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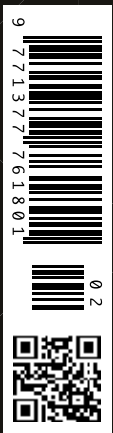
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Future medicine, today's healthcare

Is the “Smart Hospital” a chance for change?

Prof. Heinemann explains how futuristic and smart technologies that are used in preventive and diagnostic healthcare, are embedded in a new digital professionalism and quality.



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Artificial Intelligence (AI) in diagnostic radiology, robots in nursing and operating theatres, augmented and virtual reality in surgery and medical training, 3D-printed skin, blockchain technology for clinical data exchange, modern and smart buildings, preventive healthcare via apps and wearables, at-home aftercare from a screen using interactive hospital cloud services such as telemedicine and high-performance sensors, simulation techniques, cardiovascular risk prediction with deep learning, security & cyber crime prevention, gamification of patient care, and of course electronic medical records (EMR), automated pharmacy systems, fresh hospital design with real hospitality services, voice-command devices in patient rooms, integrated management systems focussing on patient satisfaction – all these and more in preventive and diagnostic healthcare, therapy and research are embedded in a new digital professionalism and quality. They describe at least some elements of what a smart hospital could look like. It may all sound a little like science fiction, but it is already far more science than fiction. Right here, right now, we have access to a future that really works.

The emergence of a new kind of medicine, and shifting – albeit it slowly – legal conditions at European and national level (in Germany and not only here) have raised many hopes of better health and recovery, but also many concerns, fears even, about the dehumanisation of medicine, about transparent “datients” (data+patients) or even “drive-ins” for the sick, and about skilled medical staff becoming dispensable, not to mention the mainstream top's for today's hospitals, like cost pressure, an ageing population and a shortage of practitioners and caregivers. Central to these developments, the three most important stakeholders in a hospital face the historic challenge of digital transformation, which cannot simply be delegated away to regulation or the market: doctors and nursing staff, patients and hospital managers today must rethink their

relationship. Where there is risk, there is also opportunity, so is the smart hospital a chance for change, a new and trusting beginning?

It is certainly time for a new beginning: neither demagoguery nor Google-based self-treatment nor coldly calculated process optimisation is much use to a system that is clearly ailing economically and socially. A new beginning is a good thing anyway, and does not imply that whatever went before it was all bad. To the contrary, in fact: in Germany, measured patient satisfaction is often higher than the apparent reputation of the hospital landscape (a declining number of some 1,900 hospitals, and 33 university clinics) would suggest. And that satisfaction undoubtedly goes further than the patients' delight at an unexpected flatscreen TV with Netflix in their hospital room. At any rate, if a systematic approach is taken to this new beginning, it is precisely smart hospitals – in theory – that offer a chance for – real! – change. As an integrated clinic concept, the smart hospital drives clinical excellence, patient centricity, strategic and operative effectiveness and efficiency with digital disruption in today's and tomorrow's clinics.

Clinical excellence – the best medicine for all

The digital transformation in medicine is primarily a scientific (research), economic (efficiency), legal (E-Health Act, EU-general data protection regulation), and social (data ethics) issue – not a purely technological one (a vast amount is already possible today). And the market is booming, the global hunt is on for the new digital health unicorns, the law and society are, to a degree, “critically positive”. And, as mentioned before, not everything is still out of today's reach: within the boundaries of what is legally possible and socially acceptable, hybrid operating theatres, imaging, and ultramodern operating technologies are as relevant as a patient experience that is enhanced by navigation systems, better room facilities, or optimised access to information. Many of the players in

the healthcare industry, like Siemens (D), GE Healthcare (USA), Samsung (South Korea), Qualcomm Life Inc. (USA), athenahealth Inc. (USA), SAP (D) or Philips (NL), are offering increasingly sophisticated features and services around the smart hospital.

Digital disruption changes medicine intrinsically, but with it, not against it. Digital transformation makes medicine clearer, richer and, for medical practitioners in research and healthcare provision, future-proof. Data are not the “new oil” just for many other industries, but also for the health industry. Here too, however, and here of all places, quality counts: pulp data in, pulp results out! The Power of Three - good data, smart use, secure internal access - starts with data. Only clearly validated, annotated and curated data can at best assist evidence-based medicine, they cannot replace it. “AI+top radiologist = positive patient outcome” is the successful formula. Correlation for sure does not imply causation. And just because it says “health app” on the label, it does not mean that what comes out is health – more research is needed here. Precisely for that reason, it takes both types of expertise, medical and digital, to get the best data and, ultimately, the best possible outcomes for patients.

In a smart hospital, comprehensive clinical excellence means that medicine is enriched, not replaced, by responsibly implemented digital possibilities. Doctors and nursing staff are not rendered superfluous, quite the opposite, in fact. With their expertise and skills, they will have more time and more digital resources with which to work, agile, themselves healthy and successful, for patients, research and other meaningful uses. In a smart hospital, the right solutions are available to doctors and nurses in all the different departments and institutes and are designed to increase their work efficiency. The practitioners in a smart hospital will have more time for good consultations, more time to go into individual concerns, strengthening the patient’s own competencies and putting more emphasis on a cooperative relationship between doctors and patients. That is medical, not industrial, healthcare. This is where the chance for medical excellence to systematically be made accessible, in principle, to everybody. In essence: best medical performance for all, without compromising the reasonable idea that additional services cost additional money.

Patient centricity – fostering dignity is a duty and a success factor

Making humanity the focal point of everything a medical institution and its stakeholders think and

Smart Hospital		
Clinical Excellence	Patient Centricity	Effectiveness and Efficiency
The best medicine for all	Fostering dignity is a duty and a success factor	Agile hospital management is an empowering strategic and operative design feature

Figure 1: Three Core Issues for Building a Smart Hospital

do is the central message. Data security/privacy and the human quality of care are key elements of that. A new digital maturity among patients is more than merely thinkable in this context: more responsibility, more transparency, more security, and above all more quality of care in patient outcomes. It almost sounds too good to ever be true. But the chances are real and tangible. And, equally, it is simply unacceptable that the average consumer in the digital age is so much more competent in selecting best prices, fashion styles, playing complex videogames, or accessing (hopefully real) news than in what really counts most in life: their health. A smart hospital in this sense is also a promotional platform for lifelong patient-learning to prevent disease and, if necessary, to enable patients to cooperate with doctors.

A smart hospital does not produce health; it creates the conditions for recovery with integrity, empathy, medical excellence and great professionalism, and it partners patients in shaping their individual preventive and restorative health regimens. This combination of scalability and personalisation can only succeed through digital transformation: it is difficult to imagine an economically successful clinic with scalable services offering individualised medical excellence any other way. Dignity is not a marketable good, but without digitally transformed management of the scarce resources and innovative medicine, there is constant institutional tension between market and competition (whether the clinics are private or public). The economically motivated goal of discharging patients as quickly as possible meets the ethical goal of treating patients as human beings with dignity, because patients want to recover as quickly as possible. That is why an important university clinic like Essen, for instance, is right to be also thinking about the patient experience and designing its version of the smart hospital around it.

Effectiveness and efficiency – Agile Hospital Management is an empowering strategic and operative design feature

Digital processes and a corresponding culture of

innovation push costs down – above all unnecessary ones – and create opportunities for long-term economic success and good employment conditions (which will include teamwork, development opportunities, optimal duty rosters, and security). Change, agility, innovation and transformation – clinics also operate in an often over-complex and impenetrable "VUCA world" (volatile, uncertain, complex, and ambiguous) and should therefore constantly strive to overcome internal, usually subjective, obstacles. There are undoubtedly objective barriers for them to overcome as well: think of the often very colourful IT systems and their difficult integration and compatibility, for example.

I see no convincing arguments that modern agile management methods and digital transformation issues are necessarily diametrically opposed to a more humanistic kind of medicine. On the contrary, it is also and especially down to hospital management as a facilitator to make a meaningful and successful future for patients, caregivers and the other stakeholders, a task that is hard to achieve with an aversion to innovation and neofeudalistic management of shortages and shortcomings. These aspects alone far exceed what is already necessary for the digital management of hospital processes. Digitally inspired medical excellence and value-based patient centricity will require long-term heavy investment, which falls both to the state and the hospitals themselves. A smart hospital also systematically uses the economic opportunities that arise from skills and experience – the assets – of its operation to generate strategic advantages (eg through cooperation), stimulate innovation (eg through start-ups), and create new sources of income (new business models). Cooperation with other health industry stakeholders like pharmaceuticals companies will also succeed better on an equal footing.

Market Research Future (2018) is forecasting for 2023 a 62-billion US dollar global market for smart hospitals, with a substantial growth rate of some 25 percent between 2017 and 2023 – it is a market of global quality, and many countries are much further than Germany (in the USA, 80 percent of around

5,000 clinics already have electronic health records; in the UK, in South Korea and Australia, examples of more advanced smart hospital approaches exist). Not least, however, smart business elements can also bring significant benefits to the funding structure of the (smart) hospital.

Naturally, legal certainty remains a major concern, not only in Germany. WhatsApp diagnoses may suit many patients' lifestyle, but the infrastructure is unregulated – there are no (agile!) standards. That said, the impetus is essentially on national and local government to take swift and consistent action when it comes to regulations – the clinics can only stand by and support them with the arguments.

In this sense, it is perhaps – a little too – daring to see in the much discussed and indeed controversial – ambitious – version of the smart hospital a chance for a new and trusting beginning in the sense outlined above. And yet there still seems to me to be good reason to do so. Neither an aversion to innovation nor recklessness will help, so perhaps the "smart hospital" is an ambitious idea on sensible middle-ground. At the same time, the term itself does not reflect the full agenda. Ultimately, a smart hospital is one that no longer has the shortcomings of clinics today. And all the stakeholders stand to benefit from that, which is why it is a good thing that at least some clinics are on their way transforming to smart hospitals. ■

KEY POINTS



- ✓ The "Smart Hospital" is a chance for change: As an integrated clinic concept, the smart hospital drives clinical excellence, patient centricity, strategic and operative effectiveness and efficiency with digital disruption in today's and tomorrow's clinics
- ✓ Clinical excellence – the best medicine for all
- ✓ Patient Centricity – fostering dignity is a duty and a success factor
- ✓ Effectiveness and efficiency – agile hospital management is an empowering strategic and operative design feature



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