# I. INTRODUCTION

## 1.1    Background

Technology has certainly become a breakthrough as well as a turning point as almost every aspect of our life is integrated with it. Not only that, but technology has also help advancing and improving life quality especially in the healthcare sector during the currently on-going COVID-19 (Coronavirus Disease 2019) pandemic. During this time, especially in the start of the pandemic in 2019, physical face-to-face interactions become quite a risky thing to do with people quarantining all over the world limiting access to social participation while at the same time creating clusters and crowds in healthcare facilities. Yet through these circumstances, technology continue to thrive more than ever as it become a tool to overcome many barriers and several other obstacles. The idea of integrating technology into healthcare has been floating for quite a while yet it is only recently pushed in 2013 by UK Secretary of State for Health and Social Care 2012, Jeremy Hunt. During the time, Hunt Challenged NHS (National Healthcare Service) England to go paperless by 2018 which ignited NHS's five year forward view on 2014 despite the planned being set back two years to 2020 (Honeyman, Dunn, and McKenna, 2016). This became the catalyst of digital transformation in the healthcare industry which progress is immensely increased during the pandemic era due to the need of creating more alternative to keep in touch with people. The digital transformation started with the implementation of IoT (Internet of Things) which is identified as a web of interconnecting object or devices that can converse which each other in a transparent way without the need of computer assistance or interne (R and R, 2015) which also come hand in hand with EMR (Electronic Medical Record). These two systems manifest to advance technology in telehealth, telecare, telemedicine, tele-coaching, and self-care application that has the potential to help people engage more on their healthcare. UK has been deemed as one of the leading countries that has been establishing telemedicine market among EU countries (Vara, 2021) and through IoT, UK was able to have the ability to gather bigger data and real time monitoring and report which presents several benefits for the NHS especially in tracking

and monitoring patients in healthcare more effectively using IoT with and expected growth of USD 41.22 Billion in 2017 to USD 405.65 Billion by 2026 (Best, 2018). Studies conducted during the implementation progress of IoT and EMR shows that through the 24/7 access of Telemedicine applications in more than 27 home care facilities in UK, has reduce the cost of emergency admissions and care up to 39% and has drops emergency department visit up to 45% which are deemed significant, proving higher quality of life. NHS England also stated that telemedicine applications also save patients from travel expenses for health consultations which amount to about £1,411 per year, calculated at 42p per mile (Williams, Elghenzai, Shubbe, Wyatt, and Williams, 2017).

Some says that these changes are like a shock, however, it is believed that the current infrastructure of telemedicine is vital especially during the current pandemic and by adapting this technology breakthrough, healthcare professionals (not only the hospital, but also pharmacies) are now able to heal at a distance as it provides support and promote long-distance clinical care, education, and healthcare, from first response to recovery with low cost and extensive coverage (Leith, Hodgkinson, R, and Grubber, 2020).

Healthcare professionals are also able to keep more patients out from their office and lessens the risk of COVID-19 infection through the telemedicine application as records also show telemedicine benefits patient 75% for providing health information as well as reducing paperwork by 60% for community nurse and 35% hospital admissions[7] Through the development of telemedicine, UK can make faster progress in weeks compared to the 10years before (Deloitte, 2021). This proven that embracing digital solutions and transformations is essential to the future healthcare services (Kannampallil and J, 2020).

Through this significance that UK has achieved, a comparative study could be done with other countries such as Indonesia. Like UK, Indonesia has been accelerating its development in its IoT and EMR in its telemedicine application especially during the pandemic. One of the breakthroughs is through the launching of the PeduliLindungi

application by Indonesia' Ministry of Health designed to help COVID-19 patient, test, and vaccine tracking. Not only that, PeduliLindungi also managed to officially partner with private telemedicine sectors in Indonesia such as Good Doctor, Alodokter, Halodok, Trustmedis, LinkSehat, Klinikgo, and etc (Ministry of Health, 2020). Indonesia Ministry of Health has also shown initiative in implementing IoT and EMR system further in Indonesian Healthcare by funding several research on clinics and health communities together with the Ministry of Education while partnering with universities. One of the research projects conducted and implemented in Bandung Clinic Health Community by designing and EMR system in which healthcare professionals such as dentists and physician can immediately and throughout update a patient's medical record as well as developing Management Information System for CHC (MISCHC) for further applications in helping to gather and analyzing medical big data (Setiawan, Utami, Mengko, R, and Indrayanto, 2014). Further EMR systems are also developed into the Index AAA Server (AIS) in which physician can read the patient's submitted data through permission and granting tickets to consultation that can be added to the records in which the physician is registered as a form of two-way security or authentication when accessing the patient's medical record and data as well as assuring patient's regarding their data permission and rights (Setianto and Utami, 2014).

Globalization also play a huge role on the development of digital healthcare as different country with different backgrounds could play on the same leveling field due to one or more reasons as said in Thomas Freidman's *'The World is Flat'* which in the case of digital healthcare touches several points in Freidman's definition of *'Ten Flatteners'* such as Netscapes, Workflow Software, Uploading, as well as Informing. Other than that, digitalization and technology development is universal as different countries with different backgrounds such as a developed and still developing one could both have technology develop which depends on how the country itself received it (Freidman, 2007).

## 1.2    Problem Identification

The different background of Indonesian and United Kingdom's (UK) politics contributes a lot to the resulting policy and regulations as well as the development it went through with Indonesia as a developing country and UK as a more developed and stable country. As discussed earlier in the introduction, telemedicine has become a prominent player during the COVID-19 era (in this paper, 2019-2022), and the question risen whether the status of a country being a developed or developing country truly matters in its progression of technology in the field of telemedicine. Another thinking also arise as Globalization is believed to create a level playing field between the developed and developing countries, so it is question whether globalization could play a big role in the progression of technology in telemedicine between Indonesia as a developing country and UK as a developed country.

With globalization in play, the common thinking of developed country may have a head start and quicker progress in development (in this case, in telemedicine) rather than developing country could be challenge other than ground factors such as the history of the country itself, law and regulation as well as other objective and challenges.

## 1.3    Research Question

As mentioned previously, globalization and technology development are universal and could affected both developed and developing country at the same time. So how does it affect the country differently? Does developed country truly had a head start on this issue or does developing have level playing ground regarding the change in digitalization? These questions will be summarized in one general proposition which is:

How is the implementation of telemedicine and digital healthcare in Indonesia compared to United Kingdom in 2019-2022 and whether globalization truly plays a huge role on leveling the field?

Due to the time frame used in this thesis still being year 2019-2022, the term

regarding Indonesian Government's official telemedicine mobile application from the Ministry of Health which is 'PeduliLindungi', is still going to be used despite the current name being changed into 'SatuSehat' on March 1st, 2023.

## 1.4    Research Objective and Significance

This research is done to find out how digitalization in healthcare is affected differently in UK as a developed country and Indonesia as a developing country and whether globalization truly contributes to a level playing field for both countries with different background.

This research may also serve as a challenge in the common thinking that developed country have a head start and quicker progress than the developing one.

## 1.5    Theoretical Framework

To further formulate, understand, analyze, and explain the phenomenon that is happening in the previous section, theoretical framework would be needed to present and discuss the theory that explains the existence of the research topic of the study case above exists (Abend, 2008). A theoretical framework is a collection of concepts and their definitions andrelevant academics literatures made by scholars that are employed in the field which also elaborate a comprehensive understanding of the concepts and ideas used in the research paper study or topic while also retaining to the bigger picture or larger field of the said knowledge that is beingexplored. Yet unfortunately, despite being widely used especially as one ofthe main structures of a research paper topic or study, theoretical framework is not readily available or transparent out in the open in many literatures most of the times. Reader and writers usually must go over the course and paper materials used as well as other relevant academic literatures used to be able to tell and pick apart the theories used in the theoretical frameworkthat could be applied to the research paper topic or study needed as one of the core strength of theories in theoretical framework itself is how simple, easy, and relevant for them to be applied to the research paper study or topic

being used (Ravitch and Riggan, 2017).

To develop a framework, some strategies are needed to be donein order to create an effective theoretical framework that can be easily applicable and relevant to the research paper study or topic being made. Oneof the first things to do is examining the research title and problem as it is one of the core components of a research paper or even thesis as well as what kind of factors or variables that might contribute or affect the result of the research itself. After listing the relevant factors and variables needed, then reviewing literatures can be done. By using those variables that has been listed, it could be used as a reference to what relevant academic literature that could be reviewed which can explain how those variables linkwith the research study or topic the best (Swanson, 2013). When enough academic literatures have been reviewed, it is until then discussion and propositions of the theories that are chosen can be assume and used to explain the relevance of the research paper study or topic being made. By using theoretical framework, researchers can also limit their scope of the study byonly focusing on one or two specific point of theories that is going to be used to analyze and interpreted that information that have been gathered used (Ravitch, Sharon, Riggan, 2017). To continue from the previous section while still pertaining to the topic of this research proposal body, the next section will elaborate the theoretical framework as well as the theories that are chosen to be used to formulate, understand, analyze, and explain the phenomenon in this research proposal which is the comparative study of IoT and EMR implementation in telemedicine between UK and Indonesia. The author willbe using two correlating theories which are Globalization in the context of technology in telemedicine as well as healthcare policy.

Considering the globalization elements, a globalization theory centers around technology would be appropriate to add to this research. Friedman contends that due of globalism's leveling of the playing field, the earth is flat which made people from far-off third-world nations can take part in economies of first-world nations which he laid out as 10 factors of 'flatteners' in his book 'The World is Flat' which are: 1) Collapse of Berlin Wall 2) Netscape 3) Workflow software 4) Uploading or open-source 5) Outsourcing 6) Off-shoring 7) Insourcing 8) Insourcing or Logistics 9) In-forming 10) "The Steroids".

The second chapter will elaborate the correlations of these factors with healthcare digitalization and telemedicine.

Due to the limitation of face-to-face interaction during the COVID-19 pandemic, technology raised rapidly. One of which could be encountered in the healthcare industry with the development of telemedicine. This could also be imbued into the theory of Globalization which is Techno-Globalism. Techno-globalism is a social theory that aims to explain globalization using the spread of science and technology (Montresor, 2001). Through the spread of science and technology, different nations and societies come together to form a more open and knowledge-based group which is characterized as "globalized." Broadly speaking, techno-globalism is establishing connections between individuals or groups of individuals using shared science and technological practices. In terms of form, techno-globalism can be expressed in macro and micro scales ranging from the interconnections of national economies to individual behavioral culture (Mothe, Dufour, Daedalus, 1995). With the advancement of technology, globalization has made it possible for nations without access to natural resources to participate in the economy by providing services. One of the skills that flattens the global economy the most is the capacity to provide online services.

Another side and perspective from the healthcare sector is also needed considering the topic of telemedicine development. The theory of social and healthcare policy is needed to differentiate things to different people as it serves different looks and perspective on what is the most effective and method to deliver proper healthcare services with other considerations such as financing and delivery service. Policy exploration is also needed to give a look to how the policy is formulated and how it influences differently in each country (Schober, 2017).

## 1.6    Research Methodology

Continuing from the theoretical framework, to see how each actors behave and develop in their own digitalization process as well as to see whether globalization truly

provide a level-playing field for both developed and developing countries, an elaboration of each country's individual history of telemedicine itself and the growth it experienced especially during the 2019-2022 COVID-19 Pandemic. On top of that, an additional of each country's regulation, law, and ethics are also needed as well as the objective of each country regarding the digitalization of their healthcare. With these, we can through the contrast and different in these policies, there are different cultural, administrative, as well as political background that may result in the decisions despite the generally similar pressing social service needs, which is the healthcare especially in the current pandemic. Through that also, we can see the challenges faced by both countries and whether they managed to get through it by gathering information collected from both countries law, regulations, and ethics as well as governmental publication, official statements, as well previous study.

Through this we can see the different process of healthcare digitalization and whether developed countries truly have an advantage and head start in this process which Thomas Freidman argued whether globalization is an uneven process and only benefits some actors or whether it truly helps to provide a level-playing field as developing countries could also develop in a fast manner depends on how they receive the change itself which in this case is the digitalization of healthcare.

## 1.7    Scope and Limitation of the Study

The analysis and conclusion provided in this paper will only be limited to and focused on the history of telemedicine and how it developed in 2019-2022 as well as how the regulations are approached and the challenges that they faced in digitalizing their healthcare in Indonesia and UK especially during the COVID-19 Pandemic in 2019-2022.

**1.8    Research Structure**

**CHAPTER I: INTRODUCTION**

o    **Background Introduction**

This section will introduce the reads to why this paper was written and how did the discussed event happen which mainly centers around the introduction of technology to the healthcare sector and how it helps to combat the barriers present due to the limitation of face-to-face interaction in the COVID-19 by transforming it into a digitally driven era. This paper will also discuss whether globalization play a huge factor in the difference or equality in telemedicine development in both developing and developed countries.

o    **Problem Identification**

This section will provide what the author felt like a risen issue between the two countries. As Indonesia and UK have different backgrounds, each being a developing and developed country. This alone will result in difference between how well and fast the two countries would be able to digitalize their healthcare and the different results following the same goal, whether Indonesia as a developing country progress slower or could it unexpectedly grow faster than UK as a developed country.

o    **Research Question**

Through the introduction elaborated in the background section and the problem identified in the previous section, a research question is proposed appropriate with the topic followed by the appropriate time frame.

- **Research Objectives and Significance**

  An elaboration of why this research is done by the writer which centers around how can the digitalization of healthcare is affected differently in Indonesia as a developing country and UK as a developed country and whether it truly gave one country had the head start and advantage.

- **Theoretical Framework**

  This section will provide the general view of theoretical framework as well as the theories being used in this research mainly: 1) Comparative Politics which will help in the comparative study between the two countries 2) Techno-Globalism which will laid out the ground regarding technology as a mean of globalization that could provide a level-playing field 3) Social and Healthcare Policy which helps to tackle the healthcare perspective of the issue risen.

- **Research Methodology**

  This section will elaborate how this research paper will approach the case which is by looking into each country's history and growth of telemedicine, the regulation, and laws as well as objective and challenges faced.

- **Scope and Limitations of the Study**

  Due to the long timeline of this event as technology and healthcare will always evolve, the author decided to focus and limit this research study from 2019-2022 which was the start of the COVID-19 Pandemic.

- **Research Structure**

  In this section, the structure for this research study will be laid out along with a brief elaboration of what each section discusses.

**CHAPTER II: DIGITAL HEALTHCARE AND TELEMEDICINE**

This chapter will elaborate the definition of telemedicine in the healthcare sector as well as how technology comes into play. This section will also include the history as well as general growth of telemedicine which might also concern globalization in the context of technology as it is a digitalization of healthcare.

**CHAPTER III: TELEMEDICINE IN UNITED KINGDOM**

This chapter will elaborate the history as well as growth of telemedicine and digitalization of healthcare in United Kingdom especially in 2019-2022. This section will also lay out the regulations, law, and ethics that are currently used to support telemedicine practice in UK as well as discuss UK's objective of digitalization their healthcare and the challenges they face.

**CHAPTER IV: TELEMEDICINE IN INDONESIA**

This chapter will elaborate the history as well as growth of telemedicine and digitalization of healthcare in Indonesia especially in 2019-2022. This section will also lay out the regulations, law, and ethics that are currently used to support telemedicine practice in Indonesia as well as discuss Indonesia's objective of digitalization their healthcare and the challenges they face.

**CHAPTER V: CONCLUSION**

This chapter will serve as a medium to lay out the conclusion gathered from the previous section and answer the question asked in the research question as well as research objectives.

# II. DIGITAL HEALTHCARE AND TELEMEDICINE

## 2.1    Digital Transformation

Technology has certainly become a breakthrough as well as turning point as almost every aspect of our life is integrated with. Not only that, but technology also help advance and improved life quality especially in the healthcare sector during the currently on-going COVID-19 pandemic. In the world where physical face-to-face interactions became quite a risky thing to do with people quarantining all over the world limiting access to social participation while at the same time creating clusters and crowds in healthcare facilities, technologies have become a tool to overcome this barrier and several other obstacles. Although the concept of integrating technology into healthcare has been around for a long, it was only recently promoted in 2013 by Jeremy Hunt, the UK's Secretary of State for Health, and Social Care in 2012. During the time, Hunt challenged NHS England to go paperless by 2018 which ignited NHS's five year forward view on 2014 despite the planned being set back two years to 2020 (Honeyman, Dunn, and McKenna, 2016). This became the catalyst of digital transformation in the healthcare sector which progress is immensely increased during the pandemic.

The digital transformation started with the implementation of IoT (Internet of Things) which is identified as a web of interconnecting object or devices that can converse which each other in a transparent way without the need of computer assistance or internet (KR, 2015) which also come hand in hand with EMR (Electronic Medical Record). These two systems manifest as a technology to telehealth, telecare, telemedicine, telecoaching, and self-care applications that can be potential to help people engage more on their healthcare. UK has been deemed as one of the leading countries that has been establishing telemedicine market among EU countries (Pharmaceutical Technology, 2021).  IoT gave the ability to gather bigger data and real time monitoring and report which presents several benefits for the NHS especially in tracking and monitoring patients in healthcare more effectively using IoT with and expected growth of $41.22bn in 2017 to $405.65bn by 2026 (Best, 2018). In more than 27 home care facilities in the UK, studies conducted during the implementation

process of IoT and EMR show that 24/7 access to Telemedicine applications has reduced the cost of emergency admissions and care by up to 39% and has decreased emergency department visits by up to 45%. These reductions are deemed significant and have been proven to increase quality of life. NHS England also stated that telemedicine applications also save patients from travel expenses for health consultations which amount to about £1,411 per year, calculated at 42p per mile (Williams, Elghenzai, Subbe, Wyatt, and Williams, 2017).

Some people claim that these changes come as a shock, but experts believe that the current telemedicine infrastructure is crucial, particularly during the current pandemic. By implementing this technological advancement, medical professionals are now able to treat patients remotely because it supports and promotes long-distance clinical care, education, and healthcare, from first response to recovery with low cost and extensive coverage. (Leite, Hodgkinson, and Gruber, 2020). Healthcare professionals are also able to keep more patients out from their office and lessens the risk of COVID-19 infection through the telemedicine application (Meller, 2020). Records also show telemedicine benefits patient 75% for providing health information as well as reducing paperwork by 60% for community nurse and 35% hospital admissions (The Deloitte Centre for Health Solutions, 2021). Through the development of telemedicine, UK is able to make faster progress in weeks compared to the 10 years before (Khannampallil and Ma, 2020). This proven that embracing digital solutions and transformations is essential to the future healthcare services (Meinert, Velthoven, Brindley, Alturkistani, Foley, Rees, Wells, and Pennington, 2018).

Through this significance that UK has achieved, a comparative study could be done with other countries such as Indonesia. Like UK, Indonesia has been accelerating its development in its telemedicine application especially during the pandemic. One of the breakthroughs is through the launching of the PeduliLindungi application by Indonesia' Ministry of Health designed to help COVID-19 patient, test, and vaccine tracking. Not only that, PeduliLindungi also managed to officially partner with private telemedicine sectors in Indonesia such as Good Doctor, Alodokter, Halodok, trustmedis, LinkSehat, klinikgo, and etc (Ministry of Health, 2021). Ministry of Health has also shown initiative in implementing

IoT and EMR system further in Indonesian Healthcare by funding several research on clinics and health communities together with the Ministry of Education while partnering with universities. One of the research projects conducted and implemented in Bandung Clinic Health Community by designing and EMR system in which healthcare professionals such as dentists and physician can immediately and thoroughly update a patient's medical record as well as developing Management Information System for CHC (MISCHC) for further applications in helping to gather and analyzing medical big data (Setiawan, Utami, and Mengko, 2014). Further EMR systems are also developed into the Index AAA Server (AIS) in which physician can read the patient's submitted data through permission and granting tickets to consultation that can be added to the records in which the physician is registered as a form of two-way security or authentication when accessing the patient's medical record and data as well as assuring patient's regarding their data permission and rights (Dwi Setianto, Utami, 2014).

## 2.2    Telemedicine

Technology has merge into the healthcare sector in the form of telemedicine which utilize many aspects that can be integrated such as long-distance communication and as far as providing medical information and service through telephone, emails, facsimile, video conferencing, electronical medical record transfer, robotic surgery, etc. without the need to meet face-to-face which became very prevalent in the era of COVID-19 pandemic after it first emerged in 1970s (Kaleko, 2000).

### 2.2.1    History of Telemedicine

The History of Telemedicine was started by a data transfer from the Academic Hospital of Leyden to Willem Einthoven's laboratory in early 1900s which then continued as a standard practice to use radio as a mean to transmit medical information. This also served as a response to the issue to providing psychiatric services to out of state patient via a two-way television educational service. The development continued to make a success in 1973 when the National

Aeronautics and Space Administration ("NASA") provided aiding remote medical care by developing Applied to Rural Papago Health Care (STARPAHC) program as medium to transmit information between their mobile facilities and consulting hub (Merrell, 2010).

More practices of Telemedicine continued throughout the years as internet access started to develop throughout the globe which allow telemedicine to evolve such communicating medical information to patients and other physicians without the barrier of distance via video conferencing (Kearney and Santander, 2001). This was further present in the first international conference on telemedicine in 1991 in which speakers addressed the conference's overarching objective, which was to

*"Convene an international, multidisciplinary gathering of experts to discuss the emerging field of telemedicine assess its future directions; principally the application of space technology to disaster response and management, but to clinical medicine, remote health care, and other needs."*

Speakers from a wide variety of professional backgrounds delivered papers and gave presentations throughout the conference. As a result, the meeting inspired the United Nations to adopt a policy and the US Congress to prepare legislation. This increased the interest in telemedicine literature which prompt more conferences to be made in the next three years (Nicogossian, Pober, and Roy, 2001).

Today, many individuals now use electronic communication in their everyday lives. Most individuals manage their life through electronic communication, whether it is texting family and friends, using various social media platforms to reach a wider audience, or being able to book appointments and make purchases. John F. Lovejoy III from the Department of Orthopedics, Sports Medicine and Physical Medicine and Rehabilitation University of Central Florida School of Medicine, Nemours Children's Hospital Orlando, reflected on how technology made a significant influence on medicine. Simple post-operative visits were the first thing the hospital introduced, followed by provider-to-provider consultations, virtual triage of new patients, virtual athletic team coverage, and the

commencement of second opinions. The telemedicine program has consistently developed with the help of senior leadership, pushing the boundaries while designing, failing, thinking, cooperating, and working tirelessly to re-imagine how orthopedic patients are triaged and assessed across the healthcare ecosystem.

Lovejoy III stated that Telemedicine is not to replace traditional medical care but rather to optimized and amplified as it is needed to be used by appropriate patients (in which some sort of basic understanding of technology is needed), healthcare professionals as well as the right clinic or hospital which should be briefed of the system and could maintain, sustain, and provide it. This is clearer than ever now because the COVID-19 pandemic of 2020, although being horrifying and destructive, has shown the utility and significance of telemedicine on a worldwide scale. Telemedicine is a dependable and effective means to continue high-quality orthopedic treatment while keeping patients, employees, and providers safe in such an emergency.

### 2.2.2 Telemedicine Growth

Prior to the COVID-19 pandemic, telemedicine was becoming more prevalent but still made up a relatively small fraction of the total amount of healthcare services offered in OECD nations, accounting for between 0.1% and 0.2% of all in-person visits in Australia, Canada, and Portugal. While most nations allowed the use of telemedicine services, several governments-imposed telemedicine-specific regulations that effectively discouraged its usage (Oliveira, 2020).

Numerous crucial in-person health treatments were either delayed or discontinued as health systems concentrated on the prevention and treatment of COVID-19 and as communities substantially changed their behavior to reduce infections. As compared to the same month in 2019, the number of in-person primary care consultations fell precipitously in May 2020, falling by 66% in Portugal, roughly 40% in Australia, 18% in Austria, and 7% in Norway (OECD,

2021). In-person consultations per capita decreased in seven of the eight nations that submitted data for 2020, with Chile and Spain seeing a 30% increase. In Australia, between early March and early April 2020, there were 38% fewer average daily visitors to hospital emergency rooms than there were during the same time in 2019. Emergency room visits in the United Kingdom were 29% fewer in March 2020 than in March 2019. When compared to March 2019, pediatric emergency department visits decreased from 73% to 88% in Italian regions (OEDC, 2023).

Early in the pandemic, teleconsultations proliferated, somewhat offsetting the decline in in-person health care services. 13.3% of the 15.5 million Medicare Benefits Schedule services provided in Australia for the three months ending in September 2020 were telehealth consultations. In Belgium, there were no teleconsultations at all in January or February of 2020; nevertheless, by April 2020, telemedicine was used for 44.4% of all visits, with a total cost of EUR 238 million paid in benefits. Compared to 1.8% of all ambulatory visits in the fourth quarter of 2019, 73.7% of primary care visits and 63.9% of specialty care visits in Canada were virtually delivered in the second quarter of 2020. In Costa Rica, teleconsultations accounted for one-third of consultations in 2020 (OECD, 2021).

### 2.2.2.1 Common Governmental Actions to Promote Telemedicine

Several actions were done to promote the practice of telemedicine as well as adapting new policies such as:

**A. Relaxing Restriction of Telemedicine Practice**

Nine nations (Estonia, Hungary, Iceland, Ireland, Korea, Luxembourg, Mexico, Turkey, and the United States) permitted medical consultations to be conducted solely in the patient's physical presence, according to an OECD Survey on Telemedicine and COVID-19, before March 2020. Governments and healthcare organizations aggressively implemented

remote care services in the early 2020s in response to the COVID-19 issue that was developing (The OECD Survey on Telemedicine and COVID-19 was sent to OECD countries in December 2021, and responses were accepted until the end of April 2022. A total of 31 OECD countries participated in the survey).

All but one of them abandoned this requirement after March 2020. Seven nations relaxed a rule stating that patients could only have teleconsultations with doctors they had previously had in-person consultations with. Austria, Turkey, and the United States removed the requirement that prescriptions could only be written in the patient's physical presence. Following the pandemic, Estonia, and Turkey both passed new laws and amended old ones to authorize or control the use of telemedicine. Medicare telehealth rules that previously only permitted clinicians in rural regions to offer telehealth have been lifted in the United States. Telemedicine services were made temporarily accessible in Korea at COVID-19's highest alert level.

Only 17 nations claim that the laws and regulations regulating the provision of telemedicine services are well established and unambiguous, despite the fast implementation of policies to promote the use of telemedicine. While this can provide providers some flexibility, it also creates uncertainty among them and might make it challenging for some of them to deliver remote care services. It is challenging for health professionals to offer care for patients outside of Canada due to disparities in licensure criteria for physicians delivering virtual care, which are decided at the provincial and territorial level by regulatory agencies (OECD, 2023).

## B.  Financial Incentive on Telemedicine Practice and Usage

Governments encouraged the use of telemedicine by altering the way that providers are compensated. Since the start of the COVID-19 pandemic, eight nations—Belgium, Czech Republic, England, Estonia, Hungary, Korea, Latvia, and Luxembourg—have started to cover real-time (synchronous) teleconsultations through mandatory programs. Eight nations have started to pay for remote patient monitoring services: Belgium, England, Estonia, Germany,

Hungary, Ireland, Latvia, and Switzerland. Six OECD nations include telemedicine services in the capitated payment to providers, although major consumers in 16 of these nations pay providers on a fee-for-service basis for each distinct telemedicine service they render. Key purchasers in Belgium, Germany, Japan, Portugal, and the United States pay telemedicine service providers using both fee-for-service and worldwide budgets. In addition to providing government-mandated coverage for telemedicine services, numerous nations also implemented financial incentives to encourage the use of telemedicine services. These included raising the price of telemedicine services to make them comparable to their in-person counterparts and adding payment add-ons to separately repay ancillary expenditures (such as technical assistance, equipment, and connection) related to delivering telemedicine services.

The number of nations using payment parity to incentivize healthcare professionals to employ telemedicine jumped to ten after the pandemic began. Portugal distinguishes itself because, starting in 2013, hospital teleconsultations with National Health Service hospitals contracted nationally are cost 10% more than in-person consultations. Before the COVID-19 outbreak, eight nations already had payment add-ons to individually cover ancillary costs related to providing telemedicine services. Three other nations—Estonia, Ireland, and the United States—started covering ancillary costs independently after the pandemic began (OECD, 2023).

## C. Adapting New Policies to Integrate Telemedicine

The number of nations using payment parity to incentivize healthcare professionals to employ telemedicine jumped to ten after the pandemic began. Portugal distinguishes itself because, starting in 2013, hospital teleconsultations with National Health Service hospitals contracted nationally are cost 10% more than in-person consultations. Before the COVID-19 outbreak, eight nations already had payment add-ons to individually cover ancillary costs related to providing telemedicine services. Three other nations—Estonia, Ireland, and the United States—started covering ancillary costs independently after the pandemic began. The number of nations using payment parity to incentivize healthcare professionals to employ telemedicine jumped to ten after the pandemic began. Portugal distinguishes itself because,

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### 2.2.3   Telemedicine and its Challenges

With the offered alternative of telemedicine along with the current of COVID-19 Pandemic, individuals and healthcare-systems are forced to see and adapt to viable models in the rapidly evolving situation as many has started to switch to phone and video consultation. To lessen the burden on healthcare systems, patients have been sent home with tools like pulse oximeters and self-management guidelines. To provide physical separation while monitoring and talking with patients, several hospitals have adopted robots and tablet computers. Many of these modifications will continue beyond the pandemic and be improved upon later. In hospitals in sub-Saharan Africa, for instance, robots that sanitize spaces without human interaction have been developed in response to the pandemic. The COVID-19 pandemic has boosted computer knowledge and access to technology for humans, allowing for greater physical distance. With the removal of these obstacles, telehealth now has a critical chance to reconsider its functions (Wosik, Fudim, Caemorin, et a., 2020).

A study regarding the challenges of Telemedicine during the COVID-19 pandemic in the form of systematic review which was conducted following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) statement has been done in 2022. According to the article, only 27 of the papers are included out of the 1194 identified which were gathered from PubMed, Scopus, Web of Science, Academic Search Complete, CINAHL, Embase, and Science Direct. The study concluded that the barriers and challenges present in telemedicine during the COVID-19 pandemic fall under one of the seven categories which are: 1) Technical aspects 2) Privacy 3) Data Confidentiality and

Reimbursement 4) Physical Examination and Diagnostics 5) Special Populations 6) Training of Healthcare Providers and Patients 7) Doctor Patient Relationship and Acceptability (Ftouni, Aljardali, Hamdanieh, Ftouni, and Salem, 2020).

These challenges also present around the changes in working practice and data curating which can best seen during the pandemic as it enables healthcare professionals to provide service without needing physical presence to hinder further COVID-19 spread. There are also risk in implementing digitalization of healthcare such as poor software engineering as well as data security breach which become a challenge for telemedicine Platforms and providers to be able to provide secure and reliable platforms which still accommodate regulations, law, and healthcare ethics requirements (Agboola, Kvedar, and Target, 2016). Other than that, the lack physical examination needed to diagnose and treat a patient become another challenge. While the spread of medical consultation and consultation could still take place via a digital based communication such as telemedicine application and video conferences, physical examinations that requires observations through the physician's senses which include touch, sight, sound, and smell could not be performed (Bickley and Szilagvi, 2012).

### 2.2.4   The Future of Telemedicine

During 2020 and 2021 height of pandemic, it was shockingly predicted by McKinsey & Co. that virtualization may save the US healthcare industry up to $250 billion, yet how true is this forecast? The company forecasted that Telehealth and Telemedicine. The research states that total telehealth and telemedicine utilization has stabilized at 38 times greater than when COVID-19 occurred, ranging from 13% to 17% of visits across all specialties and holding consistent since June 2020, putting the huge expansion in virtual treatment into context.

Some of the research highlighted that up to 11% surge in telemedicine usage in 40% of the consumers. About 50% of the consumers demanded a wider solution and lower costing virtual care as of per April 2021, more than 84% healthcare

providers especially physicians offer virtual consultations, and more than half the number wished to proceed the virtual service beyond pandemic. Despite indications that considerably increased levels of telehealth may be here to stay, there is concern over the future and whether McKinsey's prediction that $250 billion in healthcare might be virtualized will come to pass. To begin with, it's unclear how telemedicine reimbursement will go when the current public health emergency is over. Furthermore, a poll of physicians found that they demand equal payment for services rendered in person or online; 54% of respondents stated they wouldn't give virtual treatment at a 15% discount to in-person care. Similar ambiguity exists over the future regulatory framework for telehealth (AHA, 2021).

However, whether it is to get through a crisis or to build a long-term digital health solution, it is vital to do study before integrating telemedicine into the current healthcare practice, whether it is for hospitals, clinics, nor physicians to make sure the integration complies with all relevant legal and licensing requirements, be sure to examine state and federal guidelines, regulations, and legislation. Billing and payment system should be supported by regulatory compliance as well and as any new project, flexibility and patience must be exercised since proper implementation and integration will take time. However, the digital integration is well-established, telemedicine offers convenient, high-quality treatment and will enable healthcare providers to refocus on more issues to tackle.

### 2.2.5   Techno-Globalization and Telemedicine

As explained in the theoretical framework, this section will be elaborating the connection between Thomas Friedman's 10 flattener factors in globalization from his book 'The World is Flat 3.0', with telemedicine. The first one being #1 Collapse of Berlin Wall as it symbolized how people from the other side of the wall could join the economic stream, this can be seen in how the developing countries are now joining the develop country in digitalizing their healthcare. The second one being #2 Netscape, with the restriction of face-to-face interactions, internet

browsers usage has been skyrocketing as week as speeding up the digitalization of healthcare as almost everything were forced to become online. The third one #3 Workflow Software: Telemedicine ultimately optimized the IoT and EMT system which program utilized how software could 'talk' to each other and function without the necessity of human interference. The fourth one being #4 Uploading and Open-Source, this example could be seen in telemedicine applications creating discussion forums and blog for generally asked questions regarding common health problems which allow users in uploading and collaborating in an online project.

The next flatteners factor is #7 Supply-Chaining, again due to the restriction of face-to-face interactions, many transactions came into a hold. In this case, patients who already got their consultation and diagnosis through virtual meeting with their respective physicians wished to pick up or buy their prescribed medicine. To help with this issue, healthcare providers such as hospitals, clinics and pharmacies are collaborating and partnering with telemedicine applications. Through these telemedicine applications, patients' prescribed medicine could be purchased and delivered to their own home by using the online app which proved that technology helped to streamline item sales, distribution, and shipping. The sixth factor is #9 In-forming, one of the prime examples of this factor is Google and other search engines which help contributes and distributes a ton of information through out the world especially during COVID-19 pandemic.

*""Never before in the history of the planet have so many people - on their own - had the ability to find so much information about so many things and about so many other people," – Thomas Friedman.*

The last but not least flatteners factor from Friedman's book is the #10 "The Steroids". The steroids in this scenario is personal digital devices such as mobile phones and tablets as it is a) Digital: Currently, almost all analog contents have been digitized which ease manipulation and transmission b) Mobile: Can be carried and accessed anywhere, anytime by anyone c) Personal: In this current digital era, almost every person have their own mobile phone and can own even more than one

d) and Virtual: with the current internet speed, data all over the internet could be processed quickly easily.

# III.   TELEMEDICINE IN UNITED KINGDOM

## 3.1     Telemedicine in United Kingdom

### 3.1.1   History of Telemedicine in United Kingdom

A "stop-start" evolution that has occurred over more than a century may be used to characterize the introduction and expansion of telemedicine in the United Kingdom. Five periods are adequately divided into the establishment and this "stop-start" growth of telemedicine services by Fisk: The first phase spans the years from about the 1840s to the start of World War I in 1914, a period of intense industrial innovation and fast industrial development in a variety of fields, including health and social care. The telegraphic device, which is largely credited with enabling the telemedicine services we have today, was perhaps the most significant invention for the growth of telemedicine during this period. The second phase of telemedicine development in the UK, which ran from 1919, the year the First World War ended, until about 1970, provided little in the way of development incentives. Instead, the emphasis at this time was on defining and anchoring service principles that still apply today, as well as standardizing the duties of doctors and nurses. Telephony was adopted in both health care and social services more broadly in the 1970s because to technology developments, particularly the creation and growth of telephone networks (Jordanova and Lievens, 2021)

Initially used only for administrative tasks, they eventually played a key role in the development and facilitation of several other technological advancements in the field of data storage and transfer, including the adoption and use of electronic health records. It is crucial to highlight, however, that these technical advancements were modest in the 1970s and 1980s due to the NHS

experiencing "institutional stagnation" at the time, as well as the fact that there was still uncertainty around the context of data and its usefulness (Day and Klein, 1983).

In 1992, Scotland launched the first trial telemedicine program in the UK that adhered to the definition we use today, which is the provision of medical services through distance communications. The University of Aberdeen, a leader in the use of video connections to help the paramedics on oil rigs in the North Sea, provided this service. During this period, several telemedicine services also emerged, with an emphasis mostly on dermatology, aged care, education, emergency medical, and mental health. Overall, the introduction, growth, and adoption of telemedicine services remained "slow and haphazard," largely due to the fact that at the time, these services were primarily driven by enthusiasts with a limited understanding of how they might be incorporated into the mainstream of health and social care in the United Kingdom. In addition, industry was driving the development of the technology that would enable and support telemedicine; there was little interaction or collaboration with experts and practitioners in the fields of health and social care, and health professionals were not always equipped with the necessary skills or training to participate in such innovation. Managers of healthcare organizations were reportedly "quite gloomy about the possibilities for a long-term strategy [to telemedicine] being implemented in the long-term (Maclean, Brebner and Norman, 1995).

The Information for Health, Information Management and Technology, and the Acute Services Review Scotland all predicted a greater use of information technology within the NHS by 1998. These reports also helped establish NHS Direct (from 1999), NHS Direct Wales (from 2001), and the Scottish NHS24 (from 2001), as well as promoted the adoption of information technology to, among other things, introduce and expand the use of electronic health records. In reality, telemedicine and telecare solutions have to be consistently taken into account in all health improvement projects, according to an explicit main aim of the NHS Information for Health strategy. The fourth phase in the foundation and growth of telemedicine services in the United Kingdom was signaled by this explicit,

collective commitment to investigate and utilize information technology in health and social care. The NHS, which recently celebrated its 50th anniversary, and the fact that it has generally been successful in delivering free access to a wide range of healthcare treatments through its well-established and coordinated primary and secondary care services were two factors that contributed to the paradigm shift in the adoption of telemedicine in social and medical services during this phase. Additionally, the European Commission was sponsoring different initiatives for investigating telemedicine and telecare at the time, sometimes with partners from the United Kingdom. The United Kingdom was still a member of the European Union at the time. In the devolved countries of the United Kingdom, NHS Direct and its variants introduced "real-time" telemedicine services that responded directly and in "real time" to patients "with an almost infinite variety of concerns," this was facilitated by a 24-hour advice line whereby patients were able to contact a nurse by phone who, in relying on clinical protocols, provided patients with advice. NHS Direct and NHS Direct Wales have subsequently been phased out and replaced with a new NHS111 inquiry service, however NHS24 continues to serve as Scotland's national telehealth and telecare organization. This was deemed necessary because the NHS Direct and NHS Direct Wales proved to be more expensive than practice-based triage services, failed to reduce the overall demand for hospital and general practice services, and failed to reach those who needed medical assistance the most (such as the elderly, minority groups, people from lower socioeconomic backgrounds, etc.) (Barlow, Hendy, and Chrysanthaki, 2011).

Numerous initiatives were launched to address these flaws. For instance, in 2005, the Department of Health published the Building Telecare in England report and the Preventative Technology Funding Grant that accompanied it, both of which aimed to advance and institutionalize telecare and telemedicine in the United Kingdom. To "create the necessary infrastructure to support the development and implementation of telemedicine and telecare applications, including the establishment of a national broadband network and a national NHS Care Records Service to be implemented by 2010," a new organization called NHS Connecting for Health was also founded. In order to allay worries over the effectiveness of

telehealth and telecare, a two-year study effort called the Whole System Demonstrator Programme ("WSD"), the biggest controlled study of its kind, was also initiated in 2008 ((Barlow, Hendy, and Chrysanthaki, 2011).

The WSD followed 238 GP practices and 6191 patients with an emphasis on diabetes, coronary heart disease, and COPD. These services were delivered to a residential population of more than 1 million people over three areas in England: Ne wham, Kent, and Cornwall. The trial came to an end, and the research was released in 2011. Among other things, it showed that telehealth is linked to decreased mortality and emergency admission rates. However, many were unhappy with the WSD findings since they did not more strongly demonstrate the cost-saving benefits of telemedicine, even if this criticism also applied to other studies and activities at the time. For instance, the University of Portsmouth's UK National Database of Telemedicine was founded in 1998, reopened in 2001 as the UK Telemedicine Information Service ("TIS"), and changed its name to the Telemedicine and eHealth Information Service ("TEIS") in 2004, before being shut down in March of that same year. The data from this database was constrained and superficial, essentially only providing project names, host organizations, and the start and finish dates (where known), despite its potential for collecting and delivering detailed information on all telehealth and telemedicine activities throughout the United Kingdom (Steventon, et al, 2012).

### 3.1.2 Telemedicine in United Kingdom during the COVID-19 Pandemic

As we reach the current, fifth stage in the development of telemedicine services, there may be some grounds for optimism, even though the general trend of telemedicine services in the United Kingdom has since remained "a patchwork of initiatives and projects". The development and use of telemedicine services in the United Kingdom, for instance, appears to have more of a clear and steadfast commitment on the side of policymakers, according to Fisk. For instance, under the general heading of "digital health," the 2019 NHS Long Term Plan highlights the

potential of a wide range of technological advancements for health and social care, including telemedicine services and telehealth. The NHS Digital Apps Library was established the same year as this Long-Term Plan for the NHS and is currently under the management of NHSX (the X stands for user experience), a technology-focused unit tasked with overseeing the NHS's largest-ever program for social care and digital transformation. The COVID-19 pandemic has further surpassed these digital objectives, and in particular, the use of telemedicine services including telephone and video consultation and diagnostic services (NHS England, 2019).

*"During the COVID-19 pandemic, telemedicine has emerged worldwide as an indispensable resource to improve the surveillance of patients, curb the spread of disease, facilitate timely identification and management of ill people, but, most importantly, guarantee the continuity of care of frail patients with multiple chronic diseases." - Stefano Omboni*

On March 17, 2020, NHS England issued an order requiring health service providers to support the provision of telephone-based, digital-based, and video-based consultations and to only permit in-person appointments when necessary. The Scottish government had previously announced an accelerated investment in supporting video consultations during COVID-19. These actions led to a rapid adoption of digital technology across the NHS and considerable adjustments in the way health and social care were provided. We'll have to wait and watch what the long-term effects of these COVID-19 regulations will be on the UK's future development and use of telemedicine services (Hutchings, 2019).

But what did the rapid integration of technology into the healthcare industry really means to the UK? Nuffield Trust, an independent healthcare organization in UK helped track and provide analysis from the NHS regarding remote care especially during the COVID-19 Pandemic. Before the Pandemic, remote care via phone service has been happening yet patients are 2% less likely to have their needs meet and 4% felt that healthcare professionals gave them less time thus being understood and recognized less but the pandemic has provided significant shift regarding remote care especially telemedicine efficiency. Despite the decrease of

appointments in general practice during early pandemic, appointments using telephone and online video surged 33% in the end of 2020 (NHS England, 2020).

Despite certain groups feeling slightly less comfortable such as those with specific health conditions and aged 70 and above, 68% of surveyed patients felt comfortable or even very comfortable attending online appointment per August 2020. This also affected General Practitioners as 95% of them have provided remote care and 88% felt that remote care and telemedicine usage should be maintained in longer-term. There might also be a shift in general practitioners' habit of medicine prescription during remote care. As more patients using the remote care and telemedicine application which could also access and purchase their prescribed medicine, general practitioners need to be more cautious as prescriptions were not pick up directly at the clinic or hospital's pharmacies but was rather accessed independently by the patients through the application.

Other than that, referral rates from general practitioners have sky-rocketed, even surpassing pre-COVID-19 which is why clinical conclusions in remote appointments and care need to be more cautious as patients could not be checked directly. The percentage of patients released following telephone and telemedicine appointments decreased from 25% in February to 18% in April, which stayed until the end of September. In comparison to in-person visits, the percentage of remote appointments that require a follow-up appointment is greater. This may lead to a rise in demand for appointments in a system for elective treatment where the waiting list is already becoming longer.

## 3.2    Regulations, Law, and Ethics of Telemedicine in United Kingdom

The explanation makes it clear that telemedicine has not yet "found itself a fully established place" in the NHS or in health and social care in the UK. A few telemedicine services have, however, undoubtedly been included into the different health and social care programs provided throughout England, Wales, and the devolved regions. NICE guidelines, for instance, provide guidance on a variety of telemedicine services, such as

digital and mobile health interventions for behavior change and quality assurance measures for service providers, particularly NHS hospital trusts and independent abortion clinics. NICE guidelines were established in 1999 to help health and care practitioners in their clinical decision-making. However, the accompanying legal and regulatory framework has been fragmented and piecemeal, much like the patchwork of telemedicine services that have come to characterize the technological revolution of health and social care in the United Kingdom to date (NICE, 2020).

Telehealth and telemedicine are not yet covered by any **legislation** or regulations in the United Kingdom. Therefore, telehealth and telemedicine are subject to the same regulations as other health and social care services. Healthcare Improvement Scotland ("HIS"), Healthcare Inspectorate Wales ("HIW"), and the Regulation and Quality Improvement Authority in Northern Ireland ("RQIA") are the respective regulatory bodies with comparable powers and obligations in Scotland, Wales, and Northern Ireland. Health and social care are a devolved matter in the United Kingdom. The Care Quality Commission ("CQC") is the regulatory body for health and social care providers in England. Although it is typically equivalent to and the same in Wales, Scotland, and Northern Ireland, the following explanation concentrates solely on the legal and regulatory framework for telemedicine in England (Ministry of Health, United Kingdom, 2008).

The scope and nature of the duties performed by the Care Quality Commission in England are described in Part 1 of the Health and Social Care Act 2008, which also states that the commission's primary goal is to "Protect and promote the health, safety, and welfare of people who use health and social care services." According to the terms of the Health and Social Care Act of 2008, the CQC oversees and has authority over the delivery of health and social care in or pertaining to England, as well as matters connected thereto, such as the provision of staff to provide such care, the provision of transportation and lodging for those who need such care, and the provision of advice regarding such care. Therefore, the CQC is responsible for and has authority over all aspects of health and social care, including those that are related to physical or mental health, as well as all forms of personal care and other practical assistance provided to people who are in need due to age, illness, disability, pregnancy, childbirth, dependence on alcohol or drugs, or any other

similar circumstances. The CQC, whose mission is to advance the health, safety, and welfare of those who utilize health and social care services, now has control over the complete range and complement of health and social care in England (Ministry of Health, United Kingdom, 2008).

In general, health and social care services are referred to as "regulated activities" with reference to the CQC,74 and Schedule 1 of the Health and Social Care Act 2008 (Regulated Activities) Regulations No. 2936 of 2014 prescribes the types of activities that qualify as regulated activities for the purposes of the Health and Social Care Act 2008's provisions. In relation to telehealth and telemedicine, Section 9 of Schedule 1 is crucial since it says the following:

*"Transport services, triage and medical advice provided **remotely.***

*9. (1) Subject to sub-paragraphs (3) and (4), transport services provided by means of a vehicle which is designed for the primary purpose of carrying a person who requires treatment.*

*(2) Medical advice in cases where immediate action or attention is needed, or triage provided, over the telephone or by electronic mail by a body established for that purpose.*

*(3) Transport services which are provided within the confines of the site or venue being used for an activity or event mentioned in paragraph 4(3)(f) or (g) are excepted from sub-paragraph (1).*

*(4) The provision of an air ambulance is excepted from sub-paragraph (1) where – (a) the aircraft is registered with the Civil Aviation Authority pursuant to article 6 (aircraft to be registered) of the Air Navigation Order 2009(9), and (b) the person providing the air ambulance does not provide treatment to a patient.*

*(5) For the purposes of this paragraph – 'triage' means the assignment of degrees of urgency to diseases, **disorders,** or injuries in order to decide the order and place of treatment of service users; 'vehicle' includes an air or water ambulance."*

Even though the section expressly states that a body created for this purpose may only give medical advice over the phone or by electronic mail in an emergency, the CQC generally believes that all telemedicine provider activities in England fall under Schedule 1 section 9(2) regulation. As a result, the CQC not only serves as England's primary regulatory authority for telehealth and telemedicine services but also effectively regulates telemedicine providers in a similar manner to how they do so for all other providers of health and social care and regulated activities. The CQC released a paper in March 2017 to clarify its current primary care advice by laying out how it wants to regulate digital healthcare providers in primary care. This was done in fulfillment of its legal regulatory powers and obligations. This paper verifies that the five primary CQC quality considerations—whether the service provider is safe, effective, compassionate, responsive, and well-led—apply to digital healthcare providers as well. Additionally, provisions are provided for the registration of digital healthcare providers, the oversight and inspection of their facilities and services, as well as the execution of any CQC decisions and recommendations that call for action on the side of digital healthcare providers (Quality Care Commission, 2017).

Up until November 2019, the various professional bodies representing the health and social care professions in the United Kingdom that oversee establishing the standards of care, conduct, performance, and ethics for their members did not make a distinction between remote and in-person health and social care services. This is in addition to the CQC's regulation of telemedicine providers and services and as stated above. For instance, the General Medical Council ("GMC"), General Dental Council ("GDC"), General Optical Council ("GOC"), and General Pharmaceutical Council ("GPC"), which regulate the medical, dental, optical, and pharmaceutical professions respectively in the United Kingdom, have established standards for good medical practice that are equally applicable to remote and in-person healthcare. Those who are registered to practice in the UK's health and social care sector are required to "prioritize patient safety, protect vulnerable patients,

ensure patients understand how remote consultations work and that there may be limitations on prescribing, obtain informed consent, undertake an adequate clinical assessment, give patients all available options, arrange after care, keep notes, and stay up to date with relevant information," among other things (General Medical Council, 2019).

For instance, the GPC has provided guidelines for licensed pharmacies offering pharmacy services via the internet or at a distance. The GMC has subsequently released general guidelines on remote consultations, including that the consultation must be appropriate, that patients must have all the information necessary to make an informed decision, that patient

s must have the capacity to make that decision, and that healthcare professionals must first obtain a patient's medical history from their primary care provider to ensure continuity of care. The British Medical Association, a trade union and professional body for doctors in the United Kingdom, has also published advice on remote consultations, emphasizing the importance of data management and the safeguarding of confidential patient information, also by ensuring that consultations are conducted using secure internet access and encryption technology (Cooper 2020).

The Medical Devices Regulations No. 618 of 2002, which regulates all matters relating to medical devices, which are defined as instruments, apparatus, appliances, material, or other articles, whether used alone or in combination, and/or together with any software necessary for its application, to diagnose, prevent, monitor, treat, or alleviate disease, or to compensate for, is another set of guidelines and regulations that apply to telehealth and telemedicine. Under the Medical Devices Regulations No. 618 of 2002, a variety of telehealth and telemedicine systems, equipment, and products, including software, digital health apps, or a combination of products and software, may meet this definition of a medical device and be subject to the standards and requirements outlined in the Regulations or as otherwise prescribed by the Medicines and Healthcare Products Regulatory Agency ("MHRA"). A Guide to Good Practice for Digital and Data-driven Health Technologies was also issued by the NHS on January 19, 2021. It outlines the principles the NHS will apply to assess and ultimately determine whether to implement any

telehealth innovations (that is, digital and data-driven technologies) (Department of Health and Social Care, 2021).

## 3.3    Challenges of Telemedicine in United Kingdom

The lack of comprehensive and detailed professional standards, processes, and standards for telehealth is anticipated to become a more pressing problem as telemedicine is relied upon more frequently for the delivery of healthcare in the United Kingdom. As certain US and Canadian governments have shown, telehealth services are subject to strict criteria. One typical example is limiting the reach of remote prescriptions. The Digital Healthcare Act, which aimed to address the nation's future healthcare needs through digitization and innovation, was approved by Germany even before COVID-19. Germany's strategy has been hailed as a role model for other countries due to legislation that ensures significant modifications to its digital health technologies, such as accelerating regulatory approvals.

The lack of a cogent worldwide framework, however, has been emphasized as a danger to the advancement of healthcare innovation as each country implements new policies and legislation to support telehealth. Many times, the absence of international coherence on problems like data, finance, access, and governance prevents the development of digital technology. It is likely that more particular restrictions, either locally or as part of a coordinated worldwide strategy, may be thought to be a reasonable step when the present COVID-19 problem passes, technical advancements continue, and telehealth embeds deeper in the United Kingdom's healthcare system.

# IV.  TELEMEDICINE IN INDONESIA

## 4.1  Telemedicine in Indonesia

### 4.1.1  History of Telemedicine in Indonesia

As part of the Intelsat-funded SHARE (Satellite for Health and Rural Education) initiative, Indonesia conducted the first satellite-based telemedicine experiment and other academic endeavors between 1985 and 1987. The World Health Organization (WHO) and an Indonesian National University reportedly used teleconferences for the first time in Indonesia in 1985. Text files were used to transport the data. Early in the 1990s, Indonesia developed an affordable "Still Picture Transmission by Narrowband Technique" for educational and medical services, which was followed by several laboratory-scale image processing investigations. To conduct experiments on Engineering Test Satellite-Five L-Band transmission and related applications, the Pan Asia-Pacific Region Telecommunication Network for Tests and Research by Satellite (PARTNERS), a collaboration funded by Japan's Myanmar Posts and Telecommunications and run by the Association of Radio Industries and Businesses, was established. PARTNERS members attended video lectures from 1992 to 1997. The ITB's Biomedical Laboratory hosted another telemedicine procedure. For the nation's Primary Community Health Centre (Puskesmas), the research team developed an internet-based telemedicine system. Among the services offered are teleconsultation, basic tele-diagnosis, tele-coordination, tele-education, and medical databases (Suksmono et al., 2014).

Early in the twenty-first century, telemedicine and other fields of business have benefited from the rapid advancements in information technology. Several medical studies on telemedicine were conducted in 2004 despite the government decree on the start of telemedicine practice (tele-ECG) in 2011 (Menteri Kesehatan Republik Indonesia, 2020). The Community Health Centres (Puskesmas) established telemedicine via an internet connection, which enabled, among other

things, teleconsultation, telediagnosis, rudimentary tele coordinating, tele-education, and drug databases. The Padjajaran University Faculty of Health's Research Group created a tele-biomicroscopy in the same year. A microscopic description of an eye condition was transmitted over a wireless communication link in this system. Another experiment was conducted with important patient information transmitted across a communication link while the hemodynamics were impaired. The experiment's results were likewise positive (Suksmono et al., 2014).

PT Telkom, Indonesia's national telecommunications firm, has developed a web-based medical information system for large populations. Another study known as MediFa, which used a videophone to link primary care practices with referral hospitals, incorporated teleconsultation and tele-education. Over the following several years, this technology was enhanced to incorporate wireless application protocol, short message service, and video streaming for use by family physicians. Up until that point, Indonesian engineers had developed an ICT-based e-health system intended for pandemic control. Telemedicine was still evolving at that time. Many e-health prototypes have been created for web-based pandemic management systems and mobile phone-based systems with various communication channels. Teams from the hospital, several health service departments, and the ambulance developed a mobile communications system to assess what equipment was readily accessible (Soegijoko et al., 2011). Up until 2007, mobile telemedicine was developed as a part of a tele-emergency initiative to provide medical treatment in rural regions. In remote areas or at catastrophe sites where the communications infrastructure has failed, a mobile telemedicine system prototype made up of both hardware and software might be quickly set up.

Applications for telemedicine were originally introduced in 2010 as a component of a biomedical approach that incorporated a straightforward block diagram and several disciplines. For teleconsultations across general practitioners and specialists, e-health apps were being developed to offer real-time connections between medical stations and terminals. It can be done to utilize that store-and-

forward to provide a brief report on patient recapitalization at a center for community health care. The development of e-health apps for illness detection in 2011 utilized short message service technology for streaming audio and video data in a mobile environment (Shimizu et al., 2010). An e-prescription system with a mobile e-health system for child and mother treatment was established in the same year to help with patient and pharmaceutical data.

This system's SMS module may send brief messages in a number of different operational modes. In essence, an e-prescription for mobile e-health consists of an SMS software module and a modem connected to a PC-based e-health system. The emphasis on mobile-based health systems has greatly expanded because to telemedicine. As of 2018, the government oversees 18 private online health service applications and seven network-based health care applications. Numerous platforms offer online health services and information, yet only a few of Indonesians have utilized this. A survey conducted between May and July 2018 found that 102 participants, or 67.6% of them, had never utilized an online health care application (Husni et al., 2006).

## 4.1.2   Telemedicine in Indonesia during the COVID-19 Pandemic

The COVID-19 outbreak has sparked a global catastrophe that is straining the healthcare sector in ways that have never been seen before. The health of medical staff and the requirement for personal protective equipment is influenced by hospitals with a large proportion of COVID-19 patients who need urgent treatment. When executing medical treatments, surgeries, technology, and skill may all provide difficulties for doctors. The present COVID-19 conundrum forces doctors to employ technologies they do not comprehend since they are unfamiliar with the current circumstances. Additionally, as healthcare systems across the country prepare for an influx of COVID-19 patients, urgent action is needed to scale up the healthcare infrastructure and modernize healthcare delivery (Ventura, Gibson and Collier, 2020).

During the present COVID-19 pandemic, patients with chronic diseases get care at home as directed by their doctor. Physicians can track a patient's development without needing to see them by using digital technology. Healthcare practitioners must work to prevent COVID-19 patients with chronic illness comorbidities from being hospitalized since these patients may have comorbidities that enhance the risk of the infection increasing. On the other side, telemedicine makes it simpler to manage patient medication while treating chronic illnesses (Orozco-Beltran et al., 2017). Telemedicine is helpful in lowering the frequency of hospital visits and emergency department visits as well. Telemedicine may successfully assist patient self-management, beginning with the prescription of medications, lifestyle changes, and patient emotional management, which subsequently enhances the caliber of patient results. Patients with chronic conditions can avoid the COVID-19 infection that raises the chance of patient mortality by using telemedicine (Guan et al., 2020).

MoH issued Circular Letter No. HK.02.01/MENKES/303/2020 concerning the Organization of Health Services through the Utilization of Information and Communication Technology to Prevent the Spread of Corona Virus 2019 Disease (COVID-19) ("SL 303/2020") in response to the pandemic because the MoH Reg 20/2019 only specifically regulates the implementation of Telemedicine Services between Health Service Facilities in Indonesia. Following the MoH, the Indonesian Medical Council (Konsil Kedokteran Indonesia, or "KKI"), an autonomous, independent, non-structural body composed of a medical council and a dental council, issued KKI Regulation No. 74 of 2020 regarding the Clinical Authority and Medical Practice through Telemedicine.

Both SL 303/2020 and KKI 74/2020 are the government's responses to the need to lessen direct contact between healthcare providers and patients during the COVID-19 pandemic while maintaining access to care through the use of ICT in the form of telemedicine in order to stop the virus from spreading. During the COVID-19 emergency, these regulations give doctors, dentists, specialists, and subspecialists the clinical authority to provide medical services to patients using

telemedicine applications and electronic systems in addition to in-person consultations. According to the applicable laws and regulations, doctors or dentists who perform medical procedures via telemedicine must possess a registration certificate (*Surat Tanda Registrasi*) and a license to practice (*Izin Praktik*) in the health service facilities where the telemedicine is used (Pascoal, 2020).

As explained as well in the introduction, one of the accomplishments was the Indonesian Ministry of Health's release of the PeduliLindungi application, which enables tracking of COVID-19 patients, tests, and vaccinations. Additionally, according to the Ministry of Health's 2020 report, PeduliLindungi has successfully partnered with a number of commercial telemedicine companies operating in Indonesia, including Good Doctor, Alodokter, Halodok, Trustmedis, LinkSehat, Klinikgo, and others (Ministry of Health, Indonesia, 2021). Through these telemedicine applications, Indonesia has been leaping in its telemedicine practice as patients could easily consult physicians on a tap of a finger as well as order and have their prescribed medicine delivered right to their door. Other than that, patients who are not comfortable or confident in going to a visit, could discuss their general condition first before later being referred to physicians with more specific specialties for face-to-face or in-person check up.

## 4.2 Regulations, Law, and Ethics of Telemedicine in Indonesia

Digital health care advances, such shorter hospital travel times, and more convenient access to medical facilities for consultations, enable people make better use of their time. 18 private online health care apps and the seven network-based health service applications that the government manages. Since there are currently only circulars from the Minister of Health, such as Menteri Kesehatan Nomor 20 Tahun 2020 tentang Pentelengaraan Pelayanan Telemedicine Antarfacilitas Pelayanan Kesehatan and Surat Edaran Menkes Nomor 303 Tahun 2020 tentang Penyelengaraan Pelayanan Kesehatan dengan Teknologi Indoenamsi selam Pandemi, there COVID-19. This is when the Badan Penyelenggara Jaminan Sosian (BPJS) and the Minister of Health come into action. With

the use of the Indonesia Case Base Group (INA-CBG) system, BPJS is testing out telemedicine funding for JKN participants' referrals. For both public and private hospitals, INA-CBG is a payment system with a package system that has been developed. It is based on the condition of the patient and the method of funding patient care using cases or diagnoses that are often comparable. In addition, telemedicine financing is being proposed as part of adjustments to the JKN tariff. The INA-CBG has been used at 1,227 hospitals throughout the present JKN era (Deloitte, 2019).

According to the Indonesian Ministry of Health's road map, the amount of supporting health centers for telemedicine programs will be developed during the next five years. The Daerah Tertinggal Perbatasan dan Kepulauan (DTPK) or remote areas and islands are given priority in the Ministry of Health's five-year (2015–2019) telemedicine program plan because they are exceedingly difficult for the general public to reach. 120 tertiary healthcare facilities in the DTPK, often known as "Puskesmas," are the Ministry of Health's top priority for telehealth facilities. The referral hospital's 2015 programming has three supporting hospitals as its goal number. By 2020, there will be 680 health centers that are extremely congested. This telemedicine initiative is intended for undeveloped, borderless areas. If the locality has access to energy and can afford data services using at least third generation (3G) technology, this initiative will be effective (Ministry of Health, Indonesia, 2018).

In Minister of Health Regulation No. 90 of 2015 concerning the Organization of Health Service Facilities in Remote Areas and Very Remote Areas ("MoH Reg 90/2015"), telemedicine is briefly discussed as a support for health services in remote areas, with the aim of increasing the accuracy of and accelerating the provision of medical diagnoses and consultations, as well as other health service facilities, in areas where there are a shortage of qualified health workers. The Minister of Health ("MoH") issued MoH Regulation No. 20 of 2019 concerning the Organization of Telemedicine Services between Health Service Facilities ("MoH Reg 20/2019") to specifically regulate the organization of telemedicine in order to further implement MoH Reg 90/2015, particularly telemedicine services.

In accordance with MoH Reg 20/2019, telemedicine is the delivery of long-distance health services by health professionals using information and communication technology.

It includes information exchange on diagnosis, medication, disease and injury prevention, research and evaluation, and sustainable education of health service providers with the goal of enhancing both individual and societal health. In the meantime, "Telemedicine Services" are defined as "Telemedicine implemented between one health services facility and another health services facility in the form of consultancy to confirm diagnoses, therapy, and/or prevention of diseases." As the title of MoH Reg 20/2019 implies, the rule solely addresses Telemedicine Services between one health services institution and other health services facilities. An object or location used by the federal government, a local government, or the general public to deliver promotional, preventative, curative, or rehabilitative health services is referred to in this context as a "health services facility" (plural "health service facilities"). (Ministry of Health, Indonesia, 2019).

According to the advancement of science and technology, telemedicine services are segmented into tele-radiology, tele-electrocardiography, tele-ultrasonography, teleconsultation clinic services, and other Telemedicine consultation services. To work in the appropriate Health Service Facilities, a healthcare professional providing telemedicine services must be licensed. These categories are used to categorize Health Service Facilities:

1). Healthcare facilities that offer consulting services, i.e., those that offer Telemedicine services. Hospitals that meet the requirements and are owned by the central government, a regional government, or the private sector are considered consultancy-providing health service facilities ("consultancy-providing health service facilities"); similarly, health service facilities that request telemedicine services are considered consultancy-requesting health service facilities.

2) Hospitals, first-level health service facilities, and other health service facilities (collectively, "Consultancy-Requesting Health Service Facilities") are included in this category.

To implement Telemedicine Services, both Consultancy-Providing Health Service Facilities and Consultancy-Requesting Health Service Facilities must meet the following criteria: Resources include (1) people, (2) buildings, infrastructure, and technology, and (3) application. One of the criteria is an application, which can either be given by the MoH

or self-developed. However, a self-developed application has to be registered with the Ministry of Health. The Directorate General under the Ministry of Health, whose duties and responsibilities are concerned with the health services sector, is where Consultancy-Providing Health Service Facilities and/or Consultancy-Requesting Health Service Facilities must register themselves with the MoH as implementing Health Service Facilities. Additionally, the MoH, province health agencies, and regency/district-level health authorities shall offer assistance and oversight on the implementation of Telemedicine Services in accordance with their specialties under the applicable laws and regulations (Pascoal, 2020).

## 4.3    Challenges of Telemedicine in Indonesia

The use of telemedicine poses a number of difficulties, particularly in relation to human resources, infrastructure, and ethical guidelines, even if it can enhance the standard of medical care during a pandemic. The use of telemedicine and its integration into the national health system is still receiving little attention from physicians and health officials at the moment. During the current COVID-19 epidemic, the use of telemedicine by healthcare providers is still restricted because doctors must learn new, challenging consultation procedures. The geographical circumstances of the technology's use also influence health policy-making variables surrounding telemedicine, which restricts its usage in metropolitan regions due to the simplicity of medical facilities there compared to distant locales. For people in remote areas to consult doctors without having to go far, the bulk of current telemedicine policies employ telemedicine in rural and distant locations. Telemedicine is required in the context of COVID-19 when there is a high risk of spread among densely populated regions, such as metropolitan areas. Promoting the use of telemedicine can thus be a top priority in pandemic situations to reduce the danger of transmission through direct human contact (Kichloo et al., 2020).

Infrastructure that can accommodate telemedicine applications is needed for the purchase of telemedicine facilities. The lack of fundamental infrastructure, such as energy, electronic devices, communication tools, and software programs to support telemedicine

operations, is an unquestionable problem in developing nations. Infrastructure, data storage, and eHealth actualization (Smart hospital employing Integrated Management Information System) are all carefully planned out according to a framework called "Five Yearly Developmental Goal" by Deloitte. Additionally, because revenue metrics and insurance reimbursement are complex and have an unknown return on investment, adopting telemedicine in medical operations is expensive. The cost difficulties involved in acquiring telemedicine infrastructure restrain the development of the requisite technologies and, as a result, the use of telemedicine in clinical practice (Kim and Zuckerman, 2019).

One of the issues with telemedicine's promotion is the accessibility of medical records during doctor-patient interactions. Every doctor's office that uses telemedicine is concerned about the privacy of patient data and medical records. The use of unlicensed medicine via telemedicine is the cause of this illness. The expense of resolving ethical issues with patient information for therapy might be substantial. Medical practitioners must tell patients about the limitations put on the application of telemedicine so that they can choose to agree or reject in order to meet these moral quandaries. Clinicians who use telemedicine must also abide by particular norms and legislation in order to assure patients of the privacy of patient data and information (Ventura, Gibson and Collier, 2020).

In addition to the aforementioned, KKI Reg 74/2020 mandates that physicians and dentists who practice medicine via telemedicine evaluate the patient in accordance with their competence and authority. Additionally, the legislation states that doctors or dentists must continue using telemedicine to treat patients even if the evaluation reveals no emergency. The physicians or dentists must, however, transfer the patient right away to a health service facility for direct treatment if the examination does reveal a patient emergency that necessitates diagnostic action and/or therapy. It is essential to remember that, in accordance with both SL 303/2020 and KKI Reg 74/2020, every medical practice carried out by telemedicine must be documented in a medical record by the attending physician or dentist. Each patient's medical record can be created either manually, in writing, or electronically, as a transcript, and stored in health care facilities where telemedicine is being used. The physician or dentist must also maintain the confidentiality of medical records.

Physicians and dentists are not allowed to: during telemedicine practice:

a) conducting direct teleconsultations between medical professionals and patients without the involvement of any Health Service Facilities;

b) giving patients insufficient information;

c) making diagnoses that are outside the scope of a doctor's or dentist's training;

b) asking pointless supporting tests;

e) engaging in any degrading, threatening, or aggressive behavior against patients while providing medical care;

f) carrying out any intrusive actions via teleconsultation; charging prices that are different from or more expensive than those established by the health service provider; and granting certificates of good health.

The clauses of SL 303/2020 and KKI Reg 74/2020 will also be null and void whenever the Indonesian government considers the COVID-19 public health emergency to be over (Pascoal, 2020).

Other than that, digital health and telemedicine applications are still categorized under platform providers which is classified as information technology sector and not the health sector which create some confusion and blurred grey lines as there are still little to no clear law, regulations, and ethics regarding digital health and telemedicine sector as it is a combination of health, technology, and business. Despite the prior regulations, the Ministry of Health has offered a temporary solution regarding the use of telemedicine software to provide medical services between patients and doctors during the pandemic and prevent the virus from spreading. MOH Regulation No. 1787/MENKES/PER/XII/2010 on Health Services Advertising and Publication which also emphasized telemedicine applications as a mean of consultation and not advertising. Other than that, there are several regulations regarding how crucial patient's data and security are stated in MOH Regulations Number 269/2008, Number 36/2020, and Number 29/2004 as well as Medical Ethics (Hakim and Pardede, 2021). Despite this, Expert Staff from

Ministry of Communication and Information Technology, Henri Subiakto, stated that as according to 'Pasal 15 UU ITE' Data security responsibilities fell on the hand of the platform party as the developer of the electronic system (such as Good Doctor, Halodok, Alodokter, Grab Health , etc.) and the government would not assume responsibility or pay for any misused or leaked data from the patient's medical record integrated into the telemedicine application EMR system, which caused some public concern, especially after the Ministry of Health formally partnered with these private telemedicine companies. (Harjono, 2020). On top of that, the Ministry of Health has launched an official telemedicine website from the government that provides tele-radiology, tele-electrocardiography, tele-ultrasonography services and online health consultation in 2019 yet little know about it proving the lack of public socialization and government initiative to promote the service (Hakim and Pardede, 2021).

# V.    CONCLUSION

Patients now have far more options for scheduling general practice and outpatient visits via phone and video because to the COVID-19 epidemic. Concerning trends include rising numbers of new prescriptions and general practitioner's recommendations from distant consultations, as well as a decline in outpatient visits that result in discharge. These elements could interact, increasing the need for treatment and the length of waiting lists. More study is required to assess the effects of the rapid increase in remote care on clinical practice, patient safety, and the capability of a nation's healthcare system.

Getting from the research question proposed, of whether Globalization truly level the playing ground between developed country (which in this case UK) and developing country (Indonesia) and whether developed countries could develop their digitalization of healthcare faster than developing countries especially with the head start. The UK has been introduced to the concept of telemedicine or digital healthcare since the 1840s. It has also issued a mandatory practice of telemedicine and remote healthcare in March 2020 due to the COVID-19 pandemic. Despite its long journey, telemedicine in UK has yet to have an established placed in its regulation and was still rather a patchwork of other regulations. Albeit this, UK has issued multiple new guidelines in line with the practice of telemedicine and remote care and have since getting clearer with the boost of NHS England's 2019 Plan Highlights. On the other side, the telemedicine concept has only been introduced in Indonesia on 1985 with its implementation began on 2010 which is way behind UK. Despite this, Indonesia is aware of its lacking and made a telemedicine spread priorities for 2015-2019 to its rural areas and remote islands. Like UK, Indonesia also introduced numerous new regulations regarding the practice of telemedicine during the COVID-19 pandemic.

So how did both countries do? Despite UK's head start in digitalizing their healthcare, it could be said that Indonesia has faster development. Why so? Indonesia is way behind UK's starting point yet managed to almost catch up with UK in digitalizing their healthcare during the COVID-19 pandemic, mainly in their telemedicine application in which multiple enterprise are officially partnered with Indonesia's Ministry of Health's PeduliLindungi. But what did they do differently in providing telemedicine and remote healthcare? UK has the NHS as their center of telemedicine and remote care provider. Since they have the head start already, they have streamline plan within the NHS already which is boosted by the COVID-19 Pandemic. Yet, due to all the work fell under the NHS, telemedicine in UK has had problem in growing waiting list in their healthcare due to the single body provider in both face-to face and remote health care service. What did Indonesia do different? As Indonesia did not have a proper preparation for the surge of telemedicine usage in the pandemic, their Ministry of Health split the workload by partnering with private telemedicine applications provider. Yet also, despite decreasing the workload for Indonesia's Ministry of Health, healthcare providers are wary regarding how these private telemedicine application providers could have unlicensed recording of patient's private data which will have a probability of data and privacy leakage. Other than, telemedicine practice in Indonesia is held back due to hindered learning of the new system (telemedicine) by healthcare providers (physicians, nurse, pharmacies, hospitals, and clinics).

Therefore, it could be concluded that globalization in some way, does contribute to leveling the playing field between the developed and developing countries. It also can be seen that the head start that developed countries have, does not equal to faster progression and development. But it could also be seen that the COVID-19 pandemic acts as a catalyst to both countries to further the digitalization of their own healthcare in which both countries have their own issues and obstacles to tackle with that has been discussed in the previous paragraph.

**Medical consultations can only be performed in the physical presence of the patient**

| BEFORE | AFTER |
|---|---|
| Korea | |
| Estonia | Estonia |
| Hungary | Hungary |
| Iceland | Iceland |
| Ireland | Ireland |
| Luxembourg | Luxembourg |
| Mexico | Mexico |
| Türkiye | Türkiye |
| United States | United States |
| Australia | |
| Austria | |
| Belgium | |
| Canada | |
| Costa Rica | |
| Czech Republic | |
| England | |
| Finland | |
| France | |
| Germany | |
| Israel | |
| Japan | |
| Latvia | |
| Lithuania | |
| Netherlands | |
| New Zealand | |
| Norway | |
| Poland | |
| Portugal | |
| Slovenia | |
| Sweden | |
| Switzerland | |

**Teleconsultations are only allowed if the patient has consulted the health care worker in-person in the past**

| BEFORE | AFTER |
|---|---|
| Australia* | |
| Czech Republic | |
| Netherlands | |
| Mexico | |
| Estonia | Estonia |
| Luxembourg | Luxembourg |
| France | France |
| Iceland | Iceland |
| Ireland | Ireland |
| Japan | Japan |
| Lithuania | Lithuania |
| New Zealand | New Zealand |
| United States | United States |
| Korea | Korea |
| Austria | |
| Belgium | |
| Canada | |
| Costa Rica | |
| England | |
| Finland | |
| Germany | |
| Hungary | |
| Israel | |
| Latvia | |
| Norway | |
| Poland | |
| Portugal | |
| Slovenia | |
| Sweden | |
| Switzerland | |
| Türkiye | |

**Real-time (synchronous) teleconsultations are covered by government / compulsory financing schemes**

| BEFORE | AFTER |
|---|---|
| Australia | |
| Canada | |
| Costa Rica | |
| Finland | |
| France | |
| Germany | |
| Iceland | |
| Ireland | |
| Israel | |
| Japan | |
| Lithuania | |
| Netherlands | |
| New Zealand | |
| Norway | |
| Poland | |
| Portugal | |
| Slovenia | |
| Sweden | |
| Switzerland | |
| Türkiye | |
| United States | |
| Belgium | Belgium |
| Czech Republic | Czech Republic |
| England | England |
| Estonia | Estonia |
| Latvia | Latvia |
| Luxembourg | Luxembourg |
| Hungary | Hungary |
| Korea | Korea |
| Mexico | |
| Austria | |

**Remote patient monitoring services are covered by government / compulsory financing schemes**

| BEFORE | AFTER |
|---|---|
| Canada | |
| Finland | |
| France | |
| Iceland | |
| Israel | |
| Japan | |
| Netherlands | |
| Norway | |
| Poland | |
| Portugal | |
| Sweden | |
| Türkiye | |
| United States | |
| Belgium | Belgium |
| England | England |
| Estonia | Estonia |
| Germany | Germany |
| Ireland | Ireland |
| Latvia | Latvia |
| Switzerland | Switzerland |
| Hungary | Hungary |
| Australia | |
| Costa Rica | |
| Czech Republic | |
| Lithuania | |
| Luxembourg | |
| Mexico | |
| Korea | |
| New Zealand | |
| Slovenia | |
| Austria | |

Legend: Yes | No | Missing

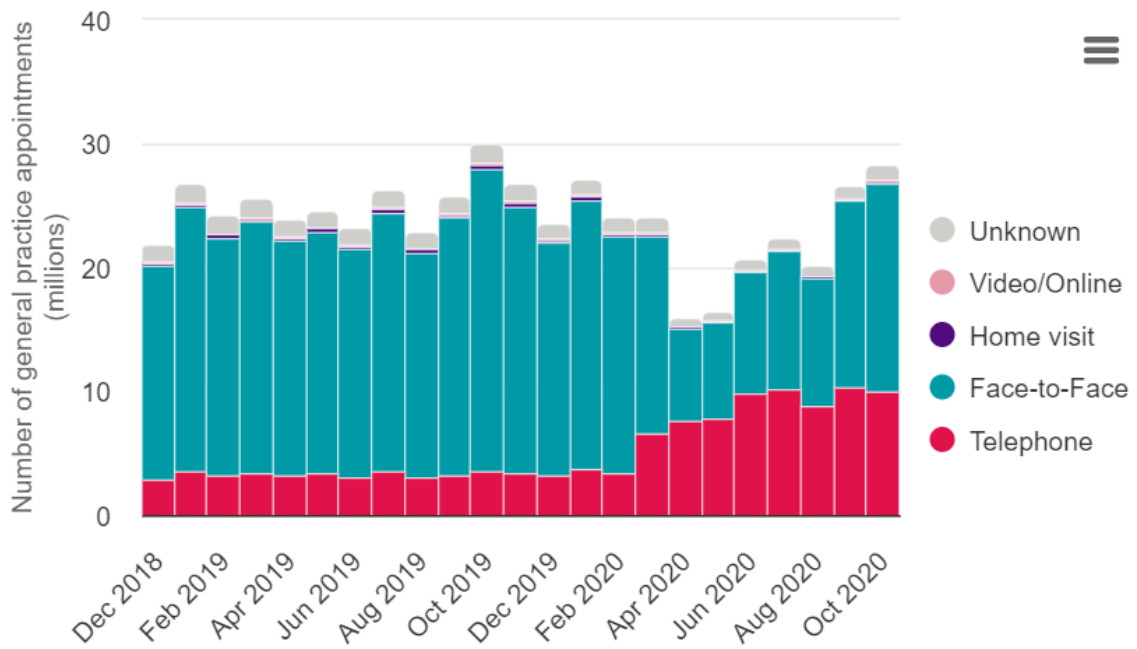*Figure 1 Pre-pandemic restrictions to the use of telemedicine were relaxed in early 2020*

*Figure 2 UK General Practice Appointment Ratio during first wave of COVID-19*