



Thematic Network - Digital Doc

Training future-proof doctors for the digital society

Digital transformation of healthcare: Training future-proof doctors is essential to get digital technologies being used in ways that contribute to better patient care, while being ethically sound and cost-effective, leading to more sustainable healthcare systems. This joint statement focuses on actions needed to prepare future and current doctors to cope with and contribute to the digital transformation of healthcare through the integration of digital competencies in the education and training curricula of medical doctors.

1. Digitalisation in healthcare: there is no escape

The digital transformation of healthcare is a complex process of change, which will significantly alter the roles of healthcare professionals. Factors driving digital transformation of healthcare include fragmentation, access problems, and unsustainable costs of healthcare, as well as suboptimal health outcomes, and health disparities. Cost and quality concerns along with changing social and disease-type demographics have created the greatest urgency for the need for change. So far the transformation has been slower than expected, but the COVID-19 pandemic has given developments an unexpected, although much needed boost. Physicians embrace the possibilities for digital communication with patients, sometimes out of necessity because otherwise waiting lists become too long and waiting rooms too full. Next to that, the

healthcare sector should undergo a critical transition from a delivery system aimed at providing episodic institutional care for the treatment of illnesses to a healthcare system that supports community-based care and embraces digital tools, with greater citizen and patient involvement in the prevention and management of illness across the life span.

Current and future technological developments bring unprecedented opportunities to increase the quality of patient care and to deliver healthcare closer to patients' homes. Furthermore, new technologies could provide solutions to reduce the workload of doctors and other healthcare professionals, and to keep the healthcare systems sustainable and affordable in the future. Those digital technologies – ranging from wearable and implanted sensors to mobile health apps, from predictive methods based on electronic records to robotic carers – influence the daily practice of medical doctors and other healthcare professionals. Although it seems that patients are slowly adapting to digital health tools [BOND Internet TRENDS 2019], many doctors are unaware or unequipped to apply digital technologies. It is therefore essential to ensure that our medical doctors have the knowledge, skills and attitudes to meet the needs of today's patients while being prepared for the future. Our medical doctors need increasingly diverse qualifications in order to meet these demands.

2. Reality check: challenges remain

To allow the digital transformation and to facilitate the use of new technologies, healthcare systems should be appropriately equipped for implementation and seamless adoption of such innovations. Their very promising opportunities notwithstanding, these new technologies should at all times be critically assessed for their best uses and added value. So far, many technologies still require a great deal of development to actually change and improve healthcare systems in Europe. It is important that the general belief in technology and its ability to solve problems should not come at the expense of evidence-based medicine and efficiency research. This means that we do not only need our medical doctors to **deal with new technologies**, we *also* need them to **critically assess** these technologies **and deliver an active contribution to their development**.

In that regard, attention should be paid to the reluctance of doctors to use technology, because they fear to lose control or even their job. This means that the digital transformation must be understood by all actors as a long-term disruptive process of change and innovation, which will change the roles of medical doctors including their collaboration with other healthcare professionals. Since this will be an evolutionary process, meaning that these new roles have not yet been established, the exact implication for education is difficult to determine, but must be anticipated.

Medical doctors will not only need to integrate and further develop the newest technologies but also acquire new sets of knowledge, skills and attitudes to evolve with and take advantage of the digital technological progress taking place in healthcare. Furthermore, awareness of ethical, legal and societal implications of new digital tools will become crucial for future healthcare workers.

Although internationally many educational leaders and healthcare professionals recognize the need, the required new skills and competences have not yet found their way into curricula and training programs of our student doctors. Neither have they become part of the professional development programmes offered to health care professionals throughout their career. Much needs to be done in this area of education and training, in order for medical doctors, and other healthcare professionals, healthcare systems and – not in the least – patients to fully benefit of these technological advancements.

3. Recommendations: from challenges to opportunities!

In order to support medical schools and (university) hospitals to advance digital knowledge, skills and attitudes as a new core component of medical curricula, we underline the following points and recommendations.

3.1. Curriculum development

3.1.1. *Re-evaluation of curriculum learning outcomes*

The pressure on medical curricula is high. The curricula are already packed with amongst others courses related to medical knowledge, clinical skills and important competencies in leadership, communication, collaboration. Stakeholders (medical experts, patients, students) should have a dialogue to critically reassess the current medical curriculum to replace less relevant and slightly outdated content with new content related to digital knowledge, skills and attitudes. Integration of digital health aspects into existing healthcare and clinical(ly)(-related) subjects, such as law and ethics, supports learning in context and saves curriculum space. ► On this basis, the educational institutions should develop action plans and ensure rapid implementation.

3.1.2. *Learning outcomes for all medical doctors*

► We propose the following necessary digital knowledge, skills, competencies to guide education and training materials for medical students and both junior and senior doctors to be equipped to deliver modern healthcare.

- Understand the technological concepts, e.g. concepts of e-Health, telehealth, machine and deep learning and robotics, and be able to use these technologies effectively in the daily practice of healthcare.
- Understand and be able to critically assess healthcare relevant types of data, data processing, the value of algorithms relevant to healthcare and of digitally assisted diagnostic, therapeutic and prognostic processes.
- Assess the (added) value, limitations and risks of new technologies, such as AI, Big Data and e-health applications, based on scientific research, for all stakeholders taking into account patient safety, patient value, patient trust, accountability and cost-effectiveness.
- Be able to work in a multidisciplinary team and actively contribute to innovation projects in digital healthcare

- Reflect on the ethical, legal and societal implications of those new technologies, and the technological development of healthcare.
- Be able to communicate with people working in the technology sector as well as being able to translate and communicate (digital) technologies with other healthcare workers and patients.
- Be able to effectively communicate with patients via electronic media, taking into account possible psychological, social and ethical implications of electronic communication.
- Identify new technologies and trends and understand how daily practice can be improved using technology and continuous innovation.

The digital transformation in healthcare further emphasizes the need for attention to multidisciplinary communication, collaboration and decision-making in medical curricula and training programs. In line, medical doctors should be trained to collaborate with people around their own data produced from wearables and also use this information for disease prevention. ► All those digital competencies should be a constitutive component of future accreditation and certification frameworks for the initial, further and advanced training of medical doctors.

3.1.3. *Flexible curriculum build-up*

It is important to come up with well-motivated and well-designed modules, based on the changes in the role and daily practice of doctors and thus the knowledge, skills and attitudes they need. However, the high speed of change in this digital transformation needs to be taken into account when developing curricula. ► Flexibility needs to be created to allow for curricular adjustments to meet the necessary digital competence standards. Integration of digital health aspects into existing clinical/healthcare (related) subjects allows the flexibility needed. ► Faculty and educational grants should foster collaboration between disciplines to optimize integration and remain updated.

3.2. Qualified healthcare professionals / educational leaders

3.2.1. *Train the trainers*

The current population of biomedical and medical experts, the teachers within our medical schools and (university) hospitals, are not well prepared for their role in teaching digital competencies and implementing digital teaching/learning formats. This means that those digital competencies need to be implemented in their own education, training, and continuous professional development. ► Therefore, the first and most important step is to “train the trainers” helping them to become the corner stone in this digital transformation in medicine.

3.2.2. *Training pathways for digital health leaders*

We also identify the need to build new frameworks on further specialisation in the field providing doctors an opportunity to not only acquire core competencies (described above) but also to have an official and accredited pathway to further build their expertise in the field and to become digital leaders at local or even national level. We will need doctors who can serve as digital health leaders and improve their departments or hospitals by continuous stimulation for adoption of

newest digital technologies (local digital health leaders) and alongside who will be the experts in national or international e-health committees as well as who will build national digital health strategies or create successful innovations themselves (Digital Health Experts). ► Building such digital health leadership academies would require additional resources, as more emphasis is needed to build doctor's soft skills such as change and organisational management, leadership and communication skills as well as the ability to innovate and work in a (multidisciplinary) team. Only by providing core competencies to all medical doctors and students and preparing local digital leaders together with national digital experts we can ensure swift and overarching transition to new digital future.

3.2.3. New professional profiles/new types of experts needed

Learning outcomes for medical education should be defined for the initial, further and advanced training of medical doctors. Nevertheless, not all medical doctors can, nor should, become digital experts. The digital transformation of healthcare will change the roles and functions of most healthcare professionals and will also reveal new professions and expertise to support and collaborate with medical doctors in their daily practice. New interdisciplinary professional profiles need to be developed to help shape the digital transformation in a meaningful, effective, ethical, evidence-based and affordable way. ► Research and skills forecasts on these new professions is needed, as well as the development of Bachelor and Master programs, such as Technical Medicine (e.g. The Netherlands), Clinical Informatics (e.g. Austria) and Health Informatics (e.g. Denmark), that offer the training for these professionals.

3.3. Supportive Context / Environment

3.3.1. Take into account people's mentalities; coping with change

Physicians provide medical care based on deep-rooted personal, social and institutional beliefs and practices. Digital transformation will be a long-lasting, disruptive process that changes roles, tasks and functions. Therefore, future and current medical doctors should be trained to deal with change and in particular digital transformation. The healthcare system, together with educational leaders, should empower future and current healthcare professionals to initiate and embrace digital solutions that are useful for patients and believe/propagate that medical practice can benefit from them. ► It is important to equip doctors with needed competencies and mindset to constantly improve their practice and critically appraise new tools as technology will only change more rapidly in the future.

In addition, health care professionals must have the flexibility to deal with patients who adapt and those who do not adapt. ► Healthcare professionals need to be made aware of the long-term impact of this digital transformation on the patient-doctor relationship.

3.3.2. Co-creation in technology-assisted medical care: dedicated professorships needed

Digital health is the responsibility of the health care sector and not (only) of the IT sector and technical universities. Healthcare professionals, driven to have a positive impact on patients' quality of life and a healthy society, should drive digital transformation rather than follow the lead of the industry to ensure it is not just about automation and efficiency, but about enhancing quality

of healthcare and health. ▶ We call for a proactive role for physicians to assess and influence the development and introduction of new digital technologies. ▶ We call for technical universities and other technology partners to engage with (university) hospitals and medical professionals to involve them in R&D and actively collaborate in curriculum design and evidence-based innovation in digital health. ▶ We call for financial support for the development of training programs/modules as well as for innovation projects in which healthcare innovations are co-created with technological experts and healthcare professionals. ▶ We call for technical and medical schools to establish specific professorships to strengthen both teaching and research aspects of the digital transformation of the healthcare system.

3.3.3. Evidence-based implementation of new technologies

Technology developments are moving so fast, supported by the enthusiasm of policy makers, sometimes seemingly so attractive that they are pushed to implementation without being thoroughly investigated. Medical doctors should play a critical role in creating this evidence for the clinical efficacy of these new technologies in the future. To ensure that technology-assisted interventions that we implement are evidence-based, doctors must be encouraged not only to interact with technology, but also to co-create and evaluate innovations (see learning outcomes). This emphasizes the need for educating students to be more critical about the use of digital medicine. ▶ That is why we advocate curriculum elements in which students are actively involved in digital health (evaluation) research and innovative developments and experience implementing such technologies into daily clinical practise. ▶ We call for support and opportunities for students and medical staff who want to develop themselves further and want to become digital health leaders to ensure evidence-based implementation of new technologies. Extra(curricular) training, internships, fellowships, etc should be encouraged.

3.3.4. Join forces and spread the expertise: Increase interoperability and mobility

Since the digital transformation of the healthcare system will be a joint effort across professional boundaries and national boundaries, ▶ we call on professional clinical organisations and regulators/policy makers to establish general standards, regulations, and validation criteria and systems, to ensure proper use and to facilitate development of digital health technologies and enhance interoperability. ▶ Formation of expert communities should be promoted and an interdisciplinary collaboration of all contributing fields – including computer science, medical informatics, biomedical engineering and the like, but also psychology, healthcare professions and social sciences – should be fostered. ▶ Sharing of expertise, tools, data, and education components should be facilitated across borders.

4. Conclusion and call to action

Digital Doc is a network *of* educators *for* educators. European deans, educational leaders, medical doctors, digital health professionals and medical students have joined forces and are committed to push forward the above mentioned recommendations.

We are thankful for the effort of the European Commission on this topic of skills for digital health. The nomination of a Thematic Network stimulated and inspired us, allowed for fruitful exchanges

of thoughts, experiences and provided a network of connections between relevant actors across the EU.

Digital Doc highly appreciates it that many of the points the network discussed are reflected in the upcoming EU funding programmes (2021-2027), especially in the Erasmus Programme, EU4Health programme and the Digital Europe Programme. All actors active in Digital Doc are called to join forces and make the most of these programmes to advance our agenda.

In order for us to do so, we would like to raise attention to the specific situation in medical education, particularly to the role of (university) hospitals. In all EU countries academic and/or non-academic hospitals play an important role in the training of doctors. In some EU countries the (university) hospitals are even the main educators of our future doctors. We call for the EU to recognize the educational responsibility and capacity of training hospitals in order to be able to participate in all EU actions and funding for education.

We consider European collaboration of high added value to innovate and improve the quality of our medical education. EU support to facilitate further exchange of knowledge and insights will help us to really implement digital skills in medical education. European collaboration will contribute to achieve better transparency between medical education programmes, necessary to facilitate EU mobility of (future) doctors.

Therefore, we call to build upon the contacts through Digital Doc and establish a European network that will take up the above-mentioned recommendations. This network could facilitate further exchanges and support the development of hands-on actions such as:

- multidisciplinary collaborative initiatives for curriculum renewal and integration of digital skills in medical curricula.
- training programmes to teach the current population of doctors and trainers/teachers and facilitate the development and accessibility of digital health leaders and experts.
- novel Master programmes for new roles and professions in digital healthcare to educate the professionals we urgently need.

Digital Doc calls regional, national and EU policy makers to encourage and support these efforts. Let us work towards technologies being developed, better understood and used by doctors in medical practice. Let us work towards effective and ethical implementation in medical practice, so both doctors and technologies will rise to their full potential, contributing to better patient care, a healthy population and more sustainable healthcare systems.

List of endorsements Joint Statement Digital Doc (April 12, 2021)

1. Medical University of Vienna, Austria;
2. KU Leuven / UZ Leuven, Belgium;
3. University of Zagreb, Croatia;
4. University of Copenhagen, Denmark;
5. University of Tartu, Estonia;
6. University of Helsinki, Finland;
7. Helsinki University Hospital, Finland;
8. Charité – Universitätsmedizin Berlin, Germany;
9. Fakultät für Gesundheit, Universität Witten/Herdecke, Germany;
10. Institute for Medical Education, University Hospital, Ludwig-Maximilians-Universität Munich; Germany;
11. School of Medicine, University of Bologna, Italy;
12. Vita-Salute San Raffaele University, Italy;
13. Hospital of Lithuanian University of Health Sciences Kauno klinikos, Lithuania;
14. Lithuanian University of Health Sciences, Lithuania;
15. University of Ljubljana, Slovenia;
16. Erasmus University Medical Center Rotterdam, The Netherlands;
17. Faculty of Medicine, University of Bergen, Norway;
18. European Junior Doctors (EJD);
19. European Medical Students Association (EMSA);
20. Standing Committee of European Doctors (Comité Permanent des Médecins Européens; CPME).