



DIGITALISATION IN MEDICAL PRACTICES

Position Paper

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1 Motivation and Framework: Challenges in the Health Care System and the FZI Health Care Day

Digitalisation also increasingly affects the health care sector. According to the German Federal Ministry of Education and Research (BMBF), this is going to change the health care system fundamentally.¹ Dr. Bernhard Rohleder, Chief Executive Officer of the German Association for IT, Telecommunications and New Media (Bitkom) sees in digitalisation maybe “the greatest potential for the medical field since the development of penicillin”². The medical journal *Deutsches Ärzteblatt* 2016, 113(24) states that: “[...] everyone wants to be there when the world of Medicine 4.0 gathers speed. Subsumed under the concept « e-health », physicians will only work on the tablet, consultation hours will take place via Skype and the patient will become a data manager of his or her examination and fitness results in the future. Administrated and saved, the data becomes huge clouds, neo-German « Cloud ». How seemingly beautiful could the new e-health world be [...]”³.

For many years, the German health care sector has been faced with the difficult task to decrease costs on the one hand but to increase the service quality through an improved organisation and patient orientation on the other hand. The prospective digitalisation wave provides an opportunity to meet these challenges through the support of modern information and communication technology (ICT). While digitalisation has already progressed so far in many industrial fields, the health care sector still sees itself at the beginning of promising developments. Particularly in this field, ICT is primarily used to make individual processes through insular solutions more efficient and effective. Digitalisation aims for the holistic integration of many individual processes through automated processes, computer-readable information as well as simplified data

accesses. It thus goes far beyond the IT support of individual processes. Purposefully developed, in other words by involving all agents, a more efficient and effective medical care and thus an improvement in the quality and economy is possible without even neglecting the patient. According to PWC, the annual efficiency potential of e-health in the German health sector can be quantified at up to 39 billion euros⁴.

The event series “FZI Health Care Days” demonstrates opportunities for digitalisation in health care. The organiser, the FZI Research Center for Information Technology, supports the transfer of innovative processes from research into practical application by presenting current developments and existing solutions, discussing opportunities and risks together, and exchanging experiences among the participants.

During the FZI Health Care Days on 20 September 2017, physicians in private practices, nurses, therapists as well as researchers, representatives of health insurance companies and IT service providers discussed how opportunities and obstacles of the “digitalisation of medical practices” can be faced. Experiences from everyday life and ex-

“Successful digitalisation requires a consequent implementation of automated processes and a consistent integration of computer-readable data streams through tailored ICT solutions“. Dr.-Ing. Iris Heckmann, division manager of Information Process Engineering at the FZI Research Center for Information Technology

“Although financial resources in the health care system are available, these have to be distributed and used properly, in order to achieve an increase in efficiency“, Prof. Dr. rer. Nat. Wilhelm Stork, scientific director of Medical Information Technology at the FZI Research Center for Information Technology.

pectations of future digitalisation solutions, which were introduced there, form the basis for this position paper and shall help to purposefully develop digitalisation in the environment of physicians in private practices.

Various agents of the health care sector hope that digitalisation will provide to diverse improvements: Physicians, for example, want more efficient and facilitated process workflows, patients want a simplified communication with their physician and opportunities of self-monitoring, health insurance companies are interested in cost-saving possibilities, while in politics a wide, sustainable and location-independent medical care is of interest. However, science sees itself as the facilitator of these requests by supporting and improving treatment decisions on the basis of existing or newly recorded data and using innovative ICT.

The success of digitalisation is thus measured especially by the extent to which it can help to improve the quality of treatment for the patient and the cost-effectiveness of medical care. Bases for successful digitalisation in the domain of physicians in private practices are considered in organisational, professional, economical and technical aspects. However, a clear distinction needs to be drawn between intentional and absolutely avoidable aspects. The aspects of successful digitalisation for physicians in private practices are examined hereinafter from an organisational-professional, an organisational-economical and an organisational-technical perspective.

2 Aspects of Successful Digitalisation

2.1 Organisational-professional Aspects: Processes, Knowledge, Cooperation and Availability

From an organisational-professional perspective, the participants agreed that the following factors should be underlined for a successful digitalisation in the domain of physicians in private practices:

- Process understanding
- The integration of “human factors”
- Digitalisation knowledge
- A cross-sectoral cooperation
- Sufficient availability & IT qualification of medical personnel

“A digitalised, bad process is still a bad process”, Prof. Dr. Stefan Nickel, director for Health Care Logistics at the FZI Research Center for Information Technology.

The basis for an improvement of the processes by means of digitalisation is the process understanding both of developers and users of these solutions. Only if the processes are identified and understood correctly, digitalisation solutions can be developed and used in a suitable way. This includes, on the one hand, the understanding of the use of this solution for a process between patient and physician (the “human factors”), but on the other hand, the understanding of the integrability of digitalisation solutions into everyday tasks.

On the IT side, physicians in private practices should therefore already be involved in the development of digitalisation solutions. The technical feasibility of IT support of a process or process step itself does not necessarily have to be beneficial to the physician or patient.

“IT is seen as an all-rounder for digitalisation issues in the medical field. It is the solution. The “human factor”, in other words the consideration of physicians and patients, is also very important in digitalisation!” Dr. med. Ilka M. Enger, specialist for internal medicine, diabetologist, Neutraubling

On the user side, the education and further education of medical professions should be adjusted in the direction of digitalisation/logistics. The technical understanding and thus the acceptance of digitalisation measures can be increased in this way. The proficiency level of physicians equals for example usually the proficiency level of an “interested user”. Depths of programming or hardware are considered as black boxes that cannot be overviewed. Digital support is more likely to be met with mistrust. Technical events and transfer panels are helpful, such as the FZI Health Care Day, in which joint potentials are visualised and discussed.

However, the digital support of existing processes is not limited to one stakeholder. Digitalisation solutions have to support diverse stakeholders (e.g. physician, care, therapy) along process chains. In order to develop and implement holistic solutions with a professional focus on the patient

with the help of digitalisation, these different stakeholders need to work together in a trusting cooperation. The basis for this is the transparency of the processes.

Digitalisation in the sense of a holistic integration and support of diverse processes allows flexibility within and between them, since these are not considered individually, but as a whole. They can thus be used and developed as needed. In order to accept the opportunities of this professional flexibility, partially rigid guidelines have to be dissolved and flexibility has to be allowed in the first place. For example, clinical paths consider no secondary diagnosis and detailed resource and time specifications. The implementation of secondary

diagnoses complicates the patient treatment due to the given, rigid process. For example, geriatric patients with a geriatric psychiatric disease: In case of an acute disease, such as a femoral neck fracture, Alzheimer’s dementia, for instance, must be taken into account in the process control of the discharge management and also be treated so that an uncomplicated treatment with a subsequent rehabilitation is guaranteed. The dissolution of rigid guidelines can improve the patient treatment and also widen the acceptability of opportunities of digital support in the field of medical care.

“For a cross-sectoral software support a trusting and reliable cooperation of the various stakeholders along the process chain is needed”, Andreas Haupt, home director DRK Residenz Bad Friedrichshall

There is no doubt that medical care can benefit from the opportunities of digital support. Physicians, for example, can use customised ICT solutions to document findings faster and more comprehensibly or to create physician’s letters. While among other things, simple macros help in documenting, it is conceivable that in the future support options via speech and image recognition will be combined with empirical data evaluation, with a transfer of valuable information useful for the physician using algorithms of AI. Furthermore, the use of telemedicine can ensure a primary health care, especially in rural areas. However, the technical opportunities do not solve the professional availability problem. If physicians or medical practices are already working at full capacity,

rapidity and networking through digitalisation is not necessarily useful. Many potential improvements, e.g. in telemedicine, can only be reasonably effective once a shortage of physicians has been remedied and the available capacities can be used efficiently and effectively, with sufficient time for the patient.

2.2 Organisational-economical Aspects: Economies of Scale and Cost-Benefit Ratio

From the organisational-economical point of view, the following factors play a decisive role for a successful digitalisation in the environment of physicians in private practices:

- Economies of scale
- Costs
- Benefits for physicians

The existing organisational structure in Germany with physicians in private practices, who are largely on their own, leads, amongst other things, to few economies of scale with regard to the digitalisation of medical practices. Physicians do not have enough time to acquire suitable knowledge about digitalisation themselves. Thus, the adaptation of existing or the introduction of new IT systems is already a great challenge for medical practices. Here, networks of physicians as well as transfer and competence centres can help with the development of roll-out and introduction concepts.

However, physicians in private practices should not be confronted with digitalisation aspects when selecting suitable digitalisation solutions. As mentioned from the organisational-professional point of view, physicians should be integrated already in the development of digitalisation solutions. After all, the physician decides whether a digitalisation solution will be used in his or her practice. Mandatory solutions such as the electronic health card are not always considered helpful. Physicians should voluntarily use digitalisation solutions based on the expected added value. Solutions should not be forced from above. From the physician's point of view, the cost-benefit ratio is decisive for the voluntary use. Currently high costs for the installation and maintenance of digitalisation solutions are impeding a sufficient digitalisation of medical practices, as the budget of physicians in private practices does often not allow this. This may require the legislator to weaken the market power of providers of practice management systems with respect to users.

„At the moment, only very interested physicians are voluntarily implementing digitalisation measures.“ Eileen van Schaik, manager of the regional physician's network Ärztenetz Mittelbaden eG

„Physicians are not involved sufficiently in the development of innovations for digitalisation. Physicians decide on the implementation of innovations. The cost-benefit factor is therefore decisive from the physician's point of view“, Dr. med. Martin Benedict, ENT and plastic surgery physician in a private practice in Ettlingen

“In order to increase the acceptance of digitalisation, concrete benefits for a medical practice should be demonstrated. An example is the potential improvement of planning, for example of appointments, through automated documentation and evaluation of process data”, Anne Zander, research scientist at the Institute for Operations Research of KIT

2.3 Organisational-technical Aspects: Interferences, Interoperability, Modularity and Patient Data

For a successful digitalisation, necessary technical conditions are required. From the organisational-technical point of view, especially the following factors play a decisive role:

- Open interfaces
- A cross-sectoral software support
- Modular solutions
- Patient-centred handling of data

Currently, practically every medical practice uses software programmes especially for documenting, billing and archiving, for the improvement of the practice procedures, schedule planning and quality assurance. Standards and defaults for software functionalities are predefined by the National Association of Statutory Health Insurance Physicians (Kassenärztliche Bundesvereinigung)⁵. Without a uniform architecture and interfaces, it is impossible or difficult to integrate the programmes into each other. The double entry of data or the loss of a significant part of existing data is not uncommon in a change from one system to another. Certified open interfaces would be necessary to ensure the interoperability of the systems.

On the provider side, this is less desirable, as it would facilitate data transfer and thus replace a practice software with another. This leads to a separation of the interfaces and to the development of insular solutions. Modular solutions would be desirable with regard to the professional and economical flexibility, which allow a simple expandability and adaptability of software solutions used in medical practices.

At this point, the legislator is required. Interface standards and data integration require legal provisions from the participants' point of view, in order to induce the software provider to comply with the standards for the electronic data interchange (EDI) and thus prevent a potential abuse of the market power. Incentives to create uniform interfaces through companies operating on the market are just as inconceivable as through mutual agreement of different medical groups.

Open interfaces are also essential for a basis of a cross-sectoral cooperation. They enable a cross-sectoral software support that can for example facilitate the necessary exchange between physicians, care, hospitals and therapy.

The basis of any support through software is the availability, the collection and handling of data. In the course of digitalisation, there are two subjects that are of central importance for physicians: a perceived flood of data and data sovereignty.

Some physicians are confronted with a flood of data that is not always effective. Patients increasingly measure their own body values with the help of apps. As useful as these values can partly be, these self-measurements may also mean more expenditure for the physi-

“The legislator has to open the interfaces”, Rüdiger Kucher, The Association of Statutory Health Insurance Physicians in Baden-Württemberg (KVBW), consultant for selective agreements.

cians. Simple solutions are needed here by which the patient's data, which is useful for the treatment and diagnosis, can easily and safely be transferred to the physician's software system. This ranges from simple solutions for avoiding of transferring computer viruses to interfaces for the general transferability and integration of measurements. In the course of digitalisation, solutions should be developed that do not require transferring the same data several times to other systems.

In all technical restrictions of data repository there is one important aspect: data sovereignty. Even if it were clear, which data may or should be collected for which treatment process, it must be clarified who the owner is and who may be the possessor of the data: The patient should always maintain his or her data sovereignty. Data may not be traded as currency. Therefore, the development of practicable frameworks for data protection, in consideration of the patient's data sovereignty, is of primary importance. In this respect, it must always be technically possible to ensure data security, for example in order to prevent the manipulation of findings.

However, when it comes to data sovereignty, it should also be borne in mind that a large amount of (anonymised) data makes it possible to improve the treatment. According to the National Association of Statutory Health Insurance Physicians NASHIP (Kassenärztliche Bundesvereinigung KVB) the offer of medical treatment will decrease and at the same time demand for it will increase until 2030. It is therefore important and necessary to learn with the help of data how to treat comprehensively and well with the existing scarce resources and capacities. Patient-centred planning by means of modern processes, for example of the field of machine learning, can support the expertise of the physicians significantly in order to ensure a high care quality for the patients eventually.

3 Summary and Outlook

Even though there is a variety of different requests and expectations for a successful digitalisation from the various actors in the field of physicians in private practices, the core of a successful digitalisation is the focus on qualitative but also economic medical treatment for patients. In this respect, the right conditions have to be established.

This includes organisational-professional aspects, such as the understanding and knowledge of processes but also of the abilities of automatisisation and of the establishment of computer-readable data streams. In other words, digitalisation requires understanding. A further significant aspect is a cross-sectoral trusting collaboration. Organisational-economic aspects lie especially in a practicable cost-benefit ratio. From an organisational-technical point of view, open interfaces are absolutely decisive and thus modular software solutions as well as a patient-centred data handling.

It is therefore necessary to create a framework in which physicians and patients in private

"The introduction of digitalisation solutions, for example of the field of Ambient Assisted Living fails basically in the physician's medical practice: Despite standards, the interfaces do not allow access to the practice software", Johannes Schneider, department manager of Medical Information Technology at the FZI Research Center for Information Technology

practices do not have to fear the control and access by other actors, but can use compatible hardware and software „voluntarily“ and data sovereignty can lie with the patient.

Footnotes

¹ <https://www.bmbf.de/de/digitalisierung-in-der-medizin-2897.html>

(last opened on 21.12.17)

² Rohleder, B, quoted in <https://www.aerzteblatt.de/nachrichten/70518/Bitkom-Digitalisierung-wird-Medizin-revolutionieren> (last opened on 21.12.17)

³ Beerheide, R: Medizin 4.0: Digitale Faszination.

Deutsches Ärzteblatt 2016; 113(24): A-1129 / B-945 / C-929

⁴ PwC Strategy&, 2017, Effizienzpotentiale durch eHealth: Studie im Auftrag des Bundesverbands Gesundheits-IT – bvitg e.V. und der CompuGroup Medical SE, <https://www.strategyand.pwc.com/media/file/Effizienzpotentiale-durch-eHealth.pdf>

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⁵ Kassenärztliche Bundesvereinigung (KBV), 2017, <http://www.kbv.de/html/ita.php>

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⁶ Kassenärztliche Bundesvereinigung (KBV), 2016,

http://www.kbv.de/html/themen_1076.php (last opened on 21.12.17)

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