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Electronic and Mobile Health

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The European Medical Students´ Association (EMSA) represents medical students across Europe. We envision a healthy and solidary Europe in which medical students actively promote health. EMSA empowers medical students to advocate health in all policies, excellence in medical research, interprofessional healthcare education and the protection of human rights across Europe.

Executive Summary

EMSA recognises that Electronic and Mobile Health holds the potential to revolutionise the way we perceive medicine. We believe eHealth to hold immense potential in the endeavour towards a more equal healthcare system by making healthcare more accessible regardless of geographical location. However, the use of telemedicine raises important ethical questions regarding data security and patient privacy. Electronic Health still faces legal uncertainty and concerns in regard to data protection. There is a lack of adequate support for the necessary training of medical staff, qualitatively good technical infrastructure as well as financing and reimbursement models for electronic health services.

EMSA identifies key pointers for the successful implementation of Electronic and Mobile Health across Europe:

- **Build trust in society** by being actively involved in the dialogue concerning eHealth alongside all relevant stakeholders, including students' organisations, to ensure that solutions are centred around healthcare professionals as primary users of this new technology and facilitate patient empowerment.
- **Provide legislation and practical support** that clarifies that the patients are the owners of their data and thus must always be granted convenient access to it, they can see what data that is being collected and with whom it is shared and the fact that no data is shared without their consent. Regulations should be closely monitored, and healthcare professionals should be educated in good data practices.
- **Provide educational support** at the medical school level by integrating digital literacy as well as specific training as part of core medical curricula to ensure that future healthcare professionals are able to use the technological advancements now being implemented in healthcare systems.
- **Develop financing and reimbursements models for electronic health solutions** that are based on scientific evidence of cost-effectiveness and patient benefit, providing the means for healthcare professionals to implement telehealth applications in their practices, including the possibility to explore telecommuting.
- **Continue to standardize the regulatory environment** for electronic health products and services, medical devices and applications concerning data protection, security regulations and liability questions.

Problem Statement

Electronic Health, or eHealth, denotes the use of digital tools and services for health including electronic health records, telemedicine, e-Prescription and Mobile Health (European Commission, 2012) as areas of application. Mobile Health, or mHealth, as another widely used term, is defined as „medical and public health practice supported by mobile devices, such as mobile phones, patient

monitoring devices, personal digital assistants (PDAs), and other wireless devices" (World Health Organization, 2011).

EMSA believes eHealth to have the potential to meaningfully improve healthcare and the way we practice medicine. Digital solutions might pave the way to generally enhance the quality, accessibility and affordability of health services (World Health Organization, 2019), which would be advantageous to medical professionals, the healthcare professionals and patients alike. This includes advantages such as the provision of more accurate data for research (Van Velthoven et al., 2016) and diagnostics (Martinez-Sarriegui et al., 2011). Additionally, such technologies can provide for better coordination of care-delivery, expansion of range regarding care-delivery with consequently improved healthcare in rural areas as well as a shift of tasks and responsibilities within the health workforce with potential beneficial implications on the bureaucratic process. For patients specifically, digital solutions are thought to increase patient empowerment (Lupton, 2013) and safety (European Commission, 2007; Schneider, 2015). Telemedicine, which is the practice of medicine using technology to deliver care at a distance, enables the bridging of existing geographic issues while ensuring safety for the patients, making it a valuable complementary tool in healthcare.

Despite the rapid increase in digitalisation due to the COVID-19 pandemic, the implementation of digital solutions still advances slowly in clinical settings (Ross et al., 2016) as well as in national health systems (World Health Organization, 2019). The European Commission recognises interoperability and lack of standardisation as major obstacles (European Commission, 2012). Further important challenges are widespread concerns of insufficient data privacy and security. Questions of legal liability arise, financing and reimbursement models are yet to be implemented and technical infrastructure in remote areas need to be improved upon to enable the implementation of eHealth. More evidence regarding cost-effectiveness and patient benefit of applications is required in some areas (Goldstein, 2014). Furthermore, existing gaps between the demand of health workers to become professionals in digital technologies for healthcare and existing competencies of future healthcare professionals mark an important obstacle for successful functionality (European Medical Students' Association, 2019).

Our View. Aim.

Outstanding benefits from complementary e&m-Health applications

Applications of electronic health have immense potential of profoundly revolutionising healthcare in almost every field. Generally outpatient treatment can be most noticeably positively impacted by eHealth solutions. Telemedicine enables the bridging of existing geographical separations, personalised medicine and sustainably improves basic medical processes and may therefore be regarded as a valuable complementary tool in healthcare. Several studies have shown patient benefits of telehealth applications for specific groups (Polisena et al., 2009; Schmidt et al.,2010; Müller, 2016) as it likely

facilitates not only the patients' safety (European Commission, 2007; Schneider, 2015) but furthermore their empowerment (Lupton, 2013) in a way that they can actively self-manage their treatment. Research has already suggested that mHealth solutions can improve the management of some of the most common chronic conditions such as Diabetes (Polisena et al., 2009), chronic heart disease (Polisena et al., 2009) and non-acute headaches (Müller, 2016). One study also showed that routine visits can be made more time efficient by using telemedical applications (Appelgate et al., 2013).

Additionally, eHealth makes it possible to gather more and better data for diagnostics (Martinez-Sarriegui et al., 2011) and research (Van Velthoven et al., 2016).

By bridging distances, seeking medical support would be simplified for patients who may not prefer to visit or for whom it would take a lot of time or effort to come to medical practice. Patients using digital means or mHealth can stay in contact with trusted family doctors, thereby facilitating the development of the "navigator role" of family doctors in the healthcare system suggested by EMSA in its Primary Healthcare policy paper (2015b). Telemedicine making the act of travelling mostly obsolete, can, provided technical infrastructures improved, be used to increase healthcare provision in rural areas. Additionally, healthcare professionals can also benefit from interoperable telemedical applications which potentially lessen their bureaucratic burden, improve time efficiency (Applegate et al., 2013) and open the possibility to tele-commute. Healthcare professionals in different places can easily discuss patients on a level of high expertise, no matter where they are primarily located, and may therefore provide support in clinical decision making or diagnosis.

Nevertheless, it must be recognised that telehealth solutions are limited and cannot replace personal encounters between patients and healthcare professionals. Telehealth cannot substitute for a doctor conducting a full body examination, including inspection and dialogue, or simply noticing the patient's walk and handshake, which can all provide essential information for confirming the correct differential diagnosis and choice of treatment. Adding to this, it has been suggested that patients prefer in-person encounters with healthcare providers due to the more intimate nature of such visits (Lupton, 2013). Taking these aspects into consideration telemedicine may be a proper tool to manage known conditions and maintain a trustful relationship but, conceivably, makes it more difficult to build them up, communication that does not take place in the same room or potentially being time-delayed allows for more miscommunication and impairs the quality of dialog. It also has to be stated that more evidence of cost-effectiveness and patient benefit of applications is still needed in some areas (Goldstein, 2014).

Lack of trust, liability questions and legal uncertainty

eHealth still faces major challenges concerning, missing incentives and liability questions. The European Commission recognises interoperability and lack of standardisation as the main obstacles (2012a). Consequently, digitalisation in healthcare is noticeably lagging behind when compared to other sectors. Nevertheless, innovations in prevention, diagnostics, therapy and administration already play

an essential role in the healthcare sector, with the usage of digital tools and services for health still only emerging.

The willingness to rely on electronic health services may be restrained as questions concerning liability seem to still remain unsettled or uncertain, partially due to the little information provided. The 2008 study report "Legally eHealth" found that "generally European law provides the Member States with a significant number of harmonised answers and solutions [regarding electronic health solutions]", however, it also found "a lack of legal certainty amongst health actors" (European Commission, 2008). Regarding defective products, Council Directive 85/374/EEC establishes the principle of no-fault liability for damages caused by them. For cases where no such link exists, national law of a member state applies. Even though a considerable amount of legislature exists, the general public's understanding and literacy of it appears to be insufficient.

Deficit of financing & reimbursement models

There is a notable lack of financing and reimbursement models for electronic health services. The commission Staff Working Document (European Commission, 2012b) finds that while the Cross-Border Directive (European Parliament and Council, 2011) establishes that telemedical services across borders have to be reimbursed in the European Union by principle, it is the competence of EU Member States to define a reimbursement model within their national health policy. According to a report by the World Health Organisation (2016), nineteen EU Member States currently have legislation or policies in place that define medical jurisdiction, liability or reimbursement of eHealth services. Nonetheless, this legal implementation process is proceeding slowly, with many European countries facing the issue of justifying significant expenditure while the respective legislation is still pending. The ensuing legal uncertainty and the lack of regulatory harmonisation add to the problem, making reimbursement of eHealth services from the public budget still rare and largely reliant on project-based sourcing.

The consequences of increased costs for patients, a lack of incentives for healthcare providers to integrate electronic health solutions in their practices and no stimulus for Information and Communication Technology (ICT) health providers to develop a sustainable health model based on new ICT (Fleischmann-Hillard International Communications, 2010), show how much these financial uncertainties inhibit the sustainable implementation of modern eHealth applications in Europe.

Users of mobile health services are currently typically being charged for the associated costs. In other examples, they can use them without monetary expenditures, but in exchange for their health data: In July 2016, the insurance company Generali started to offer lower rates for customers who tracked their fitness with mobile devices and exercised regularly (Generali, 2016). An incentive for physical exercise and a healthier lifestyle is thus created, which comes at an expense for customers who are unable to live up to these implicit requirements due to health limitations, their financial situation or other issues. Furthermore, this method may be used as a tool for health insurers to practice positive risk selection as the insurer attracts more customers that are already very fit, while not providing equal offers to

patients who suffer from chronic diseases or multimorbidity. It needs to therefore be recognised and ensured that patients are self-determined regarding their own health data and need to be informed and give consent to their data being confidentially processed.

Concerns about data privacy & security

Widespread concerns of insufficient data privacy and security are generally an important issue that shall never be neglected. It must be acknowledged that electronic patient summaries, health records, and prescriptions promise to improve efficiency and patient safety in the healthcare sector. mHealth is, therefore a key element in the efforts to form a more efficient, connected and future-proof healthcare system. Although electronic and mobile health approaches' success depends greatly on the considered use of data, the vast gap between chances and challenges of electronic health is exemplified in it.

Currently, patients have to remember and retell their history almost every time they visit a new healthcare provider. In practice, much is forgotten, misheard or mixed-up. Multimorbid patients with chronic diseases often visit multiple specialists, and the transfer of data between them can and should be improved. EMSA recognises in its policy on Cross-Border Healthcare that the transfer of electronic health data may be particularly beneficial in cross-border settings, when communication is difficult (2015a).

Personal healthcare information is the most personal and private kind of data, especially when it comes to end-of-life decisions. It is also very valuable, as shown in the United States, where "medical bills are the biggest cause of bankruptcies" (Konish, 2019), health records are reported to be twenty times more valuable than stolen credit card data (Humer and Finkle, 2014). They can potentially be misused by current or future employers, insurance companies and others. In times of massive data breaches, it is necessary to establish new trust in data privacy within society. A study conducted by the Canadian government (2010) has found that, while the general receptivity towards the idea of converting records from paper to electronic has grown, a majority of patients insists on keeping the records strictly between patients and treating healthcare professionals.

eHealth literacy

Even in an increasingly digitalised healthcare system, eHealth literacy is not yet fully established in our society. According to a European Commission survey, around six out of ten EU citizens have used the Internet to search for health related information, eight out of ten people thought the information they found online was useful, but 40% did not think the information came from a trustworthy source (European Commission, 2014). The growing use of the internet and social media for health information makes EU citizens more vulnerable to misinformation as the internet and social media contribute to its spread (Lewandowsky et al., 2012). However, the more informed someone is, the more enabled they are to curtail the spread of misinformation and the safer they feel to confidently navigate through the ever-growing amount of data and opinions. EMSA thus acknowledges the need for large-scale eHealth literacy campaigns and effective mechanisms against the spread of misinformation.

In order for eHealth to be well implemented into a healthcare system, future healthcare providers must have the necessary eHealth skills to deliver and operate safely in the digitized healthcare environment (Brørs, Norman, & Norekvål, 2020). As future healthcare professionals, it is necessary for medical students to be eHealth literate and have skills to navigate their workspace. However, an EMSA survey showed that the majority of European medical students (53%) considered their eHealth skills as 'poor' or 'very poor', even though 85% agree or strongly agree to eHealth being more implemented in the medical curriculum (Machleid et al., 2020). In order to narrow this gap, revisions are necessary to the medical curriculum. EMSA therefore recognises its policy on digital health in the medical curriculum and supports relevant stakeholders, principally European medical faculties, in the effort to enhance future healthcare professionals' eHealth literacy and implement eHealth literacy courses as a vital part of the medical curriculum (European Medical Students' Association, 2019).

<u>Beneficial synergies through the COVID-19 pandemic</u>

With the emergence of the COVID-19-pandemic, telemedicine rapidly advanced and now plays a vital role in everyday medical care. Regarding the question of further implementation of eHealth applications, the modernisation of medical care was less weighed against issues of liability and reimbursement but rather against the spread of a potentially deadly disease. Many countries have in this regard relaxed their regulations on eHealth services for the sake of tackling the pandemic (Tebeje, 2020). Consequently, a variety of mHealth systems emerged which had to be developed and refined rapidly while simultaneously being already used by patients and healthcare providers. It is nowadays considered that the healthcare sector will likely retain these new developments long term rather than reverting back to pre-pandemic ways (Power, 2020). Although this appears to have been widely accepted in this particular situation, implemented solutions need to be re-evaluated in the aftermath of the crisis as standards change again. Solutions which were accepted during the COVID-19 pandemic may not meet our expectations regarding safety, efficiency or even suitability once the pandemic can better be controlled. An active medical, legal and political dialog needs to be established if the full potential of the boost in eHealth innovation initiated by the pandemic is to be realised.

Recommendations

EMSA calls upon the WHO to:

- Lead and promote global collaboration and the transfer of knowledge for the advancement and integration of digital health products and new health technologies into existing systems and services at the national level;
- Lead the development of cross-sectoral partnerships to align resources and investments to ensure the sustainability of electronic and mobile health;
- Promote the standardisation of and strengthen the governance for safety, security, privacy, interoperability and the ethical use of data and digital health tools;
- Lead the development of efficient fact-checking and risk communication mechanisms;

- Build trust for tackling health-related misinformation online;
- Lead and promote an international communication campaign to sensitise people to the benefits of digital health solutions.

EMSA calls upon European Member States to:
- Advance the development of electronic patient summaries in a format suitable for data exchange that is accessible to all EU citizens;
- Identify and promote sustainable financing and reimbursements models for electronic health solutions that allow patients to freely use scientifically backed applications with proven benefits and that provide incentives for healthcare professionals to implement telehealth applications in their practices;
- Improve technical infrastructure, especially in remote areas, for telemedicine services;
- Develop and implement digital health literacy campaigns and trainings to improve literacy of the general population;
- Adopt legal and ethical frameworks assuring patient safety, data security, appropriate use and ownership of health data, privacy data recoverability as well as protection of intellectual property rights.

EMSA calls upon European Institutions to:
- Closely monitor that the General Data Protection Regulation (GDPR) is applied and personal health data is disclosed in a comprehensive and structured way;
- Develop efficient fact-checking and risk communication mechanisms;
- Build trust for tackling health-related misinformation online;
- Identify and share good practices, knowledge about the implementation of new methods, evidence and lessons on digital health across countries and international communities;
- Stimulate and support every country to adopt or review, own, and strengthen its national digital health strategy in a way that enhances the level of country maturity regarding digital health to achieve positive health outcomes in line with the national health plans, updated norms and standards recommendations, and universal health coverage;
- Coordinate investments in evidence-based approaches to assess, promote, and disseminate new and innovative health technologies for national scaled digital health programmes using a person-centred approach to facilitate actions and investments based on informed decisions through the Horizon Europe programme;
- Create an international communication campaign to sensitise people to the benefits of digital health solutions.

EMSA calls upon European Healthcare Professionals' Associations to:
- Develop best-practice manuals for the use of medical records, health data and digital health tools;

- Promote the inclusion of electronic healthcare appliances and services into healthcare practice across different specialties;
- Construct efficient evidence-based evaluation standards for mobile health applications.

EMSA calls on European medical faculties to:
- Implement eHealth literacy courses as a vital part of the medical curriculum;
- Ensure medical students are familiar with commonly used and new technologies that relate to the healthcare system;
- Identify specific gaps and needs in their curriculum regarding the implementation of digital health practises;
- Share the best practises with other faculties and relevant stakeholders through various platforms;
- Advocate for continuous faculty development and train the medical educators to gain the necessary skills and knowledge of the topic in order for them to train students better.

EMSA calls upon EMSA Faculty Member Organisations and Members to:
- Advocate for the inclusion of healthcare innovations in medical education and practice;
- Recognise the importance and raise awareness among their members of electronic and mobile health applications and their effects on the health system;
- Empower fellow medical students to become educated on the topic of electronic and mobile health;
- Organise local and national activities and stay in touch with relevant stakeholders to increase advocacy level;
- Stay in touch with faculty administrations and curriculum development boards to make sure that modules/units covering electronic and mobile health topics will be implemented.

Conclusion

Digital technologies are an essential component and an enabler of sustainable health systems and universal health coverage, having great promise to improve health and well-being for patients worldwide. Electronic and Mobile Health can improve medical care efficiency and cost-effectiveness, making routine visits more time-efficient. The spread of information and communications technology and global interconnectedness has great potential to accelerate human progress and to bridge the digital divide. This underlines the need for embracing eHealth for the future.

It is paramount that medical institutions implement eHealth literacy courses as part of their core curriculum in order to embrace the evidence-based approach. Building trust in digital solutions is crucial for their further implementation in the healthcare system. Financing and reimbursement models are still lacking or missing, hindering the smooth eHealth adoption process. Data protection is of utmost importance, and transparency regarding the use of patient data must be maintained. Legal aspects

should be adopted regarding data security in order to ensure the protection of intellectual property, the appropriate use and ownership of health data, as well as its recoverability.

Definitions

eHealth (Electronic Health): "eHealth involves a broad group of activities that use electronic means to deliver health-related information, resources and services" (WHO, 2014)

mHealth (Mobile Health): "mHealth is the use of mobile technologies to support health information and medical practices" (WHO, 2016)

Telemedicine: "the practice of medicine using technology to deliver care at a distance. A physician in one location uses a telecommunications infrastructure to deliver care to a patient at a distant site" (AAFP, 2020)

Telehealth: "refers broadly to electronic and telecommunications technologies and services used to provide care and services at-a-distance." (AAFP, 2020)

Information and Communication Technology (ICT): "Diverse set of technological tools and resources used to transmit, store, create, share or exchange information." (UNESCO, 2021)

GDPR: General Data Protection Regulation

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