CASE STUDY COLLECTION:

THE IMPACT OF COVID-19 ON THE DIGITAL TRANSFORMATION OF HEALTH AND CARE

EPHA BRIEFING

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About EPHA

EPHA is a change agent – Europe's leading NGO alliance advocating for better health. We are a dynamic member-led organisation, made up of public health civil society, patient groups, health professionals, and disease groups working together to improve health and strengthen the voice of public health in Europe.

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Introduction

The ongoing COVID-19 pandemic, which manifested itself most strongly across Europe at the beginning of 2020 when physical distancing measures and mobility restrictions were gradually adopted in all Member States, is often credited with having accelerated the pace of digitalisation in society. For example, working remotely and online learning via virtual platforms has become a regular feature of life for many professionals and learners.

One of the sectors in which digital technology is said to have been catapulted forward particularly strongly during the pandemic is healthcare. While commonly described as a laggard compared to other economic sectors, media reports indicate that policy reforms were accelerated during the pandemic in Europe and worldwide[1], with a host of new start-ups emerging in the digital health realm.[2] A 2021 European Parliament report[3] confirms that:

> *"The pandemic is redefining how and what care is delivered. Digital tools can provide effective support for institutions during a pandemic, allowing the deployment of novel digital healthcare models at different stakeholder levels – from healthcare and research, to government and general population."*

Indeed, an increase in the deployment of digital health tools has been recorded in a number of European countries and regions, which has helped make digital health tangible to many ordinary people for the first time. In Sweden, for example, the demand for medical teleconsultations during the pandemic has doubled, while in the UK, Spain, and Italy the demand has multiplied by a factor of 30.[1] Among the services and tools that have become more commonplace are telemedicine and telehealth services, as well as mobile health (mHealth) apps and wearables allowing for the collection, sharing and analysis of personal health data, remote monitoring, as well as direct communication between health providers and patients. The pandemic being an international public health crisis, digitalisation has also played a major role in the surveillance and management of COVID-19, with the development and introduction of specialised contact tracing apps at national level as well as EU-wide, interoperable Digital Green Certificates viewed as major steps in containing the virus and supporting the relaunch of international mobility for tourism, leisure and business purposes.

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1 https://www.ft.com/content/31c927c6-684a-11ea-a6ac-9122541af204

2 https://www.euractiv.com/section/coronavirus/news/over-20-of-digital-healthcare-startups-emerged-during-the-pandemic/

3 European Parliament (2021), Briefing - The rise of digital heath technologies during the pandemic, The rise of digital health technologies during the pandemic (europa.eu)

European and national policymakers have taken advantage of the COVID-19 crisis in the sense that the economic, social and societal ramifications of the crisis pushed them to consider the merits and invest in digitalisation in unprecedented ways, triggering major policy initiatives in the digital health realm. No longer a sleeping giant, health is now seen as one of the most important sectors for the introduction and deployment of digital technology – as a way to strengthen and reform health systems, ensure continuity of care, and enable new ways to connect health professional, patients and other stakeholders with one another to improve patient care.

However, there is still very little evidence about the impact of accelerated digitalisation in the healthcare domain on ordinary people (i.e., different categories of end users including patients, healthcare workers and ordinary people). The introduction of digital tools also highlighted some of the challenges that naturally occur during any significant technological transition and will need to be addressed to safeguard the successful integration of digital tools into health systems, which should be among the chief objectives of strategies in this area.

This briefing discusses some of the principal recent developments that demonstrate how digital tools and services are becoming more concrete and valuable for end users during the pandemic across Europe. A few short case studies proposed by EPHA members demonstrate the different ways in which digital tools have been deployed to improve or complement traditional models of (public) health information and care delivery. The paper neither aims to be extensive in scope nor does it provide a comprehensive analysis of lessons learnt from the pandemic with regards to digital health; rather, the examples chosen highlight some potential good practices relating to the introduction of digital tools under COVID conditions while also revealing some of the challenges recorded. Given that the latter may affect people's trust in the uptake and deployment of these tools, it will be fundamental that policymakers, developers and other stakeholders – including civil society - address and rectify them.

COVID-19 as a digital accelerator

Whilst a few European countries (e.g. Italy) were already hard-hit before the WHO declared COVID-19 a global pandemic in March 2020, the quick spreading of the coronavirus across Europe changed the day-to-day work, study and leisure habits of most Europeans quite abruptly. Given the sudden need to continue to operate healthcare services and medical consultations during lockdown, health providers and managers quickly recognised the need to capitalise on the potential of digital technology. Despite marked differences between countries in terms of their eHealth readiness (e.g., investments into

digital infrastructure and skills) new services and tools have been introduced in almost all European countries.

Moreover, the pandemic was a moving target: public health decisions had to be taken quickly and continuously adapted based on the best available evidence. This ultimately resulted in the adoption of different policy responses and coronavirus measures in different countries. Arguably, this fragmented reaction confused and displeased many citizens, especially during the early phase of the pandemic when efforts to create interoperable digital solutions to combat the pandemic were still in their infancy, and people were faced with sudden restrictions on mobility and border closures.

As hospitals and medical practices became increasingly overburdened by growing numbers of acute COVID-19 cases, emergency admissions and patient deaths, the need for physical distancing and self-isolation increased. At the same time, many chronic (non-COVID) patients were faced with uncertainty, partly because crucial prevention and treatment services were disrupted or temporarily unavailable or because they were concerned about physically going to their health provider to seek advice and care. WHO estimates that 90% of countries faced a disruption of one or more essential health services as a result of COVID, with an average country facing a disruption in half of all of its health services.[4] A qualitative study interviewing Flemish GPs reports that in person consultations during the pandemic have declined partially as a result of patients being afraid to contract coronavirus in a healthcare facility.[5]

In light of these circumstances the arguments in favour of digitalising parts of the healthcare sector were quite clear given these technologies' abilities to collect, analyse and process personal health data and to link up people and processes even under the most difficult circumstances. This has also changed attitudes: for example, whereas prior to the COVID-19 outbreak, many individuals and healthcare professionals were sceptical about teleconsultations, the evolving pandemic prompted experimentation with digital solutions among providers and patients and has reduced the fear of contact. To give only three examples: in Germany, due to the introduction of a new eHealth law, health apps can now be prescribed and reimbursed[6] and in France, over 19 million reimbursements were processed for teleconsultations in 2020-2021.[7]

4 https://www.who.int/news/item/23-04-2021-covid-19-continues-to-disrupt-essential-health-services-in-90-of-countries

5 Verhoeven V, Tsakitzidis G, Philips H, et al. Impact of the COVID-19 pandemic on the core funch tions of primary care: will the cure be worse than the disease? A qualitative interview study in Flemish GPs. BMJ Open 2020;10:e039674. doi: 10.1136/bmjopen-2020-039674

6 https://www.bfarm.de/EN/Medical-devices/Tasks/Digital-Health-Applications/_node.html

7 https://www.apizee.com/teleconsultation-at-the-service-of-the-territories/

EU Policy: Shaping a European Health Data Space

At the EU level, COVID-19 exerted a profound influence in policy terms: the newfound recognition of the importance of joined-up public health thinking and the need to cooperate more assertively in the face of severe cross-border health threats led to the creation of a new, standalone EU4Health Programme and steps taken towards the establishment of a European Health Union, which prescribes stronger roles for the Union Agencies (European Medicines Agency, European Centre for Disease Prevention and Control), stipulates the creation of the Health and Digital Executive Agency (HADEA) and many other actions to improve pandemic preparedness, surveillance and management.

Under the 2021-2027 Multiannual Financial Framework (MFF), public health funding received a significant boost, with digital funding particularly well endowed: while HADEA will oversee a budget of over 10 billion EUR for digital-related activities (incl. under the EU4Health Programme, the Digital Europe Programme, the Connecting Europe Facility and Horizon Europe) much larger amounts are available to Member States under the Recovery and Resilience Facility (RRF) and other funding streams to speed up research and deployment of digital health technologies.

Health data occupied a particularly central role in this effort. Policymakers recognise the increasing added value of Big Data and Artificial Intelligence as key elements of health systems strengthening and reform to boost public health resilience, make healthcare services more efficient and cost-effective, and empower patients to play an active part in co-managing their health by facilitating non-discriminatory access to health data.

The successful establishment and enactment of a European Health Data Space (EHDS) is a fundamental objective in the (post)-pandemic context. It is a core element of the EU4Health Programme and thereby also closely linked to the implementation of a number of EU health policy priorities including Europe's Beating Cancer Plan, resolving medicines shortages, tackling antimicrobial resistance, promoting healthy nutrition, attaining vaccine equity, etc., all of which will benefit from vast amounts of quality, comparable personal health data. In addition, many non-health initiatives relevant for public health – from the European Green Deal objectives to smart mobility and the Farm to Fork Strategy – also rely on new ways of data processing and analysis, with the European Strategy for Data anticipating nine common data spaces covering key sectors.[8]

8 European Commission, COM(2020) 66 final

It goes without saying that developments within the realm of digital health itself, including the EU-wide roll-out of Electronic Health Records (EHRs) and ePrescriptions, the introduction of precision therapies based on genomic insights, improved early diagnostics and imaging techniques depend on making personal health data available and accessible.

Closely tied to the development of the EHDS (and integrated into the public consultation launched by the EC in 2021), Artificial Intelligence (AI) has become one of the primary vectors of data-driven healthcare, the goal being to create 'ecosystems of excellence and trust' based on European values[9] to effectively exploit its full potential in the health domain as an important element of Europe's Digital Decade (2021-2030), which provides a guiding vision containing ambitious targets relating to the roll-out of secure and sustainable digital infrastructures, the digitalisation of businesses and the public sector, and improving digital skills among the population10. Crucially, the embedding of AI will enable experts to train algorithms on health datasets.

Whereas AI promises to improve prevention, diagnosis and treatment of diseases, the undertaking does not come without a price: the ethical stakes are high, and as the EC has noted itself, certain AI applications pose "specific and potentially high risks to the safety and fundamental rights" of individuals, which is clearly of relevance from a health perspective taking into account both physical and mental health aspects.[11] Especially in healthcare, creating and facilitating trust is paramount, hence EU actions on AI aim to address various aspects related to ethics, safety, fundamental rights, liability and regulation.[12]

The Commission's proposal for a Regulation on AI[13] exemplifies the European approach, balancing the need to step forward with crucial protections of the health, safety, and fundamental rights of persons, inter alia stressing that algorithms should be used "in a privacy-preserving, secure, timely, transparent and trustworthy manner, and with an appropriate institutional governance". In this context, a study commissioned by EPHA in 2020 concluded that the public health community could learn from the insights of digital rights organisations that have followed the introduction of digital tools in other sectors and are closely following developments in healthcare.[14]

9 European Commission, COM (2020) 65 final, White Paper on Artificial Intelligence – A European approach to excellence and trust

10 For more information, see https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

11 European Commission, CoM(2021) 205 final, p.3

12 European Commission, COM(2021) 205 final, ANNEX, p.31

13 European Commission, COM(2021) 206 final, Proposal for a Regulation laying down harmonised rules on AI (Artificial Intelligence Act) and amending certain Union Legislative Acts

14 EPHA (2020), Data-driven healthcare and the digitalisation of society – the stakes for public health, https://epha.org/wp-content/uploads/2021/02/reflection-paper-data-driven-healthcare-developments-and-the-digitalisation-of-society.pdf

Public health apps: making digital tools tangible

While policymakers and technology developers are taking a rapid leap forward, the EHDS and AI still remain abstract for many Europeans, not least due to a lack of public dialogue about the concrete advantages and risks, pros and cons of the new data-driven health tools and services.

The launch of coronavirus contact tracing apps, and now the so-called Digital Green Certificates (also in the form of an app) are important in this context in the sense that it allows millions of Europeans to gain first-hand experience of applications serving concrete purposes; by linking personal responsibility with public health objectives, the apps provide a palpable way for individuals to engage with digital technology under pandemic conditions. In many European countries, prior to the COVID-19 crisis, the digital infrastructure was not yet sufficiently developed to integrate digital solutions into health systems; apart from a few front-runner countries in which the digitalisation of healthcare was already comprehensive (e.g. involving patient registries and EHRs, online health portals, ePrescription and other offers), in most Member States such developments were either part of pilot projects or disjointed 'add—on' services that only reached certain sub-populations.

The implementation of national coronavirus apps to facilitate contract tracing and other public health purposes provides a particularly interesting picture of the factors at play during rapid digitalisation. A number of lessons can be drawn from problems and opportunities that influenced their adoption, use, current limitations and future potential. These kinds of apps were also among the tools most discussed among EPHA members and partners given their practical role in controlling the spreading of the coronavirus and their reliance on personal data to work reliably and effectively, thereby posing many ethical questions about users' health and safety, privacy and fundamental rights.

Snapshots from the national level: how do digital tools impact on citizens?

Given the need to control the coronavirus as quickly and effectively as possible, it is perhaps not surprising that the introduction of contact-tracing coronavirus apps has so far generated mixed results. While their initial uptake has been good in certain Member States, in most European countries adoption has been relatively slow, development has been difficult and costly, and trust has not been sufficiently built up yet at the population level; in Member States that have deployed them, on average 21% of the population uses a contact tracing app.[15] Among the

15 Mobile contact tracing apps in EU Member States, https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/travel-during-coronavirus-pandemic/mobile-contact-tracing-apps-eu-member-states_en

shortcomings that appear to characterise the introduction of these apps are the following:

- Insufficiently wide uptake among citizens for the apps to work effectively
- Technological flaws compromising their purpose and reliability
- Inadequate communication about their purpose and functions
- Concerns over data protection and privacy
- Low digital and health literacy among certain subgroups of the population
- Unequal access to smartphone technology across the EU

EPHA was interested in these developments widely discussed in the domestic news media of most Member States. To better understand the impact on end users, we asked our members to provide insights from the national level. The annex below presents case study vignettes from six countries proposed by EPHA's members, highlighting different aspects of digitalisation experienced during the pandemic and outlining both strong points and challenges. Most importantly, they demonstrate some of the main effects these technologies – including apps, chatbots, online platforms, EHRs and telemedicine solutions - have had on citizens, which we hope will be important information for policymakers to secure future buy-in and increase trust in digital health solutions aimed at end users.

Conclusion and Recommendations

The examples chosen demonstrate that digital health technologies can quickly make an impact especially under health crisis conditions, and that it is possible for them to make important contributions to safeguarding health service access, as well as ensuring an acceptable level of continuity and quality of care. However, as these solutions do not exist in a vacuum, care must be taken to avoid that they are operating in silos and thereby lose their relevance and meaningfulness.

Based on the examples below, the following observations can be made, which may help inform future policies on digital healthcare:

1. The introduction of digital solutions in national or regional healthcare systems should take a long-term perspective;
2. Digital tools should complement - and not replace - physical, in-person healthcare services;
3. Effective implementation of digital health technology can reduce the strain on health systems, as well as improve accessibility of health services;
4. Adequately informing the population about the purpose and function of digital health technologies encourages their use;

5. The uptake of digital health services is also stimulated by formally integrating them as part of the health system, and treating them the same as in-person services;
6. Shortcomings such as lack of transparency and corruption at government level, as well as 'top-down' introduction of digital tools without meaningful end user involvement creates distrust towards their use; and
7. EU Member States should commit to improving citizens' access to digital technology, as well as digital and health literacy.

Case studies

1) Poland: Chatbot deployment to relieve health system stress

Like in many other countries, the emergence of the COVID-19 pandemic put an enormous strain on the Polish national health system. Worrying about their health and seeking ways to protect themselves from the novel coronavirus, many Poles rushed to call their primary care providers and national health lines, shifting the focus from other health conditions. To relieve the pressure on medical telephone lines, the Polish Ministry of Health partnered with IBM to create a chatbot which has been answering tens of thousands of patient inquiries on a daily basis. The chatbot advises people how to recognize the symptoms of COVID-19, how to protect themselves against the novel coronavirus, and where and when to seek help.

The chatbot was developed in just three days after arrangements with the then Deputy Minister of Health who was tasked with the digitization of the healthcare system, as well as the e-Health Center. It took IBM specialists only a couple of days to launch the chatbot and connect it to the official webpage and the database of the Polish Ministry of Health and the National Health Fund (NFZ).

The chatbot is based on IBM Watson Assistant technology that uses machine learning and natural language recognition to answer questions in a given field. In this case, the information was provided to the chatbot by the Polish Ministry of Health, the National Health Fund and the Chief Sanitary Inspectorate. This included basic information about the course and symptoms of COVID-19, the rules regarding self-isolation and quarantine, as well as advice related to what to do in the event of suspected disease. The assistant also answered questions related to the laws and measures introduced to combat the pandemic. In case of more complex answers, the assistant could refer the questioner to a consultant or direct him to a resource that might contain the desired answer.

Prior to the pandemic, the national health line operated by the NFZ served approximately 2,500 calls, with the number plateauing at 5,000 when

the virus first reached Europe in 2020. Right before the IBM chatbot was launched in mid-March of 2020, the number of daily telephone calls made to NFZ jumped to 41,000. However, after the launch of the platform, the number of calls made dropped down drastically to 15,000 calls a day.

The positive effect of the chatbot was also evident from the number of visits to the official webpage of the Polish Ministry of Health, where the chatbot operated. In February 2020, prior to the first case of SARS-CoV-2 infection being documents in Poland, the website attracted 700,000 visitors a month on average. Just a month later, the website was visited by 3.8 million internet users (430% increase). According to official data, the chatbot answered more than 2.2 million queries related to the pandemic, greatly relieving the pressure put on health authorities and allowing people who really need to access the NFZ health line to access it.

The Polish case thus demonstrates how digital health technology can be used positively to relieve the stress that national health systems might face in times of a pandemic, as well as make it easier for patients to obtain the answers they are seeking. Similar tools could be implemented for other diseases and not only COVID-19, allowing patients to get informed more easily about their health-related concerns.

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https://www.ibm.com/cloud/watson-assistant

https://pacjent.gov.pl/

2) Croatia: Online vaccination platform Cijepise

Like other European countries, Croatia relies on a successful vaccination campaign to stop the spread of novel coronavirus. To make COVID-19 vaccination more accessible and easier to schedule, the Croatian Ministry of Health launched Cijepise – an online vaccination platform where residents of Croatia can register for the vaccine using their personal identification number. Once one becomes eligible for the vaccine, depending on their age and health history, the system sends out an automated e-mail or text message inviting the person to get vaccinated at the government vaccination site closest to their place of residence.

It is important to note that Cijepise serves as a complement and not a replacement for the more traditional approach to vaccination (which relies on general practitioners vaccinating their patients). In theory, the online platform has a two-fold effect: firstly, it makes the vaccines more accessible by allowing people to receive them at an alternative location, thus alleviating the problem of limited availability of vaccine doses at one's primary care provider; secondly, it relieves general practitioners of

the time consuming duty to schedule and administer vaccines and enables them to focus on other patients' health needs.

In reality, however, the platform has been largely non-functional. By the end of April 2021, only 5,358 people out of more than 200,000 who registered on Cijepise since February received the invitation to get vaccinated. Among those who received an invitation, a large number were healthy individuals under the age of 30, who should not have received the invitation yet. Others reported being invited to get vaccinated despite already having received both doses of the vaccine, or being invited to receive a second dose without ever receiving the first jab. Furthermore, the registrations of the first 4,000 individuals who signed up for vaccination through the platform were deleted by the system. Since then, the Croatian government has not published any figures on how many people received the invitation from the platform itself to get vaccinated, but as of October 2021, 45% of the Croatian population has received at least one dose of a COVID-19 vaccine.

To make matters worse, the vaccination platform has come under even more scrutiny due to corruption allegations involving the Health Minister Vili Beros himself. As uncovered by Croatian journalists, Cuspis, the company which was awarded the contract to design Cijepise, belongs to the Minister's personal friend. The same company has also been involved with a number of other large projects since Beros became Health Minister, which have cost the Ministry almost 5,000,000 kuna (around 660,000 euros).

Although Cijepise sets a precedent in Croatia when it comes to the use of digital health technologies, it demonstrates that rushed platforms designed under dubious circumstances are set to be ineffective and might hinder public trust towards the use of government-sponsored digital health services.

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3) Germany: Introduction of EHRs

On 1 January 2021, after 16 years of discussions and preparation, Germany adopted the largest digitalization of its healthcare system by initiating electronic patient health records (elektronische Patientenakte – ePA in German). The aim of electronic health records (EHRs) is not only to improve patient access to their health records, but to enable comprehensive digital connectivity within the German healthcare system. While their use is voluntary, EHRs enable all healthcare providers of a patient to access their health records with the patient's consent. This digitalization of the German health system is in line with the Recommendation published by the European Commission this June, which seeks to make EHRs interoperable across the EU.

In line with the German Social Security Code, EHRs must store data on "findings, diagnoses, therapeutic measures, treatment reports, and vaccinations for cross-case and multi-patient documentation about the patient" of all German residents with a statutory health insurance, which accounts for around 90% of the population. Such data can either be entered by patients themselves without the supervision of a medical professional (for example, self-measured blood pressure or blood glucose levels), or they can be copied into patients' records from a healthcare provider at the request of the patient. Both patients and healthcare service providers can gain access to EHRs using the electronic health card and by entering a PIN. It is important to note that healthcare service providers are able to access their patients' EHRs without the patients, but strictly under the patients' control – this access can be revoked anytime at the patients' discretion. In case a patient changes their healthcare provider, the patient can freely transfer all of the data and medical documentation stored in the EHR to the new provider.

A recent survey done on a representative sample of over 1,000 adults in Germany found that patients have a high interest in accessing their own health information, with over two third of Germans indicating so. However, many healthcare providers and physicians in particular are not so keen on allowing patients to access their medical notes. They argue that doctors' notes are primarily written for doctors in a way that is incomprehensible to an average patient, and that writing these notes in a way that is accessible to patients is too time consuming. On the other hand, allowing patients to participate in the self-management of their own health and medical conditions may expose health practitioners' errors and omissions in medical documentation, which could in turn improve the accountability of healthcare providers.

Germany, however, is not the only EU country which has taken major steps to digitalize its health system and implement EHRs. These steps are in line with the vision set by the European Commission which would see the implementation of a cross-border European electronic health record exchange format in the EU. This would allow EU citizens to securely access

and exchange their health data no matter where they are located in the EU, significantly reducing bureaucratic hurdles.

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4) Malta: Digital contract tracing

During the COVID-19 pandemic, European governments introduced a number of tools and measures to combat the spread of coronavirus, ranging from mandatory mask wearing mandates, total lockdowns, mass vaccination programs and contact tracing among others. Contact tracing of COVID-19 positive cases is particularly useful as it offers the opportunity to identify individuals which might have been exposed to the virus, and direct them to quarantine in time before they are able to pass the virus onto someone else, thus disrupting the chain of infection. On 31 May 2021, EPHA organized a focus group discussion with the Malta Health Network to gain insight into the attitudes of Maltese patients towards contact tracing, and in particularly app based contact-tracing.

Traditionally, contact tracing is performed manually, which requires health workers contacting infected individuals and asking them to provide a list of all of their contacts who are in turn then contacted and instructed to self-quarantine for a specific period of time. However, this process is both labor intensive, and people might not accurately provide all of their contacts. Automated contact tracing in the form of a smartphone app using Bluetooth technology offers a solution to this. Once two phones with a COVID-19 contact tracing app and activated Bluetooth are sufficiently close for an extended period of time (usually 15 minutes), they swap anonymous ID codes. In case a person using a COVID-19 contact tracing app tests positive for coronavirus, they can then anonymously notify all people they have been in close contact with via the app to isolate and get tested.

In the focus group attended by 11 Maltese patients and 2 doctors who were personally involved in developing the national Maltese app, the majority of the group had a positive attitude towards COVID-19 contact tracing apps. More than half of the patients had downloaded the app. Those who did not download the app typically stated that they do not use the app as they have been staying at home since the beginning of the pandemic; yet, even they acknowledged the usefulness of coronavirus

contact tracing apps. App users felt safer with the app installed on their phone, and primary data from Malta suggests that almost 4,000 Maltese residents got tested for COVID-19 as a result of receiving a notification on app.

On the other hand, some limitations were highlighted. One individual raised the issue of data privacy – not knowing what happens with the data, how long it is stored for and who has access to it. Oddly enough, despite manual contact tracing being far more privacy invasive than contact tracing done by digital technology, the **literature on acceptability of COVID-19 contact tracing apps** often cites privacy concerns as one of the main barriers to the use of such apps. Another user complained about an increase in the phone battery drainage as a result of having to keep the app along with Bluetooth constantly active, as well as the interference it causes to other devices using Bluetooth technology, such as wireless headphones.

It is important to keep in mind that digital contact tracing is a useful tool among other COVID-19 prevention tools and measures, and not a silver bullet for the pandemic. To increase the uptake of such technology, European governments should clearly communicate the benefits as well as the potential risks of using contact tracing apps, and what measures have been taken to ensure that user data is protected.

5) Sweden: Increasing regional digital health services

Already prior to the pandemic, Sweden ranked in the top tier of European countries making use of digitalisation similar to its Nordic and Baltic neighbours (e.g., Finland, Denmark, Norway, Estonia). The national vision for eHealth 2025, released back in 2016, reflects this maturity and places great emphasis on end user co-creation, data security and enhancing people's own resources by building up digital knowledge and skills. Among other objectives, eHealth is seen as a means for improving welfare and correcting inequalities of access.

The telemedicine and personal eHealth service application 1177 is a nation-wide platform where Swedish citizens can, both by phone and digitally, get access to their health record, talk with a nurse, order tests and prescriptions, book doctors' appointments and look up symptoms. The tool has seen a dramatic increase in the amount of users during the pandemic: for example, in the Stockholm Region, around 82 % of the population possessed a 1177 user account in 2020, while e-service log-ins witnessed an increase of 154 % year-on-year.

The pandemic triggered further acceleration in the use of digital technology at the regional level. The Stockholm Region added a host of new features to its main digital health app (see below), expanded its overall digital offer and ensured healthcare workers are better equipped with mobile digital technology, which allows them to work more flexibly.

The app Alltid Oppet-1999, which existed prior to the pandemic with a more limited capacity offered by the Stockholm SLS, greatly expanded the number of primary care and specialist providers (including psychiatry and youth clinics) connected to it. It is the main channel for booking digital medical consultations and vaccination appointments. New features including video consultation and chat (real-time and asynchronous) were added, and a particular effort was made to ensure continuity of care for chronic disease patients as a risk group.

As a result of the increased digital offer, downloads rose from 40,000 to over 950,000 in 2020. Future plans to improve the available services include multi-party video meetings to enable healthcare professionals to better collaborate with each other, see groups of patients and their relatives, and have interpreters present during consultations. In addition, the Region is developing virtual waiting rooms with drop-in times and more advanced forms.

Like elsewhere in Europe the roll-out of the Alltid Oppet app has not been an easy ride, with a few flaws having compromised its initial success and trust in its efficacy; nonetheless, after these teething problems were resolved, it managed to succeed. Greater challenges are posed by the need to procure a modern healthcare information environment able to fully exploit the possibilities offered by Big Data and AI in light of an increasingly outdated Swedish IT infrastructure.

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6) France: Telemedicine booths in medical deserts

In France, it sometimes takes people several tens of kilometres to access a doctor in certain rural and semi-rural areas. It is estimated that nowadays around 3.8 million French people, or about 5.7% of the total French population, live in a so-called medical desert – an area without a practicing general practitioner. This number has been gradually increasing every year since 2015, when 2.7 million French people (3.8%) lived in a medical desert. The recent introduction of telemedicine booths in locations such as pharmacies, nursing homes, and town halls across French towns situated mainly in these medical deserts aims to tackle the issue. These booths, as the name suggests, offer remote medical consultations with medical practitioners; as of 2020, such consultations are fully reimbursable under the French social security system.

Apart from having a video camera that allows a patient to be virtually seen and heard by the doctor, the telemedicine booths are integrated with a variety of medical tools such as a thermometer, a tensiometer, a stethoscope, an otoscope, an oximeter, a spirometer, and others. Guided by the doctor, a patient can use these tools alone or might be assisted by another health professional, such as a pharmacist or a nurse who is on-site. Prior to the teleconsultation, the patient is required to answer a short questionnaire about their symptoms and general health status, after which they are put in touch with a doctor. Just like in the case of an in-person consultation, the attending doctor is able to prescribe medication and refer the patient for additional examinations.

The COVID-19 pandemic has popularized the use of medical teleconsultations in France. Between 2018 and early 2020, on average 4,000 to 5,000 teleconsultations were carried out by French doctors each week. However, in February 2020 this number grew to 40,000 teleconsultations a week and by March 2020 it peaked at 1,000,000 in a week. By the end of March 2020, 44% of all general practitioners had carried out at least one virtual consultation. Traditionally, virtual consultations were the most popular among urban citizens in their 30s and 40s, but since the pandemic the use of telemedicine among those aged 50 and older has grown rapidly, with 20% of all teleconsultations being done by those aged 70 and older (compared to only 8% in 2019).

The majority of French doctors and patients believe that the growing use of telehealth has a net positive impact on national health. 88% of French patients were satisfied with the quality of their virtual consultations in 2020, as well as 78% of health professionals who hosted these consultations. More than 70% of the population is also willing to book a teleconsultation with a medical practitioner, which is one of the highest acceptance rates in Europe. This success would not have been possible without the French government's decision to treat teleconsultations equally to physical consultations under the social security system.

Undoubtedly, the increasing use of medical teleconsultations is expected to improve people's access to healthcare services and reduce wait times, thus alleviating some of the problems caused by the growth of medical deserts. However, teleconsultations should complement and not completely replace physical consultations.

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