

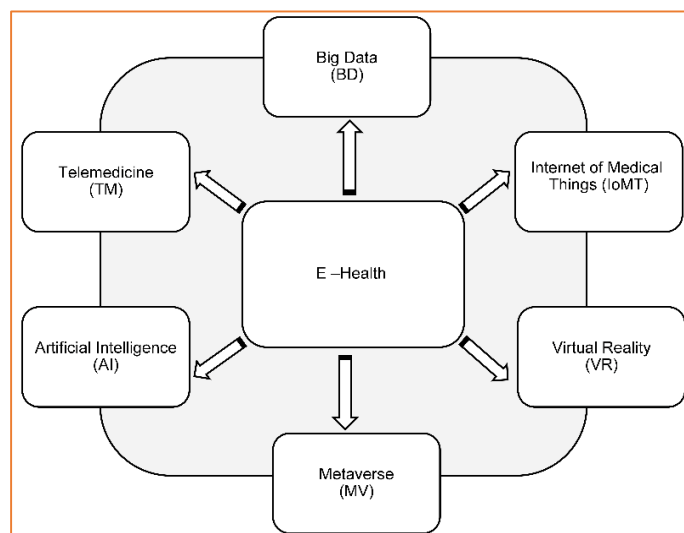
# Innovation in the Italian National Health System and the Cost-Reducing Impact of E-Health and Telemedicine: The special case of the Telemedicine Project of the Casa Sollievo della Sofferenza Hospital (Apulia Region)—When Information and Communication Technology Comes to the Aid of the Territory

Matteo Maria Cati

## Abstract

The recent events of the COVID-19 pandemic, caused by the SARS-CoV-2 virus, have dramatically and suddenly changed the dynamic interactions among the various elements of the complex social and economic texture of most countries around the globe, such as Italy, accelerating the digital transformation in many areas of human activity and in particular in the health care sector.

After having defined e-health (Figure 1) and some of its applications, with particular reference to telemedicine, the following important research question is addressed: what are the factors that contribute to the successful introduction of telemedicine?



**Figure 1:** (Graphic presentation) – E-Health and some of its applications

**Keywords:** E-Health, Telemedicine, Information and Communication Technologies, Health Policy, Health Legislation

## Introduction

The COVID-19 pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus [1-5], has had devastating global effects in terms of death tolls and the overall number of infections. The spread of the

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virus and the resulting drastic emergency measures, that were introduced almost everywhere, particularly in Italy [6-8], to reduce the transmission and proliferation of the infection and the formation of clusters of infected people

- 1) dramatically and suddenly changed the dynamic interactions taking place among the various elements that compose the complex system of the social and economic texture;
- 2) accelerated the digital transformation in many areas of human activity [9,10].

The health emergency measures, such as lockdowns and curfews, introduced by governments [11] have conditioned billions of families and businesses to relate with the surrounding environment in a completely different way and raised very heated debates on the possible undemocratic nature of these interventions [12,13]. In the past two years, smart working, distance learning and e-health have become aspects of peoples' daily routines [14]. COVID-19 disrupted life in general and the way public and private organizations function. Many companies were forced to allow their employees to work at home, and many people had to integrate digital technologies into their working lives.

There is no doubt that the pandemic, together with other factors such as the evolution of the population's structure in Europe and in Italy, has accelerated the pace of digital transformation [15,16] in many sectors of the economy, including health care and education. Even if, at this stage, it is not clear what will be the future impact of such a new trend [17], it is evident that it has determined organizational changes and the need to redesign business strategies. As many observers have noted, the rapid introduction of e-health will most likely reshape the future health industry, which represents one of the most important sectors of the world

economy [18].

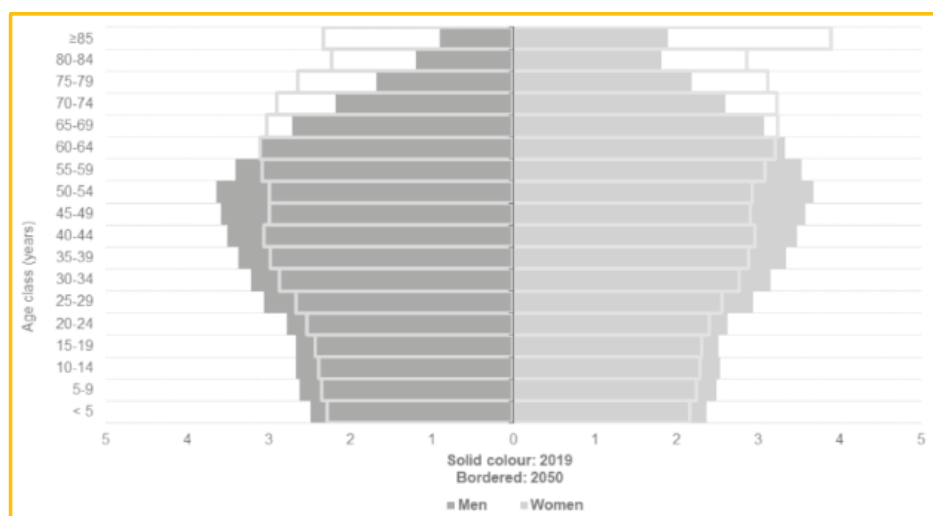
Public and private initiatives aimed at promoting the usage of the tools of information and communication technologies (ICT) in health care must in any case be supported by the presence of a regulatory framework at the national and international levels.

This article focuses on the recent efforts of the Italian health legislation to increase e-health literacy and to incentivize the health care system to adopt the new tools of ICT with particular reference to telemedicine. For this purpose, the author considers the implementation of the Telemedicine project of the Casa Sollievo della Sofferenza, a private Catholic hospital in Southern Italy, as a special case study as an example of excellence.

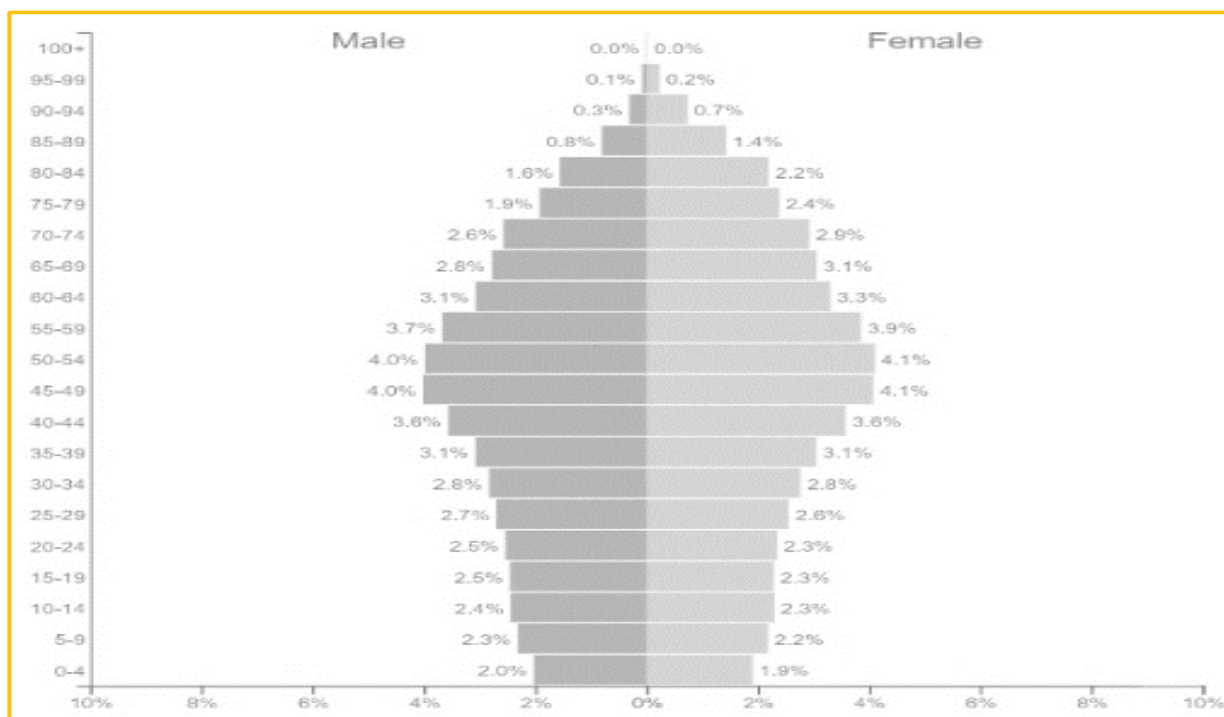
## E-health and the recent evolution of the European and Italian population's structure

The usage of the tools of Information and Communication Technologies (ICT) in the health sector, namely, e-health, such as telemedicine [19], is not new news, given the following:

- progressive population aging, particularly of the European (Figure 2) and Italian (Figures 3a and 3b) populations. The size of population changes of a country or of a group of countries depends mainly on four factors: births, deaths, migration flows and exceptional and unpredictable events (such as the COVID-19 pandemic). What immediately catches the eye in Figure 2 is that the population structure of the EU—which comprises the populations of 27 countries (children: 0-14 years; working-age population: 15-64 years; elderly: 65 years and over)—is expected, between 2019 and 2050, to change, with fewer working-age people and an increasingly elderly population.

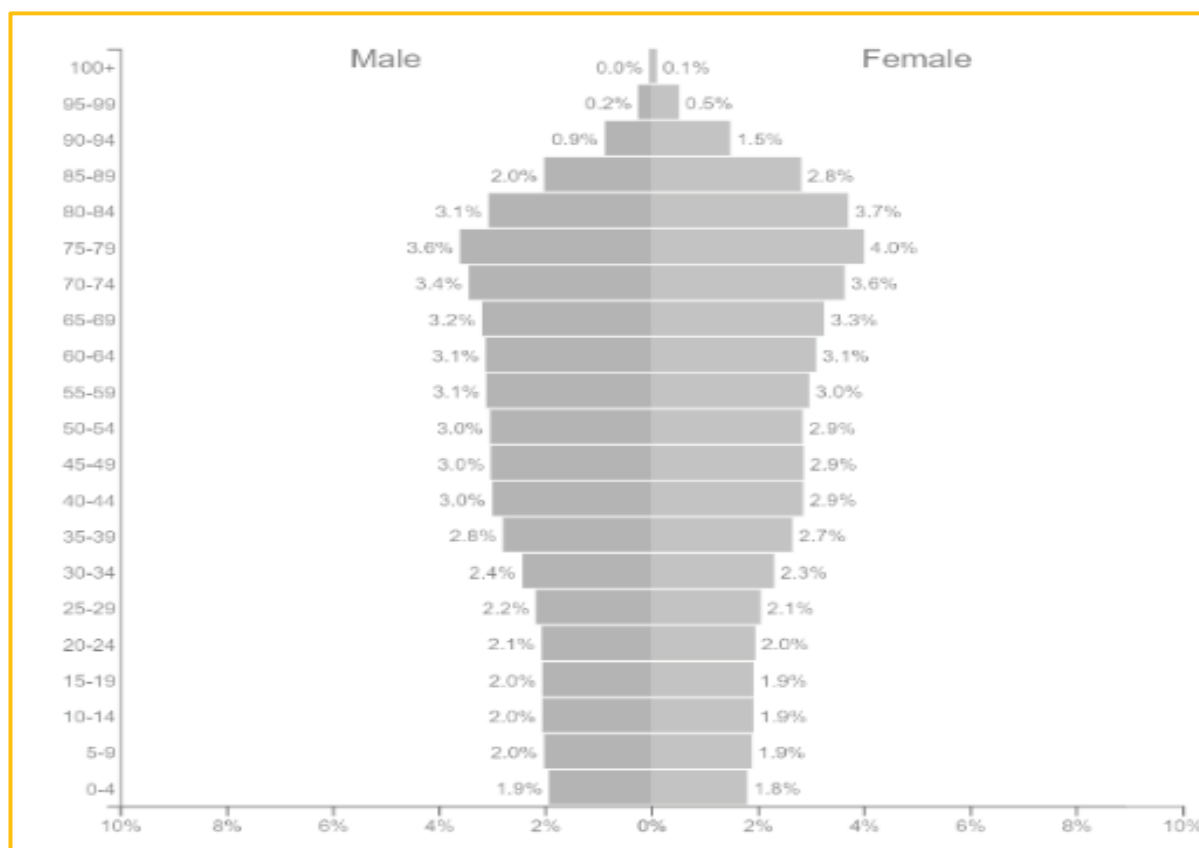


**Figure 2:** Population Pyramids, EU-27, 2019 and 2050 (% share of total population)  
Source: Eurostat (demo\_pjangroup) and (proj\_19np)



**Figure 3a:** Population Pyramid Italy 2019 (% share of total population (60,550,092))

Source: <https://www.populationpyramid.net/italy/2019/>



**Figure 3b:** Population Pyramid Italy 2050 (% share of total population (54,381,674))

Source: <https://www.populationpyramid.net/italy/2050/>

A similar trend can be observed in Italy. In 2019, on the basis of the data of the Italian National Bureau of Statistics (ISTAT) [20], of 60 million 391 thousand residents (60,391,000),

- the population aged 65 and over represented 23.2% of the total;
- that up to 14 years of age 13%;
- that in the range 15-64 years 63.8%;
- and the average age approached the milestone of 46 years.

Although long-term forecasts on population trends are uncertain and must be continuously updated, the Italian National Bureau of Statistics (ISTAT) [21] predicts that by 2050, the overall population in Italy will be 54.2 million individuals (52,400,000):

- people aged 65 and over could represent 35% of the total;
- young people up to 14 years of age, 11.7% of the total, thus recording a slight decrease;
- those in the range 15-64 years 53.3%;
- and the average age should approach approximately 50 years. In this case, the ratio between those over 65 and young people would be 3 to 1.

These trends will have important implications

- at the macro level (countries, governments, business, civil society, the household sector and business sector, health and social security systems, labor market)
- and at the micro level (individuals, individual firms, pension entitlements and so on).

The most relevant problem for the health care systems of countries such as Italy, in which the population is progressively aging, is the increase in the incidence of noncommunicable chronic diseases in the total population,

and the COVID-19 pandemic has become particularly pressing concern [22]. In this regard, the 2022 Annual Report of the Ambrosetti European House Center for Italian Public and Private Health Studies [23] focused on noncommunicable chronic diseases (among which the most common are neoplasms, cardiovascular and cerebrovascular diseases, chronic respiratory illness, diabetes and mental disorders) that are more likely to affect the elderly population (65 years of age and over), and it has highlighted that in 2020,

- o in Europe, based on Eurostat data and as indicated by the European Commission initiative of June 2022 "Healthier Together - EU Non – transmissible diseases" [24,25],
- 42.6% of European citizens (of 447.7 million individuals [26]) had a problem due to the presence of one or more nontransmissible (noncommunicable) chronic diseases;
- in particular, 65% of those over 65 and 70% of those over 75 were affected by one of the aforementioned pathologies.
- o in Italy, people with at least one chronic disease represent 40.9% of the population (59,236,213 individuals [27]), of whom more than 90% are individuals over 75 years of age.

It is intuitive to imagine that the progressive aging of the European and Italian populations, as illustrated in the demographic pyramids (Figures 2, 3a and 3b); the reduction in the mortality rate due to therapeutic and technological innovations; the lack of prevention and of a culture aimed at adopting correct lifestyles will increase the share of citizens in Italy and in Europe who are affected by noncommunicable chronic diseases and comorbidities;

The progressive increase in population aging and the number of individuals with chronic diseases will have a strong impact on the evolution of health expenditure in Europe and Italy.

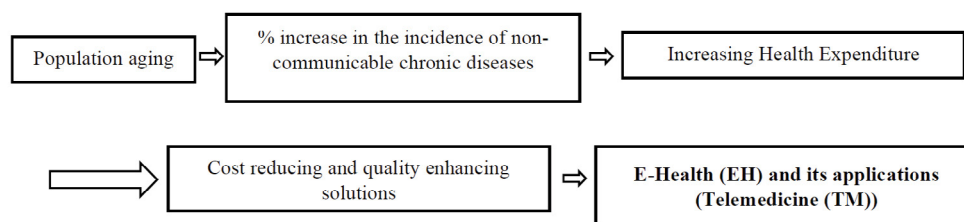
Recent data show that in 2020, the share of health expenditure in the EU due to chronic illness was equal to approximately 70-80% of the total, corresponding to approximately 700 billion Euros per year. In Italy, health

**Table 1:** Italy - Data on Health Expenditure (in millions of Euro), as a % change with respect to the previous year, as a % of real GDP, from 2018 to 2022 and forecasts for 2023–2025.

	2018	2019	2020	2021	2022	2023	2024	2025
<b>Health Expenditure (millions of Euros)</b>	114,423	115,661	122,721	127,834	133,998	131,724	128,708	129,428
<b>% change previous year</b>	-	1.10	6.10	4.17	4.82	-1.70	-2.29	0.56
<b>As a % of real GDP</b>	6.0	6.40	7.40	7.17	7.04	6.62	6.20	6.02

(Source: Memorandum of the Court of Accounts on the Update Note of the 2022 Economy and Finance Document – available at: <https://www.corteconti.it/HOME/Documenti/DettaglioDocumenti?Id=3d140efb-aaf5-4f27-b177-03951626b38f> and Chamber of Deputies - Parliamentary documentation - The Level of Funding of the National Health Service in 2022– available at: [https://temi.camera.it/leg18/temi/tl18\\_il\\_fabbisogno\\_sanitario.html](https://temi.camera.it/leg18/temi/tl18_il_fabbisogno_sanitario.html))

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**Figure 4:** E-Health and its applications (telemedicine (TM)) as cost-reducing solutions

care expenditure for chronically ill people is equal to approximately 67 billion euros, corresponding to 50-60% of the total health expenditure.

The recent evolution of health expenditure in Italy between 2018–2022 and the forecasts for 2023–2025 (Table 1) clearly reveal the following:

- Due to the COVID-19 pandemic, health expenditure underwent strong growth between 2020 and 2021, corresponding to a 6.10% change with respect to the previous year and a 7.40% percentage growth rate with respect to real GDP. Such a growing trend is expected to continue through 2022.
- For various reasons (including the need to contain public spending and reduce the public debt-to-real GDP ratio as required by the European Union, global geopolitical events that have led to an increase in energy costs and of the rate of inflation), the recent Update Note of the 2022 Economic and Financial Document [28,29] drawn up by the Italian Government foresees in 2023 and 2024 a substantial decrease in health expenditure (also considering the plans to reduce health expenditure implemented in various Italian regions to contain total public health expenditure [30-35]):
  - o between 2022 and 2023, the expenditure will decrease from 133,998 to 131,724 million euros, corresponding to a 1.7% decrease in health expenditure with respect to the previous year;
  - o between 2023–2024, the expenditure will decrease from 131,998 to 128,708 million euros, i.e., a 2.29% decrease with respect to the previous year.

The contraction in health care spending over the next two years will also have a strong impact on the evolution of the health care sector (considering the endemic shortage of health personnel (in particular doctors and nurses) in emergency rooms, hospitals and in the Italian territory).

If we now jointly consider the previous issues and, in particular, the following:

- progressive aging of the population (the resident population in Italy is decreasing: from 59.2 million in 2021 to 57.9 million in 2030 and to 54.2 million in 2050 [36]).

The ratio between individuals of working age (15-64 years) and those of nonworking age (0-14 years and 65 years of age and older) will go from approximately three to two in 2021 to approximately one to one in 2050, and in particular, the projections of the Italian National Institute of Statistics predict that for every 280 elderly people, there will be 100 young people in 2051).

- the resulting increase in the incidence of total noncommunicable chronic diseases, which the World Health Organization (WHO) [37,38] considers to be the cause of 75% (accounting for 486,663 victims of noncommunicable chronic diseases) of overall deaths in Italy of people aged 70 years or older in 2019 (most recent available information);
- the greater burden that this will place on health expenditure (the health incidence will rise to 9.5% of GDP in 2050 [39] due to the progressive aging of the population and the greater numerical importance of noncommunicable chronic diseases);

it is intuitive to imagine that precedence will be given to cost-reducing solutions, i.e., to health policies aimed at reducing costs and increasing the effectiveness and efficiency in the provision of health services, such as, as indicated by the European Commission, e-health (also known as digital health), given the cost-reducing impact of digital health for both the organization and the patients. As a recent study states [40]:

“Digital health interventions have significant potential to improve safety, efficacy, and quality of care, reducing waste in healthcare cost.”

## E-health and telemedicine

Electronic health (e-health) applies the tools of information and communication technologies (ICT) to health care. Various definitions of e-health have been given in the literature [41-43] and by international and national entities. The WHO [44] defines e-health as follows:

“cost-effective and secure use of information and communication technologies (ICT) in support of health and health-related fields. It encompasses multiple interventions, including telehealth, telemedicine, mobile health (mHealth),



electronic medical or health records (eMR/eHR), big data, wearables, and even artificial intelligence. The role of eHealth has been recognized as pivotal in attaining overarching health priorities such as universal health coverage (UHC) and the Sustainable Development Goals (SDGs)."

On the other hand, the European Union [45], with particular reference to its members' states, suggests that e-health:

"can improve access to healthcare and boost the quality and effectiveness of the service offered. E-health describes the application of information and communications technologies across the whole range of functions that affect the health sector".

The Italian Ministry of Health refers to e-health as *"the use of tools based on information and communication technologies to support and promote disease prevention, diagnosis, treatment and monitoring and health and lifestyle management"*. In other words, "E-Health can be defined as a set of technologies applied with the help of the internet, in which health care services are provided to improve quality of life and facilitate health care delivery" [46].

All definitions have a common denominator, meaning that they all combine

- information technology,
- telecommunications,
- and medicine

and highlight the main purpose of e-health [47], that is, to expand health care locally, regionally, nationwide and universally to improve the well-being of individuals [48,49]. The most common applications of e-health are telemedicine, big data, the metaverse, artificial intelligence, the internet of medical things (e.g., surgical devices and implantable devices) and virtual reality (see Figure 1 – graphical representation).

The systematic study of the applications of e-health, such as telemedicine, both at the macro level (within a nation) and at the micro level (locally in public or private hospital structures) requires the following:

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the identification [50] of

- the needs [51] that e-health fulfills;
  - the determinants of e-health demand [52];
  - the determinants of e-health supply [53]; and
  - whether e-health facilitates access [54] to care.
- 

At the base of the introduction of e-health, there are the needs that it is supposed to satisfy. However, what does the term "need" mean, and in particular, what does it mean when referring to e-health? To be able to define it, it is necessary

first to identify the meaning of health care and then to find the definition of health need.

The term health care [55] "means treatment, prevention and supportive care that is effective – either alone or as part of a care pathway – in improving, maintaining, or slowing the deterioration of health now or in the future (or both)". Before defining the notion of health need, as well as the definition of health care, there is an equally relevant concept, that is, 'access to health care', whose importance has been reiterated on many occasions by the European Commission [56]. 'Access to health care' is the right of everyone to "timely access to affordable, preventive and curative health care of good quality". The concept of health need is strictly linked to both the notions of health care and access to health care. In fact, health needs are defined as "the right care (meaning cost – effective care) provided in the right place and the right time".

During the worst period of the COVID-19 pandemic, a new, urgent need arose to avoid direct contact between patients and doctors since such contact was becoming a potential source of contagion. The acceleration of the transition from face-to-face visits to remote visits using ITC tools has given the impetus to the use of some of the e-health applications, among which telemedicine (an application of e-health whose demand and supply were weak before the beginning of the pandemic and delivered in mostly experimental conditions) stands out in importance.

The WHO [57] defines telemedicine as follows:

"the provision of healthcare services at a distance with communication conducted between healthcare providers seeking clinical guidance and support from other healthcare providers (provider-to-provider telemedicine); or conducted between remote healthcare users seeking health services and healthcare providers (client-to-provider telemedicine)".

The World Health Assembly Resolution on Digital Health (W.H.O. 2018) [58] recognizes "the important role of digital technologies, such as Telemedicine, to strengthen the health system, to improve the Universal Health Coverage (UHC) (i.e. to ensure the quality, accessibility and affordability of health care services)" [59] and to ensure the achievement of other purposes of the Sustainable Development Goals (SDGs) [60,61]. E-health and its applications, such as telemedicine, can improve health and decrease health inequality.

Although the effectiveness of telemedicine compared to in-person visits is still being studied, considering its relative ease of use (in comparison with respect to other e-health applications) with a variety of telecommunication tools such as smartphones, tablets, telephones and others, it may be useful to deepen the discussion of this issue.

**Table 2:** Direct and Indirect Costs that Telemedicine may Decrease.

Direct Costs	Indirect Costs
<b>For individuals/patients</b> Travel Costs	<b>For individuals/patients</b> The loss of a working day
<b>For the organizations and the health system</b> Consultation prices (Hospitals)	<b>For the organization and the health system</b> <ul style="list-style-type: none"> <li>• occupation of physical space and material resources consumption of involved hospitals;</li> <li>• greater pressure on administrative and clinical services;</li> <li>• overload of the specialty's appointment schedule</li> </ul>

One of the recent questions affecting the health care system is what factors influence its performance. Among them (on the basis of the list given by the WHO [57]), the following stand out in terms of relevance:

- “relative geographical inaccessibility (of hospitals, polyclinics, medical clinics...);
- low demand for services;
- delayed provision of care;
- low adherence to clinical protocols;
- costs to individuals/patients;
- costs to doctors and hospitals;
- health expenditure trend”.

If we look at the literature, it seems clear that the introduction of telemedicine may have a beneficial effect [62] in solving, with reference to the previous list, problems of geographical inaccessibility, low demand for services, and delayed provision of care, and it may have cost-reducing effects (see points e), f) and g)). More specifically, as we will see, the cost-reducing effect of telemedicine may particularly concern the following type of costs:

Barriers to free access to health care services, as well as problems of quality and affordability, were already relevant issues in many OECD countries prior to the beginning of the COVID-19 pandemic, which has highlighted these issues further.

A recent OECD report [63] suggests that in 2019,

- access to health care, at the origin of unmet needs, is often compromised by limited availability or affordability;
- more than 30% of the population in countries such as Italy had accessibility problems since care was delayed or forgone due to waiting times and/or transportation difficulties;
- 23% of the low-income population delayed or did not look for care due to affordability issues.

In summary, there are many occasions where the health needs of individuals are unfortunately not met. Unmet needs are a common measure [64] of access to health care in Europe and in OECD countries and are quite helpful in identifying the

limits, which were present before the COVID-19 pandemic and that the spread of the virus further highlighted, of a nation's health care system and the spaces for improvement, where technological innovation plays a crucial role.

### The special case of the Telemedicine Project of the Casa Sollievo della Sofferenza Hospital

We have seen how the COVID-19 pandemic has highlighted the strengths and weaknesses of the Italian national health system, such as the following:

- systematic shortage of medical and health care personnel, particularly in emergency departments;
- evolution of public health expenditure (see Table 1), which increased during the pandemic and is now expected to decrease over the next two years, 2023 and 2024, in an effort to remedy the problems of high structural public debt;
- health spending reduction plans (namely, the health spending review) in the most indebted Italian regions (i.e., regions that have a structural health deficit greater than 5% of ordinary financing and have health revenues), implying cuts in health spending and investments [65]; currently, in Italy, there are seven regions that apply reduction plans (Abruzzo, Calabria, Campania, Lazio, Molise Puglia and Sicily), two of which (Molise and Calabria) are administered by special commissioners;
- the need for greater capillary coverage and territorial surveillance to better cope with any future pandemics and the country's demographic dynamics to guarantee effective coverage of the health needs and more effective prevention policies of the entire population and throughout the Italian territory, divided between the industrialized regions of the north and the agricultural regions in central Italy and the south;
- the importance of accredited private hospital structures, which often make up for the shortcomings of public health and are often marginalized or excluded from public health investments.

In addition, the spread of the virus has accelerated, both in the northern regions and in the central and southern regions, the digital transformation and, in particular, the use of ICT

tools that, as the current literature now recognizes [66,68], improve the quality, accessibility and affordability of health care services, i.e., universal health coverage (U.H.C.). In Italy, several hospitals started intensifying the implementation of telemedicine (in particular, televisits) projects to exploit the beneficial effects that the digital transformation [69,70] has been proven to provide during the worst period of the pandemic.

One of the Italian cutting-edge projects concerning the provision of telemedicine services and, in particular, televisits has been implemented and carried out by the Hospital Casa Sollievo della Sofferenza (House for the Relief of Suffering), founded by the famous Italian Capuchin Father Pio of Pietrelcina, located in San Giovanni Rotondo, a town in Apulia (see Figure 1), one of the regions of Southern Italy. Despite its particular territorial location (San Giovanni Rotondo, 565 meters above sea level and approximately 45 minutes from Foggia, is the third most important city in the Apulia region but cannot be reached by train or by airplane but only with private transport or by bus), the aforementioned hospital represents one of the few examples of excellence in a private accredited hospital in Southern Italy, if not the only one, with 865 beds, ISO 9001-2015 certification and involvement in cutting-edge biomedical research.

Considering the particular territorial conformation of Italy, with the more industrialized North and the agricultural South, the results obtained by the Padre Pio Hospital position it as a state-of-the-art health care facility in terms of quality and quantity of services provided in the area and the skills of the managers running the hospital, despite public health management that is not always favorable to health facilities of that type. Such excellence has been recognized in the rankings, based on factors such as cost, advanced technology, quality treatment and others, drawn up by Newsweek in 'The World's Best Hospitals 2022' (available online at: <https://www.newsweek.com/worlds-best-hospitals-2022/italy>). Casa Sollievo della Sofferenza is in 29<sup>th</sup> place and is indicated as the best hospital in Southern Italy.

The service area of the Casa Sollievo della Sofferenza Hospital (hereafter simply C.S.S.) includes mainly the

southern regions (considered rural areas with respect to the more industrialized North) of Puglia, Basilicata, Sicily, Campania, Molise, Abruzzo and Calabria, representing 18,253,329 million people, corresponding to approximately 30.9% of the overall population in Italy (58,983,000 individuals as of January 1<sup>st</sup>, 2022, on the basis of the data from the Italian National Bureau of Statistics (ISTAT)). In this scenario, the COVID-19 pandemic has clearly accelerated the digital transformation and e-health literacy [71,72], with particular reference to telemedicine, considered the ideal tool to avoid direct contact between patients and doctors, and in the health care sector. Taking advantage of the acceleration



Figure 5: Southern Region Apulia (Italy)

in the use of ITC tools and anticipating the Italian legislation [73-77], since July 2022, Casa Sollievo della Sofferenza has implemented the first Televisits for the Gastroenterology Operative Unit (with reference to inflammatory bowel disease) [78] and for the operative units dedicated to pain management. Over time, the project will be extended to over thirty specialties.

The telemedicine project implemented by C.S.S. is part of a broader vision proposed (see the Project Work -Hospital-Territory integration in the management of the post-acute or chronic phase of patients. A shared management in the light of the DM 77 and the funds of the Piano Nazionale di Ripresa e Resilienza (PNRR) [79] (Apulia Region)) by recent Italian legislation (Ministerial Decree 77, 2022). This legislation pertains to the role of hospitals and the need to integrate hospital care with territorial care and to cope with the new scenarios and new health needs due to the epidemiological (COVID-19 pandemic caused by the SARS-CoV-2 virus), demographic (progressive aging of the population) and social (economic inequalities) transition. In addition, there are needs due to the spending health review implemented by the Italian government following the high health deficit in various regions, particularly in Apulia.

As a result, "the recent legislation (such as the so called 'spending review' and DM 70 in 2021) in this regard provided for the decrease in the number of accredited hospital places financed by the Regional Health Service, equal to no more than 3.7 bed places per 1000 inhabitants, and 0.7 bed places per 1000 inhabitants for rehabilitation and long-term post-acute care. Hence the need to identify alternative forms to hospitalization and enhance the specialist outpatient network, especially for the system of care dedicated to chronic diseases" [80]. A profound modernization (DM 77 in 2022 and expected subsequent changes) of territorial healthcare and a further variation of the standards in hospitals, such as the number of beds per 1000 inhabitants, is foreseen in the various legislative updates in place.

Even if the data are not yet available, the televisits project,



<b>Availability</b>	Health care facilities, goods, services and programs together with a functioning public health system have to be available in sufficient quantity
<b>Accessibility</b>	Health care facilities, goods, and services have to be accessible in the jurisdiction of the state, without discrimination to anyone
<b>Acceptability</b>	Health care facilities, goods, and services must be culturally appropriate and respectful of medical ethics
<b>Contact</b>	Actual contact between the service provider and the user
<b>Effectiveness</b>	Barriers in treatment adherence, provider compliance and diagnostic accuracy

started during the COVID-19 pandemic and still ongoing, of the gastroenterology operative unit (with reference to inflammatory bowel disease) of the Casa Sollievo della Sofferenza Hospital is an example of the effort to increase and improve the effectiveness of health coverage with particular reference to noncommunicable chronic diseases.

This project fits well into the problems that the literature [81-84] on the practical applications of telemedicine and televisits (even in rural areas [85]) has highlighted in terms of the following:

- solving problems of territorial accessibility to hospital and outpatient clinics;
- finding effective alternatives to rehospitalization of discharged patients with chronic diseases;
- its cost-reducing effects with particular reference to the following:
  - a) decrease in costs for patients and their families (less travel and less time wasted);
  - b) reduction in costs for hospital structures and doctors who provide telemedicine services and, in particular, televisits.

Furthermore, telemedicine and televisits seem to improve the quality, accessibility and affordability (through a cost reduction for both patients and hospitals) of health services, i.e., U.H.C. and its effectiveness.

A reliable metric [86] to track progress in achieving U.H.C. is the notion of effective coverage, which the WHO defines as [87] “people who need health services obtain them in a timely manner and at a level of quality necessary to obtain the desired effect and potential health gains”.

The events that occurred during the pandemic and the current situation of the Italian health system, with particular reference to the Apulia region where the Casa Sollievo della Sofferenza Hospital is based, have highlighted the emergence of unmet needs for various reasons (from the pandemic health emergency to problems due to territorial distances and transportation costs, waiting lists, and convenience). These circumstances, as also highlighted by the various OECD reports, even before the start of the pandemic, gave the opportunity to detect the presence of a part of the population whose health needs, due to various barriers, were not met and who were therefore in a certain way left behind. For this reason, the ongoing telemedicine and televisits projects

for chronic nontransmissible diseases [88] fit well in the so-called Tanahashi framework [89], on the basis of which health coverage can be examined through a series of dimensions, i.e..

Furthermore, health facilities, goods and services must be scientifically and medically appropriate and of good quality.

The Tanahashi framework is useful for determining the reasons why there might be subsets of a given population that access and benefit from health care services and others are that do not through the identification of the following:

- barriers (i.e., factors that hinder the target population from making the appropriate use of the health service offered);
- facilitating factors (factors that enable the target population to make full use of the health service offered).

The telemedicine and televisits project implemented by the Casa Sollievo della Sofferenza, particularly for chronic nontransmissible diseases, seems to be able to fill part of the gap between the target population that currently is unable to access the required health services and the actual health coverage and to benefit not only patients but also hospitals due to its cost-reducing impact.

## Conclusions

The COVID-19 pandemic has accelerated the digital transformation and the use of new tools of ITC, such as telemedicine and televisits. During the post-COVID-19 era, e-health and its applications can become a relevant instrument capable of improving the provision and accessibility of health services, health care performance and the ability to achieve universal health coverage and the dimensions described by the Tanahashi framework. The pilot project for the implementation of televisits at the Casa Sollievo della Sofferenza Hospital, an international center of excellence in Southern Italy, is an example to be imitated.

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