, which makes it easier for companies to enter other areas, access new technologies and get an increase of activities agility, through collaboratives tools.

Use of clouds in Albert Einstein Israeli Hospital

Albert Einstein Israeli Hospital is a hybrid multicloud institution, with varieties of uploads present at computational environment, which go from highly integrated traditional systems, focused on care, to a system that captures, collects and makes this information available, to sophisticated analytics, that has found in cloud the most adequate architecture.

In this model, it's possible to respect uploads' technical demands, with tasks that must be carried out through traditional systems, and to explore commercial models' scalability and available resources offered in cloud. There are important elements in this decision making: connectivity requirements increase and there's a security issue. What is observed in the institution is a great growth of cloud activity, which involves relationships with the main sector players.

Pillars to cloud adoption

- Bigdata analytics, as healthcare organizations are traditionally great data collectors and there's an effective challenge: to be capable of, from these data, to prescribe conducts or make predictions;

- Use of scalable structures and pre-configured specific platforms to create data lakes and algorithms processing;
- Digital services, as the relationship between users (patients) and physicians is increasingly being effectively done by digital services.

Reflections about leader formations for the new moment

Matheus Zanardi - counselor of Ise Business School

Regarding the decision making, it's possible to establish three dimensions in leader formation:

Economic: it's about the way how results from different options are understood and measured and about scenarios are stimulated for decision making;

Ethics: involves what is the right decision to be made by the individual according to the circumstances and moments in which it's presenting, based on their personal experiences' history and principles;

Politics: in it, we recognize that, in any decision, some are benefited to the detriment of others.

The last two dimensions (ethics and politics) can offer elements that may contribute in facing challenges when embracing Healthcare data digital networks.

Three issues that must be faced



- How to develop the readiness of public and private leaders to embrace this transformation;
- How to form good ethics for deciding about opportunities and business challenges that will be presented;
- How to redirect individuals' work capacity after technology advances in incorporating technical knowledge.

Only by confronting beliefs and mentalities, it becomes possible for having a behavior and posture change in a sustainable way. When something doesn't go well or when a great transformation is desired, the organization's typically reaction is to try solving through corporative politics, regulation and incentive systems, but procedures and incentive programs are not capable of assuring a culture that provides an authentic concern by people. It's necessary to break the paradigm that these tools by themselves could be capable of offering responses.

Ethics is important to deal with all contingencies and possibilities brought by technology, so that the patient may be the transformation protagonist. "The question is: what should we really do? Not what everyone does. Not what we have done until now or what models suggest", highlighted Zanardi.

Technology advance can and should be rethought as an enabler of a more humane and comprehensive approach in all dimensions that involve care.

ESD-28: innovation and collaboration space for RNDS advance

Wilma Madeira - manager of Social Responsibility Projects at Oswaldo Cruz German Hospital

Oswaldo Cruz German Hospital exercises its social responsibility and has been a SUS (Healthcare Unique System, in Portuguese) partner in the support program for developing digital Healthcare strategies in SUS. The hospital

has been following a path of deliveries since 2009, in the challenge of strategically building a partnership with the Ministry of Health, more specifically in RNDS, as it's understood that the project supporting Healthcare digital strategy through ConecteSUS, offering visibility to RNDS, is a structural strategic support project.

In 2009, Oswaldo Cruz German Hospital, as the first excellence hospital, saw, in due course, the possibility of being pioneer in conceiving a Proad-SUS project, in a partnership between public and private institutions, that which could give support for beginning the first components' building, that are still present in the National Healthcare Data Network. Still in 2009, the hospital had two pioneer projects:



Clinical Horus Tool: it included a clinical monitoring, triggers, alerts, analysis and georeferencing, all elements of a developed system to be a national system for managing pharmaceutical care;



Health map: it still exists in the form of a link (www.mapadasaude.gov.br), in which the manager can locate, by logging in, the distribution of Healthcare equipment in Brazil. For 2022, the challenge is to incorporate five more states in this expansion and there will be an evolution of the digital Healthcare strategy that has already been built.

The evolution of digital maturity index, which was a methodological construction created by the project, contributes to monitoring the evolution of Healthcare equipment that compound the National Healthcare Data Network. It's necessary to offer support of building an innovation ecosystem that strengthens RNDS and takes it to the future.

The cycle that strengthens this network involves both capturing and integrating some functions inside DataSUS own arrangement on a day-to-day basis. This partnership facilitates the holding of workshops for state Healthcare managers and within councils of municipal Health secretaries in federative units where ConecteSUS is being implemented, in order to support its implementation. There's a support front for the interoperability with pre-clinical care flow laboratories integrated to National Healthcare Network.

More specifically about Covid-19, there's a support front for integration the laboratorial environment manager system, to send Covid-19 exams to RNDS, in an effort for capturing and integrating these data.

Other fronts

- Oswaldo Cruz German Hospital supports the ConecteSUS general data office and the Committee for Digital Healthcare;
- Communication is seen as a strategical function and, therefore, the project with DataSUS provides for results dissemination to Brazilian society through monthly informative newsletters and an annual publication;
- Promotion of 1st National Healthcare Data Forum, that took place during Healthcare Informatics Brazilian Congress, in 2020. These events are considered very important, because they strengthen changes and the commitment of a group in which partners, together with the Ministry of Health and Brazilian society, are committed to build a National Healthcare Data Network.

In innovation path, discussions are being held about digital Healthcare, Telehealth, work with agile tools, design thinking and a strategy to strengthen digital Healthcare itself by RNDS, through instrumentalizing partners in a solid building of an ecosystem that would strengthen the National Healthcare Data Network.

Oswaldo Cruz German Hospital has been assertive in its efforts in the field of social responsibility. In June 4th 2021, G7 recognized digital Healthcare issue as a governmental strategy action. Pandemic has highlighted the importance of internationally sharing and validating Healthcare data for supporting Health politics development.

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