

HOW CAN AN AI SUPPORTED, SELF-ASSESSMENT TOOL RAISE STANDARDS OF DIGITAL HEALTH SERVICES DURING COVID-19 EMERGENCY?

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Abstract It is understandable that digital health services are now being developed in the context of a global emergency. However, it is crucial that standards are in place for these services to support their operation in a way that accommodates common interests and objectives and recognises the level of their importance for all stakeholders involved (including service recipients or users). We believe that it is necessary to establish and maintain quality standards for digital health products and services in these conditions. Furthermore, even after the pandemic, the need to integrate digital health services into traditional health and social services will remain a priority. Therefore we consider whether multi-criteria, self assessment tools, supported with artificial intelligence, can raise standards of digital health services that are rapidly developing as a consequence of the COVID-19 pandemic. We believe that such digital services are no longer just an alternative form of health care. It follows that frameworks for the development of standards, accreditation and regulation must also be included as national (or supra-national) priorities. These will help ensure not only technological but also service quality.

Keywords:

digital health, telemedicine, standards, remote health, telehealth, eHealth, AI, assessment tools.

1 Introduction

In the light of the current COVID-19 pandemic, vulnerable groups that include some older people and chronic patients are increasingly likely to be the recipients of remote medical treatment and where procedures and service protocols need to be in place, enshrined where necessary within standards.

To improve the situation within the health domain and to raise the quality of such digital health services we are introducing the possibility for the researchers and developers to have their work guided by standards - as a result of which the products or services in question are more likely to be useful and accepted by end users (whether or not patients) and by both health and social care workers. The standardizing tools in question can help companies and other providers to decide how they will fine tune their developments and innovations for a more efficient result and product or service success.

To benefit end users who should always be at the centre of health innovation, the International Code of Practice for Telehealth Services (ICPTS) and an accompanying multi-criteria tool for standardizing such services has been developed. The scope is being explored, furthermore, for the tool to be enhanced through Artificial Intelligence (AI) whereby the careful and confidential analysis of end user data can underpin the assessment of end user well-being and potentially predict the outcome of certain service interventions.

2 Supporting the development in eHealth

Many strategies for health services currently give insufficient attention to the potential role of standards and regulation. But standards are increasingly necessary. Often high service costs and the uncertain outcomes of the COVID-19 pandemic mean that those in practice or undertaking research are aware that digital health services are not only an option - but are both necessary and here to stay. What, therefore, are the regulations, strategies required to shape the development of such services and the standardizing tools can be applied?

3 WHO Global Strategy on Digital Health 2020-2025

The World Health Organization (WHO) recognises a three-tier approach to digital health service provision. It focuses on enabling countries to plan, adopt, and benefit from seamless and secure technologies that provide effective clinical and public health solutions in order to accelerate the achievement of the health and well-being related sustainable development goals (SDGs). This means leaving no one behind (whether children or adults, rural or urban) with digital solutions to improve their health and well-being. The three tiers are (1) Decision makers - who support and ensure, at local, regional and national levels, the safe and ethical use of technology; (2) Providers - who support and enable the training of providers to use digital technologies to effectively deliver health benefits; and (3) the wider Population - who will experience improved health and well-being through digital health.

4 EU4Health programme 2021 - 2027

The European Commission is committed to the further development of digital health services. This is clear from an exploration of the strategies developed and the financial commitment announced recently by the EU. A wider digital transition is considered as a key to Europe's future prosperity and resilience. And as part of the next long-term EU budget the Commission has proposed the Digital Europe programme - to help accelerate economic recovery and drive the intended digital transformation. The digital transformation of health and care is part of this and will improve the well-being of millions of citizens so that they can more readily play a part in the recovery.

In digital health, the use of advanced computer sciences (for example, in the fields of 'big data', genomics and AI) plays an important role in strengthening health systems and public health, increasing equity in access to health services, and in working towards universal health coverage. To ensure the effectiveness of the digital transformation of health and care (in improving the well-being of citizens) key factors are noted as including: interoperability of systems and technologies; overcoming market fragmentation of health systems; securing access to digital health solutions and quality health data; and ensuring citizens can

trust the digital solutions in question (e.g. in relation to the safeguarding of their personal data).

5 eHealth in the context of COVID-19 and Digital health opportunities

In order to advance new digital technologies in health care towards personalized medicine, AI, data analytics and high-performance computing are essential. The digital transformation of health and care, however, requires investments to leverage the potential and help ensure better health and care outcomes. But, overall, in the situation brought about by the COVID-19 pandemic, policy makers and other stakeholders should recognise that technology that works for people requires deployment in a way that makes a real difference to people's daily lives (i.e. not just in respect of health outcomes) as well as respecting European values.

6 Use of AI in digital health

The European Commission's approach to AI is one that seeks to ensure trust. This, in turn, requires the data on which it is based being high quality, inclusive and specific to its role (a matter covered by the European General Data Protection Regulations (GDPR)). The approach deals with technological, ethical, legal and socio-economic issues, attention to which will help to boost the EU's research and industrial capacity - putting AI and robotics at the service of European citizens.

AI, in fact, has become an area of strategic importance and a key driver of economic development. It can bring solutions to many societal challenges ranging from treating diseases to minimising the environmental impact of farming. However, socio-economic, legal and ethical impacts have to be carefully addressed. Machine learning (a key element of AI) denotes the ability of software and computers to learn from their environments or from very large sets of representative data. The outcomes of that learning enables systems to adapt their behaviour to changing circumstances or to perform tasks for which they were not originally explicitly programmed.

To build robust models at the core of AI -based systems, high-quality data is necessary. In the light of these factors all developers and providers of digital health should involve end users in all key aspects of product or service development. The ICPTS and the online self assessment tool can help in this, especially when backed up by accreditation.

Examples

Over the next decade AI will transform the medical world. Deep-learning algorithms will aid (and are in some cases already aiding) the development of new drugs; interpretation of medical images; the cleaning up electronic patient charts; and much more. In fact, it can be understood that AI and digital health are, in many respects, made for each other. Digital health looks for digital solutions to promote the health of the body and the mind; AI attempts to reproduce feats of the mind in digital form. Digital health is the matter; AI is the mind. Consumers, health service providers, government regulators, and funders of startup companies are all coming to recognise this. The union of AI and digital health, in fact, will upend much of traditional health practice - from how we undertake blood tests; to how we monitor chronic conditions; and to the relationship we have with our doctors.

Despite fears that machines carry the potential to displace humans, most experts believe artificial and human intelligence will work synergistically. The bigger concern is, in fact, a shortage of people with both biomedical knowledge and algorithm-building proficiency. If this workforce challenge can be resolved, the key to creating successful AI applications then rests in large part on the quality, quantity and usage of data.

7 Self assessment tools and standards in digital health - *Example of good practice - International code of practice for telehealth services*

One of the models we are researching is the ICPTS, which is a multi-criteria tool for standardizing remote health services. It was developed by Telehealth Quality Group (TQG) through the work of Malcolm Fisk and Drago Rudel. The TQG is continuing to develop the Code of Practice within the International Society for

Telemedicine and eHealth (ISfTeH) with support of Friederic Lievens and other experts within the ISfTeH Standards and Accreditation Working Group. The TQG is a European Economic Interest Grouping (EEIG) that was established on completion, in 2013, of the European Commission funded TeleSCoPE project (EAHC 2009 11 11). It works in partnership with Global Community Resourcing (Australia) and, from 2020, within ISfTeH. The ICPTS provides quality criteria against which eHealth, telemedicine and remote health services can be assessed and certified. Importantly, it addresses health both in its clinical and well-being senses. In being located in the preventive and public (rather than clinical) health space, it emphasizes the benefits for service users and the way in which services are provided. It includes the quality planning guidelines set out in ISO / TS 13131 (2014), meaning that a service certified in accordance with the Code also meets the requirements of the technical specifications ISO / TS 13131 (the guidance standard of the International Organization for Standardization on Health Informatics - Telehealth Services).

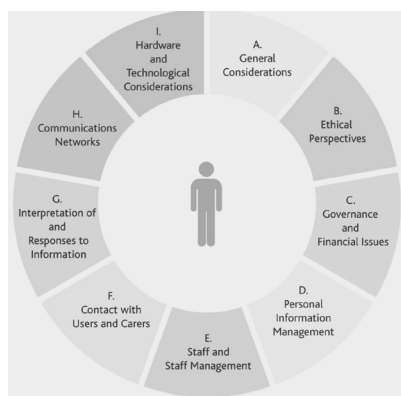


Figure 1:Fisk M., Rudel D., International Code of Practice for Telehealth Services: Framework and Focus

The Code contains nine areas, as shown in Figure 1. The central position of the person using the service symbolizes their importance and their freedom to decide on services and service options. A premium is placed in the Code of Practice, therefore, on services respecting (older) people's rights and dignity; and agreeing with users specifically on matters such as how their personal data, including health data, is collected, stored and used.

8 Conclusion

Prior to the COVID-19 pandemic, European Member States had started to digitalise their health systems and health data. The COVID-19 pandemic has highlighted the role of data and digital technologies for health, and such technologies have been a key part of the response. For example, to support the Member States in their efforts to develop national contact tracing and warning apps, the Commission adopted an EU toolbox and guidance principles for the use of mobile applications for contact tracing in spring 2020.

Other measures responding to the COVID-19 pandemic have included supporting the resilience of health systems through the adoption of digital health (including tele- and video-consultations) and enhancing service speed and effectiveness in many other areas. The pandemic shone a bright light on the potential of data and digital technologies to tackle wider challenges such as the rising burden of preventable diseases; multi-morbidity; health workforce shortages; the growing threat from infectious diseases; the need for rising public spending on health and long-term care; and demographic change.

Securely linking different health data sets such as those mentioned above, is an important step towards creating sufficient volume of information from service users for health and care to fully realise the benefits of new technologies through the use of high-performance computing, data analytics, computer modelling, and AI. This will pave the way for new applications in the field of health and care, such as digital twins, which have the potential to enhance early detection and prevention, and enable the discovery of powerful new diagnostic and therapeutic approaches.

Can AI tools raise standards? The raising of products and service quality happens due to the setting of benchmarks in relation to what represents quality digital health products and services. Standards and codes of practice provide a framework by which quality goals can be achieved. How successful, useful and health improving products and services can be will, to a certain extent, depend on these. If a company or a startup is planning, therefore, to develop a digital health product, or if a hospital or a care centre is implementing a new service, they can use an international standard such as the ICPTS and the assessment tool

to help appropriate development. The products and services developed with the support of such a tool will also prove to be more beneficial for the end user as an individual, as well as at the level of society at large, when properly implemented within the framework offered for the development of such digital health services.

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