

HACKING HEALTHCARE

UNDERSTANDING AND RETHINKING
HEALTH IN THE 21ST CENTURY



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Think Tank for Business, Society and Life Sciences

In cooperation with Julius Bär and
Collegium Helveticum of ETH Zurich and the University of Zurich

NEUE ZÜRCHER ZEITUNG PUBLISHING

HACKING HEALTHCARE

UNDERSTANDING AND RETHINKING
HEALTH IN THE 21ST CENTURY

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This text is a short version of the original German book
“Hacking Healthcare – Das Gesundheitssystem verstehen und weiterdenken”
(Neue Zürcher Zeitung Publishing)

Published by W.I.R.E., Think Tank for Business, Society and Life Sciences

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“If you can’t get rid of the skeleton in your closet, you’d best teach it to dance ...”

George Bernard Shaw

Health is omnipresent. No day passes without media reports about groundbreaking progress in medicine or the detection of new public health risks. Health is affecting more and more areas of our lives: from our diet to our everyday behaviour, every action is becoming a decision for or against good health. It therefore comes as no surprise that the subject is grabbing the attention of both the public and investors, and stirring up controversy in political debate unlike any other.

The healthcare system is undergoing radical change: with the help of modern medicine and growing affluence we are getting older and older, the spectrum of diseases is shifting as a result towards increasing numbers of chronically ill people. As a consequence, healthcare costs are rising steadily and there is a risk that the currently offered services will one day become unaffordable.

This debate is anything but new: studies putting forward the same conclusions were published decades ago. It almost seems as if the principal challenges and conflicts have barely changed in the last 20 years – although medical science celebrates one breakthrough after another. The healthcare system is more than ever in a polarised situation: torn, on the one hand, between growing dynamics in biomedical research, new digital applications and patients’ expectations and, on the other hand, sluggish structures and values that are changing very slowly or not at all.

The need is therefore growing to adopt a long-term planning horizon and identify possible blueprints for adapting the healthcare system to the framework of the future. To be able to do so, it is essential to understand the reasons for the system's inertia.

One possible explanation is the fact that in many countries the financial pressure to undertake reforms is not high enough to trigger real changes. Another, however, is the enormous complexity of the system, which makes it nearly impossible to obtain an overview of the overall context and make long-term, fundamental decisions. Additional hurdles are debates based on ideological principles that make compromises difficult and corroborate dogmas. The result is that, instead of rethinking the system along the patient's value chain and from a long-term point of view, people focus on the present and on optimising individual areas.

Understanding, rethinking and creating

HACKING HEALTHCARE aims to present a holistic picture of the present and future of the healthcare system and put forward proposals on how we can shape tomorrow's health sector. While the first part of the book analyses the healthcare system on the basis of five main topics (people, functions, actors, costs and revenues, regulation) and illustrates it graphically with a wealth of data (German version only), the second part looks towards the future and formulates concrete ideas and policy recommendations. The goal is to penetrate the fragmented view of the healthcare system. In addition to understanding the current structures, however, we need to lay a foundation for designing the system for the next generation, in other words: for hacking it. Although the term "hacking" is mainly associated with the manipulation of computer software, it actually means breaking open the surface of a system and redesigning individual processes and sub-systems. The focus is always on the user, who is trying to optimise the system with the instruments

available to him. Against this background, this book's conceptual model is not based primarily on current structures, but places the needs of the people and patients of tomorrow at the centre. The ideas and areas for action are intended to help actors to develop the services and framework of the future.

The structures of the healthcare system of tomorrow will remain constant

With increasing life expectancy forecasts and rising costs as well as the rapid advance of new technologies into medical and nursing care, the dynamics of technological progress shall not obscure the fact that healthcare systems in most countries are embedded in conservative structures. This is partly due to the great complexity of the structures and high level of regulation, but also has to do with the fact that values related to medicine are bound to traditional ways of thinking.

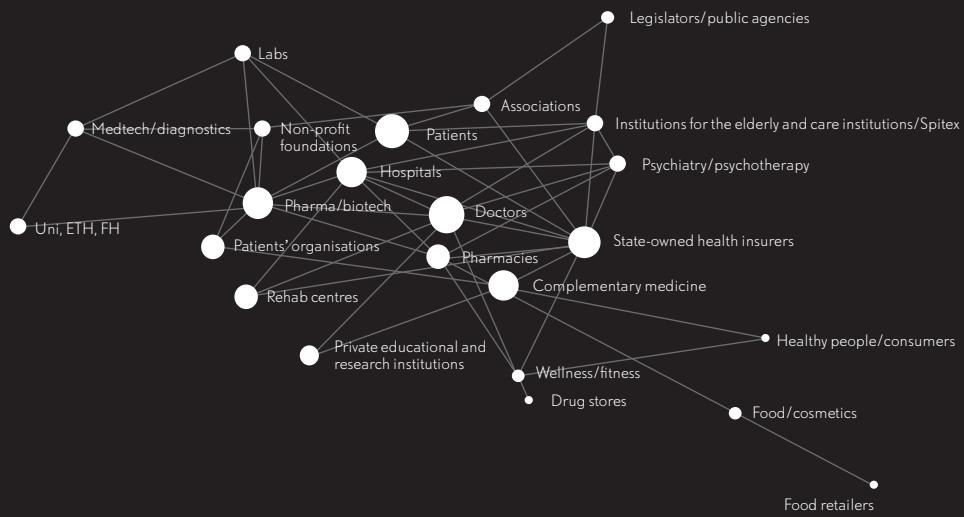
In a study conducted by W.I.R.E., managers of companies in the healthcare system were asked about current and future cooperation. The evidence indicated that they saw more potential for new cooperative relationships, particularly in the area of maintaining and promoting health.

However, no fundamental change was identified: doctors, health insurance companies and hospitals currently lead the field as key cooperation partners. The trend shows that these three sets of actors will continue to head the rankings in the future. While in qualitative interviews the decision makers surveyed describe far-reaching change in the system, with, for example, new actors from the consumer goods markets or the IT sector capturing key roles, they do not appear in the systematic, quantitative survey about future networks (FIG. 1).

FIG. 1 — Network of the future (strong links),
[n = 485]

Only complementary medicine will make major gains
in importance in the network of the future

The size of the elements shows the importance of the individual actors



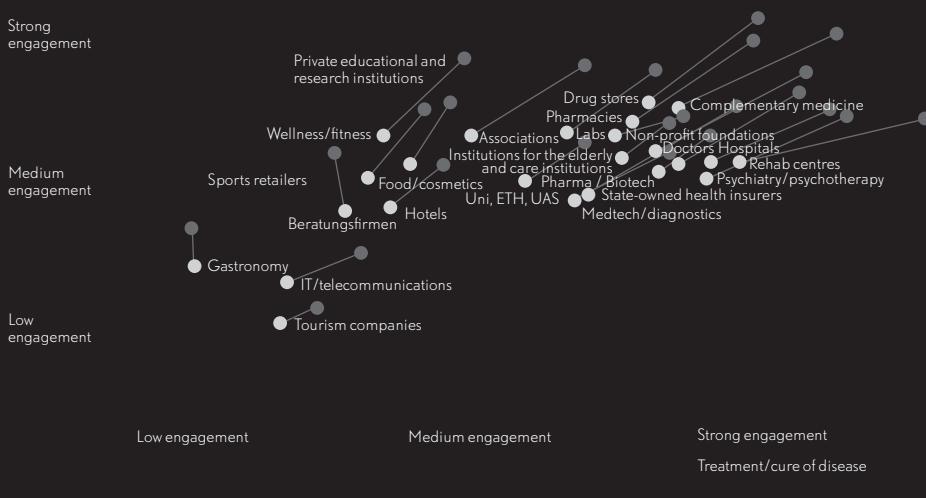
Source: Ulbrich & Sigrist
2009

The study investigated the future positioning of companies not only in health promotion and preventive medicine but also in market sectors that focus on the cure of diseases or rehabilitation. 52 percent of the companies surveyed tend to want to expand their engagement in the areas of health promotion and maintenance in the future, 16 percent actually want very strong expansion. In total, 68 percent of the organisations surveyed aim to increase their engagement in health promotion in the future. More than half of the respondents expect an increase in their engagement in the area of treating and curing diseases in the future. While 35 percent expect their engagement in the sickness sector to remain the same, the figure in the health sector is 24 percent. Only just under 4 percent of companies are considering reducing their engagement in the area of health and 3 percent in the area of sickness (FIG. 2).

FIG. 2 — Present and future focus in the field of sickness and health [n = 485]

More than half of the actors surveyed want to extend their engagement in the healthcare sector in future, the focus is on curative care

Maintenance / prevention of health



Source: Ulbrich & Sigrist 2009

Hacking the system

Despite the system's inertia, it is essential for structures to be adapted to the future framework and for reforms to be driven forward. However, too often decision makers in politics, business and science are expected to produce final, long-term solutions. A master plan, so to speak, which can be used to surmount all challenges. It is often forgotten that this is impossible, even disregarding limited resources, shared power and limited funding. It is simply unrealistic to predict the future and produce final answers for such a complex and complicated system, and the expectations associated with a master plan will therefore lead in the wrong direction. Rather, we have to define the central goals and areas for action and develop ideas and possible solutions, in order to reach an approximation of the future by an iterative approach. In other words, the goal is to create space for innovation that places human beings at the centre, is not self-referential and stands the test of reality. This is a time-consuming and often difficult process that will inevitably have its failures, mistakes and unsuccessful projects. In addition to foresight, innovation therefore also and above all demands the courage to experiment, a culture that can deal with failure - and a dash of disobedience. In this spirit, we wish you, dear reader, far-sightedness and the courage to address the complex structures of the healthcare system and rethink it – and redesign it as “hacker”.

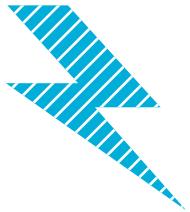
The authors

Healthlab

A significant part of the results in this book is based on the “Healthlab” project, which the think tank W.I.R.E. conducted between 2009 and 2013. The aim was to network experts from all parts of the healthcare system for a period of four years and to reflect rationally and impartially on the key future challenges and areas for action behind closed doors. These debates produced not only some of the statements in this book but also a variety of concepts that the participants developed and formulated on the basis of their personal experience. The ideas and food for thought here are not necessarily the opinions of W.I.R.E.

In this function, “Healthlab” took a pioneering role in the Swiss healthcare system by linking knowledge and opinions using an interdisciplinary approach and having representatives of industry, medicine, science and design reflect together on the structures of tomorrow’s healthcare system. The project was made possible with the support of partner organisations Sanofi, Amgen, IBM, Galenica and PricewaterhouseCoopers, whom we would like to thank at this point for their courage and far-sightedness. Above all, we would like to thank the 40 experts who supported the project over the four years with knowledge, time and commitment. A particular debt of gratitude goes to the Collegium Helveticum of ETH Zurich and the University of Zurich as well as to Julius Baer, W.I.R.E.’s strategic partners.

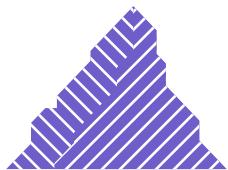
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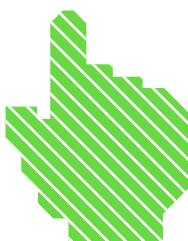
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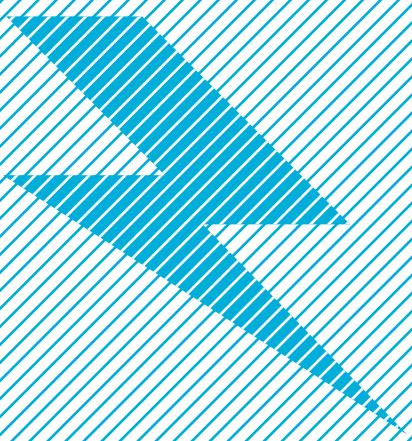
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What shapes the healthcare system of the future

The demands on the healthcare system's medical care and structures are not defined by technological progress alone, but also by demographic and societal factors such as the general understanding of health and changing individual lifestyles as well as economic conditions. However, relevant trends often cannot be clearly assigned to the present or the future; rather, they are a continuum.

However, not every indication of a possible change in the system, not every technology, however advanced, will become established. Conversely, new business models or therapies may spread very quickly if there is a high demand for them. Against this background, ten overarching trends which will determine the future framework for the healthcare system are presented below.

The growing mobility of the population and the promises of the multi-option society present new challenges to the healthcare system. The demand for flexible forms of medical care provision is growing. Yet with the new possibilities of the flexible structures, stress levels for providers and patients are also rising. As is the risk of sacrificing quality.

Change has become a constant in today's society. Flexibility is becoming an indispensable criterion for a person's success, both in private life and at work. Teleworking models and video conferencing are increasing employees' flexibility, we are accessible and productive around the clock at any location. This increased flexibility in personal and professional life has also changed family structures: work and leisure are dissolving into one, childcare and employee management are being carried out in parallel and to increasingly individual patterns. As the flexibility of our lives increases, mobility rises with it, more and more people are travelling long distances for work or play or to maintain social contacts: 19,000 kilometres per annum on average for residents of Switzerland.¹ As a counter-trend to a faster pace of life, slowness is also being rediscovered. Movements to "slow down" time will continue to grow. Concepts such as slow food, which is publicly proclaiming a return to the original way of eating, and the wellness boom are current signs of this trend.

The mobile society accordingly also demands more flexibility from the healthcare system in terms of the location and timing of the provision of care. For example, as mobility increases so does people's need for fast and uncomplicated access to medical services. Patients want to avoid long periods in doctors' practices and hospitals. There is an increasing call for medical offerings that are available during the everyday routine and as far as possible round the clock, and that take account of flexible working hours. Minimally invasive surgery facilitates this acceleration for hip or bypass operations and shortens hospitalisation time. "Walk-in clinics" in railway stations or supermarkets, which are accessible almost 24 hours a day, can be seen as an indication of the trend towards more flexible structures in healthcare. At the same time, there is less and less tolerance of time-consuming examinations and long waits for results. Moreover, new offerings are arising in the area of regeneration: to compensate for the increasing lack of time and sleep, a growing demand is developing for products and services that promise recuperation.

Even today, more and more medical treatment is on an outpatient basis, as Swiss hospitals' statistics also show. Between 2006 and 2009, around 5 percent more outpatient treatments were carried out than in the year before.² An increasing number of diagnoses is included in this figure. The demand for just-in-time/just-in-place measurements is likely to rise even faster than that for corresponding therapy offerings, since after all judgements have to be made during the everyday routine

as to whether a treatment is actually needed or not. With an increasing range of mobile diagnosis instruments available, more and more of which can be used in combination with smart phones and smart watches, monitoring and measurement of the body is shifting more and more into the everyday realm and into the hands of the citizens.

However, along with society's increased mobility, there is also a rising threat from epidemics, which can spread faster due to the rapid increase of worldwide travel and global food trade flows. Consequently, international early warning systems and surveillance of travellers from high-risk regions at airports and railway stations as well as in hotels are becoming more important. At the same time, the risk that decentralised offerings will lead to a loss of quality is increasing, because control functions have to be transferred to smaller care units. Patients and customers have greater flexibility to pick the most suitable offering from a selection, which means that the complexity of finding the right one is also growing. With direct access to self-gathered medical data, however, these data also have to be interpreted by the individual. More flexibility therefore means more work and also more costs.



While people in emerging economies are still threatened by infectious diseases, the frequency of age- and lifestyle-related disorders such as cardiovascular disease, diabetes, cancer or mental disorders is on the rise among the industrialised nations. This shift of the spectrum of disease towards chronic illnesses makes fundamentally different demands on the healthcare system, the current structures can no longer cope with the requirements of the future in terms of infrastructure and therapy concepts. However, even in the developed world there is still a risk of infectious diseases because of increasing resistance to antibiotics. The key to the problem may lie in a change in behavioural patterns and not just in new therapies.

As a consequence of increasing life expectancy, lifestyle changes and the increased demands of working and everyday life, the spectrum of disorders in the developed world is shifting towards chronic illnesses and lifestyle-related and mental ailments. Demographic developments will have a major influence on future diseases; Switzerland is among the countries where the over-60s is the fastest-growing population segment. Whereas around 17 percent of Swiss people are more than 60 years old today, by 2035 the figure will be up to 26 percent.³ Typical age-related diseases such as cancer and dementia will therefore increase, chronic illnesses will be part of everyday life. After cardiovascular diseases, cancer is the biggest killer in the developed world. The number of diseases of the nervous system is also on the increase: in Switzerland, cases of dementia are expected to more or less double by 2050.⁴

Demands on performance and flexibility in working life, leisure time and the social environment are rising for people in the highly developed world. Stress, overexertion and also loneliness as a result of increasing individualisation are leading to an increase in mental illnesses. According to the World Health Organization (WHO), around 450 million people in the world today are suffering from mental illnesses, including anxiety, depression and dependency disorders. Depression, for example, is already the most significant illness causing the loss of healthy years of life.⁵

As a consequence of changing eating and exercise habits, lifestyle-related diseases also continue to spread. Excessive consumption of high-energy fats and sugars, together with the increasing lack of exercise, is one of the main reasons for the progressive rise of obesity. Diabetes and other metabolic diseases are one consequence, as well as the increased risk of cardiovascular disorders such as high blood pressure. The prevalence of diabetic disorders is increasing rapidly, not only among older people, but also in younger segments of the population.⁶ In Switzerland, the total number of diabetics is officially estimated at around 300,000.⁷ However, experts assume the existence of a “dark” figure of double that number.



With growing affluence and the transition to higher-calorie nutrition based on the Western model, emerging economies like China and India are also struggling increasingly with lifestyle-related diseases. Cases of obesity, diabetes and cardiovascular diseases resulting in heart attacks and strokes are rising significantly in these countries. The latest studies assume that there are 92 million diabetics living in China alone, only 12 million of whom have been officially diagnosed.⁸ Infectious diseases have declined significantly in China as in other countries. The chronic diseases, in contrast, have increased because of lifestyle changes and deteriorating environmental conditions. Existing inpatient structures have to be reconsidered, since many of the chronic diseases arise in everyday life and can only be treated in inpatient establishments such as hospitals to a limited extent. Calls for treatment to be embedded in everyday structures are becoming louder. The same applies to a focus on early recognition and prevention, which are considered absolute prerequisites in the field of diabetes, for example, to ensure that healthcare systems remain affordable in the medium term.

In the emerging economies, infectious diseases are still the main cause of death. More than four million people worldwide fell victim to tuberculosis, HIV and malaria alone in 2008, most of them in sub-Saharan Africa.⁹ Here, too, however, cases of cancer are soaring – more than half of all cancers worldwide occur in these regions, one third of them triggered by pathogens.¹⁰ In addition to transfers from person to person or through insects, contaminated water is the main reason for the rapid spread of infections. Yet infectious diseases could increase again in the industrialised nations as well, as pathogens become progressively more resistant to drugs and average temperatures rise. Resistance to antibiotics in particular has become a serious problem for the preservation of public health worldwide. One in five of the 400,000 tuberculosis sufferers in Europe is difficult to treat because commonly used drugs are not efficacious against the multi-resistant form of this lung disease (MDR-TB). In total, this multi-resistant form already accounts for more than 5 percent of the twelve million tuberculosis cases worldwide.¹¹ With the rising threat from Ebola, it has become evident that an effective healthcare system has to be based not only on the availability of active substances, but also on health competence. This applies equally to emerging economies and industrialised nations, whose populations have succumbed to illness due to unhealthy behaviour.



Today, good health is a basic prerequisite for social acceptance and career success. This establishes a key condition for the further popularity of a healthy lifestyle throughout the entire population. With the increasing demands on high performance capabilities and good looks, however, there is growing pressure on people. As a consequence, health and appearance are being artificially altered with technical aids and progress in plastic surgery. Health-related stress continues to increase.

Health is considered one of the highest societal values in the industrialised nations. And with the broadened definition of mental and social well-being health is omnipresent and embraces all areas of life from nutrition and shopping to travelling or home-building. Many of our decisions influence our health directly or indirectly. The status of a healthy lifestyle has also changed fundamentally over the past years. While in the past health was associated with abstinence, nowadays it stands for hedonism, good looks, but also a conscious lifestyle. Peace, healthy eating and a natural life are increasingly regarded as actual luxuries. Moreover, health is increasingly being put on public display by means of health and beauty products and the eternally young and active body. Cosmetic surgery institutions and fitness offerings to tone and rejuvenate the body will continue to boast a growing clientele. More and more old people, too – with greater purchasing power behind them than the previous generation – want a physically active and mentally vital life. Just under half of Switzerland's senior citizens today do sport one or more times a week¹² and special senior citizens' universities - there are now nine of these in Switzerland – report record numbers of registrations.¹³ The days of well-nourished business and political leaders are also over. Physical activity and an immaculate appearance have become essential to every career.

Conversely, in view of our knowledge about lifestyle's influence on health, illness is more and more frequently understood as a failure or the consequence of a person's own behaviour. Health, in contrast, is becoming a status symbol that defines a person's place in society. The pressure on the individual to remain healthy, high-performing and good-looking is growing. As a result, the solidarity between the sick and the well stands on shaky foundations. To an increasing extent, this relates to people who suffer from diseases that are potentially their own fault as a consequence of the wrong diet or the consumption of addictive substances. These behaviours and low health competence correlate very frequently with a low level of education and income and a migrant background.





However, this “health pressure” is also leading to counter-reactions: the striving for beauty, youth and health is simply too much effort for many, the enjoyment of unhealthy foods or of potentially health-damaging activities such as sunbathing or smoking is given higher priority. To express disgruntlement with society and its values and to set themselves aside from it as individuals, people are going against the general trend and deliberately rebelling against the social norm.

Most people, however, will continue to strive for an idealised self-image free of flaws and deficiencies. If lifestyle changes to maintain and improve health reach their limits, technical medical tools are used. In more and more cases, technologies that actually serve a therapeutic purpose can also be used to improve the human body – for human enhancement. Regenerative medicine is already capable of repairing or recreating individual parts of cells and organs.¹⁴ In addition, with increasing frequency damaged tissue is being healed or repaired using the body’s own stem cells.¹⁵

Implant technology methods could also be used to improve performance.¹⁶ For example, researchers are working on implanting an electrode into epilepsy patients that recognises early when an attack is imminent and triggers the release of a drug in the body. External aids like Google Glass, which places information from the Internet directly in front of the wearer’s eye, could also be inserted in the body in miniaturised form one day.

Health-promoting nutrition is another element of healthy living. Organic products are in ever greater demand, foods containing healthy ingredients with artificial supplements are also gaining in significance. The production method will ultimately become negligible because the way food ingredients interact and impact on health at the molecular level is better understood. The health benefits of organic and functional high-tech foods are reaching parity.

With the growing economisation of the healthcare system, marketing is playing a more important role in medicine. Healthcare products and doctors' practices are becoming ever more fancy, private hospitals bear an increasing resemblance to luxury hotels, Botox treatments are offered in parallel with visits to the hairdresser, body measurements using smart phone applications and other gadgets are becoming an end in themselves, even where no medical necessity exists. The emotionalisation of health services may help to promote healthy behaviour. However, this "staging" may also undermine the professional nature of medical therapies.

In a rationalised world, people's receptivity to emotional stimuli increases. The desire for special experiences grows. This is demonstrated partly by the way many products in saturated markets are successful and stand out because of their image and the experience they communicate, although standardisation has led to virtually uniform real product quality. Consumers are willing to pay for emotional value: Apple's lifestyle computers, for example, command a price premium of up to 100 percent compared to mass market products.

More special experiences are being demanded and offered in the healthcare system as well. Along with specific wellness offerings that promise special sensory experiences far remote from everyday life, experiences in medicine are also becoming more important. Appealing premises and selling spaces are gaining in importance in hospitals, pharmacies and doctors' practices. In addition, unconventional concepts such as "making your own suppository" are being offered in special pharmacies.¹⁷



As health and sickness become eventised, patients increasingly want to discover their own bodies, for example at check-ups where the lung function is analysed on ultrasound equipment together with the doctor or by independent checks on sleep using mobile phone apps. Measuring your own body and your life is becoming a special experience that is pursued by more and more people around the world in the “Quantified Self” movement.¹⁸ Using small electronic instruments or mobile phone apps, personal details such as the length of working hours, sleep patterns, mood or even television consumption in everyday life are recorded and analysed. The measurements are based on the assumption that not only health, but quality of life in general can be improved by quantifying everyday routines: for example, if a systematic analysis of e-mail contact with friends allows you to make inferences about your communication behaviour in various forms of relationship and facilitates personal psychological learning effects. The US company 23andMe, which specialises in DNA analysis, goes a step further. Buyers receive a kit for taking saliva samples, including DNA analysis.¹⁹ Using the genetic information allows you to identify your family tree and health predispositions and to network with the 300,000-plus members of 23andMe.

Experiencing your own body is increasingly practised not only for medical purposes, but also for entertainment; health-related applications are being “gamified”.²⁰ Health games such as the mobile phone game Epocrates, where the aim is to identify more than 100 diseases as quickly as possible on the basis of symptoms, help people to confront their own bodies and the field of medicine by way of play. However, there are also risks involved: as such fun apps become popularised, there is increasing uncertainty among patients about which medical apps and tests they can trust for a serious assessment of their health.



The individualisation of society is extending more and more to health. The body and state of health are becoming a means of projecting individual values and people's own personalities. At the same time, the call for tailor-made medical services is getting louder. A central driver is the increasingly precise measurement of mind and body. However, with increasing personalisation the costs will tend to rise again. Which means answering new questions about our right to the amount of tailor-made services on offer in a solidarity-based system.

In the course of time, the importance of social distinctions such as gender-specific roles, class, origin, region, age group or profession has declined in the Western world in particular. Individual existence has taken the place of the traditional norms. More and more people are opting to pursue their own goals and to focus on their own personal values. One consequence is that the number of single households is rising continuously, likewise the number of families with no children or only one child. For example, according to an OECD study more than half of all households in the industrialised member countries are childless.²¹ With the increasing social importance of the individual, the aspiration of self-actualisation has also grown, people's own ideas of lifestyle and career are central. At the same time, the spectrum of possible life models has widened enormously in the past decades, people can choose between more and more options. This is accompanied by greater independence, which is further encouraged in the digital age by individualised acquisition of information.

Individualisation has various consequences for the healthcare system: body and health are becoming important instruments for giving expression to individual responsibility and self-determination and for projecting these expressions. This emancipation is making many patients want to discover their own bodies and to play a greater role in diagnosis and therapy. Doctors and medical institutions will find themselves more and more frequently confronted with patients who focus on their personal ideas of the medical model and treatment.²² Attitudes towards the healthcare system and medicine will accordingly be increasingly shaped by individual views of the world. Whereas the foundations of school medicine and science were dictated by experts and accepted in the past, more and more people are now taking decisions on the basis of their personal values about what kind of medicine they "believe in". Whether an infection should be treated by homoeopathy or antibiotics is viewed as part of individual freedom of choice, expert opinion, in contrast, is being treated increasingly as advice.



At the same time, medicine is experiencing personalisation through drugs. For example, selected therapies, particularly in cancer treatment, have been tailor-made for patients on the basis of pharmacogenomic methods for some years now. The drugs are only administered once it is known for sure that the active substances will actually take effect in the patient. On the basis of advances in diagnostics and the improved understanding of the molecular processes in the occurrence of diseases, it can be assumed that the market for individual forms of treatment will increase further in years to come. However, this will no longer comprise personalised drugs only, but holistic offerings that are aligned with a patient's needs along a chain of treatment. The prerequisite for being able to provide holistic and personalised treatment is a precise record of a person's constitution and environment, which also includes taking mental and social influences into account. Corresponding analysis methods for their quantification and evaluation by the patient will gain in importance. With increasing personalisation, quality and also costs are likely to rise because the efficiency advantages of standardised therapies and treatments will disappear.

The omnipresent Internet is creating new social and virtual spaces. People have been exchanging information about their private lives for years. Now, social networks are successfully invading the healthcare system more and more, with patients consulting independently among themselves and making their data available for research into rare diseases. However, they will only do so if clarity prevails about the ownership of the data and if it is ensured that patients themselves also stand to gain.

As a result of the collapse of traditional communities and of progressive individualisation, a social vacuum has developed in the past decades in which many people long for a sense of belonging, direction and security again. In this connection, the Internet is treated as the new hope of a more democratic and more participative society. Communities, forums and social networks in which common interests, experiences or opinions are exchanged and people once more feel themselves to be part of a larger whole have experienced enormous growth rates. Virtual networks, the sharing economy, open source and crowd-funding lay the foundations for democratised and integrated communities. The behaviour of a new generation of Internet users, the so-called “digital natives”, who have grown up with social media such as Facebook and Twitter, will also increasingly influence the healthcare system. They no longer rely on the traditional form of political representation, but grasp the initiative themselves by exerting influence according to the bottom-up principle of the social networks, independently of the agenda of the politicians and the business elite.

The democratisation of the public sphere caused by the networking of citizens, customers and patients across borders and social classes will continue to increase and lays the foundations for new services and offerings along the value chain from research to therapies: in the USA, digital patient networks such as PatientsLikeMe have become established in the past few years.²³ Using such networks, people can upload their own case history to the Web, search for diagnoses and possible therapies and exchange ideas with other patients suffering from similar symptoms. The objective is to understand your own state of health better and to document it in order to be able to make a more independent choice of therapy and medication. The network now has more than 200,000 registered users. An enormous database that can be used for studies or more accurate therapies is created as the users share case histories, diagnoses and therapies. For example, PatientsLikeMe launched a platform in 2013 to find new ways to measure states of sickness and health with the involvement of its users and to share this information on an open access basis.

New methods of financing such as crowdfunding allow virtual communities to carry out clinical studies quickly and easily – and often with a better database than the big pharmaceutical companies. In addition, social networks' communities can have studies conducted on specific diagnosis groups which are of insufficient commercial interest to the industry, or can review and revalidate results of clinical studies. However, this type of peer-to-peer research also throws up regulatory, licensing and validation issues.²⁴

Doctors are also networking increasingly online. Doximity in the USA is the largest doctors' network in the world, with more than 700,000 registered profiles.²⁵ It is also known as "the doctors' Facebook" and is mainly intended to help general practitioners to find specialists for complex cases.

The Internet has empowered people in the health sector to network, to create patient-centred offerings themselves and therefore to reduce their dependence on service providers and manufacturers. In future, this new form of medical self-determination will increase even further with the refinement of the technologies required and the rise of a generation shaped by the digital age. This will strengthen patients' emancipation and change traditional research, since people's life situation and habits will be included.



The mechanisms of the consumer goods markets increasingly apply to the healthcare system as well, patients are becoming consumers. However, the risk of polarisation into luxury and discount medicine is growing.

Healthcare expenses have been rising steadily for decades. According to the latest health figures for OECD countries, they increased by around 5 percent per annum between 2000 and 2009. However, this growth flattened off with the start of the global financial and debt crisis. Switzerland ranks as the third most expensive country in the world in this context.²⁶

Healthcare expenses will increase again in the next few years. The call for austerity measures and efficiency improvements will increase and affect all areas that are financed by the solidarity-based basic insurance system. In particular, reductions in the price of drugs and medical technology products are being demanded, likewise cuts in the services that are covered by the basic insurance. To increase efficiency, models are being transferred more and more from the private sector and consumer goods markets to the healthcare system. For example, logistics in hospitals is already being organised on the basis of the Lean Management principle that was developed at Toyota in production and that aims to optimise the value adding process holistically and by avoiding superfluous activities.²⁷

It is becoming a central requirement of evidence-based medicine to quantify therapies for comparability. It remains problematic that precise quantification of medicine is often impossible: medicine is not an exact science. It also remains difficult to assess the value of preventive medicine, because a very large number of influences has to be taken into account and continuously recorded and evaluated over a long period of time.

Patients are increasingly taking their orientation from their experiences as consumers and transferring this knowledge to the healthcare system. The decision on whether and what healthcare services will be used is made more and more frequently on the basis of price and quality, offers are compared. This means that a similar polarisation into premium and discount segments is emerging to that which is being observed in the traditional consumer goods market.

The increasing demand for health services is creating a growing market which makes a significant contribution to economic growth in many countries. It is assumed in Switzerland as elsewhere that hospitals have a major future growth potential.²⁸ In particular, the so-called “secondary healthcare market”, in which consumers and patients pay for services out of their own pockets, could grow significantly in future. The major part of this market consists of prevention- and beauty-focused offerings from the fields of nutrition, wellness or aesthetic medicine as well as electronic devices to monitor fitness. In contrast, it is still difficult to estimate the market potential for sickness-oriented therapeutic products and services that are not financed out of basic insurance cover.



The progressive digitisation of the healthcare system creates the precondition for more efficiency and improved decision-making bases. In addition, more possibilities for therapy and care are emerging, although these are accompanied by ethical issues. Among other things, the risk of cyberchondria is increasing with free access to medical data. Above all, however, the growing possibilities of technology have to be weighed up against their actual benefit to the patients.

The rise of data-based medicine

Digitisation is advancing rapidly and will influence medicine more and more. Even today, the Internet is the second most important source of health information after the doctor for patients and consumers.²⁹ In Germany, one person in three already seeks medical advice online. People use forums, health lexicons and interactive healthcare platforms to obtain information or advice, exchange experiences with other patients and make their own decisions on the optimum treatment. The Swiss portal “Sprechzimmer” (“Consulting Room”) registers around 20,000 visitors per day. However, the various online offerings differ sharply in terms of the quality and timeliness of the information, there is virtually no quality control and reliability is often difficult to judge. Serious websites in this area, such as WebMD, try to counter this problem with certification.³⁰

At the same time, the all-pervasive presence of the Internet is leading to a society with limitless access to information. The sheer volume of data may, however, become a problem, it grows every year by around 60 percent.³¹ It is barely possible for non-experts to check the relevance and veracity of the information. The result is often more confusion rather than more transparency. With this overload, cases of so-called “cyberchondria” are also increasing, whereby patients surfing on the Web imagine without objective grounds that they have serious health complaints. On the one hand, this happens because fragments of information are not professionally organised within a larger context. On the other, because statistically an above-average number of patients for whom normally effective treatment has failed to work exchange views and experience on health forums.

However, the blanket coverage by wireless Internet connections networks not only more people, but also everyday objects. More and more of these may be equipped with powerful microchips and mini-sensors, transforming them into little computers that intercommunicate independently. An “Internet of things” is developing that supports humans as a thinking environment.³² Cisco estimates that by 2020 around 50 billion things will be connected to the Internet.³³



Networking diagnostic measuring instruments enables improved and continuous checks on a person's state of health. Sensors and chips that are built into the natural environment, worn on the body or implanted will increasingly monitor health-related parameters automatically and analyse the resulting data - and then even be able to dispense the correct dose of a drug. Together with online patient care by doctors, pharmacists, nurses and health insurance companies, this will result in patients' more and more frequently receiving digital diagnoses and therapies, and doing so in their everyday routine. This will lay the foundations for the development of convenient measuring and monitoring methods at home.

So far, the healthcare system has not made sufficient use of the quantities of data that are gathered by hospitals, doctors, industry and public agencies. This is mainly for data protection reasons³⁴ and out of fear of data misuse. The potential of analytical and diagnostic devices is ultimately based on increasingly powerful algorithms that are already making it possible to reach accurate diagnoses in specific areas or to select the right therapy from an enormous number of possibilities – in oncology, for example.

With the inclusion of artificial intelligence, robots are also gradually becoming more important. For example, RP-VITA, one of the leading medical robots, was licensed by the US Food and Drug Administration (FDA) in January 2013 for use in hospitals.³⁵ So-called “telepresence robots” are already in use in Irish hospitals. They are fitted with a monitor and a camera and can then visit patients and serve as the physical presence of a doctor at a remote location, allowing him or her to look after patients in different hospitals. The same robots can also be used by patients who cannot leave their sickbeds. For example, a young person was able to take part in family life at home and attend school during a stay in hospital with the help of the robot.



Digitisation is therefore also influencing the physical world more and more. Technologies such as 3D printers are also laying the foundations for decentralised production methods. For example, it is possible to make implants for dentistry or reconstructive surgery that are tailored to a patient's specific anatomical features. With the support of orthopaedists and designers, a family recently produced its own prosthesis for a daughter who suffers from a rare muscle disease. The technology opens up still more possibilities for the future: researchers are working on producing drugs locally with tiny chemical reactors and a 3D printer – for example for use in a pharmacy or the patients' homes. Pharmaceutical companies would then sell only the blueprint. Even today, cell biologists at Princeton University³⁶ in the USA have “printed” an ear,³⁷ an artificial liver has also been produced. At the same time, initiatives that are intended to enable citizens to make their own biotech instruments and to test methods are becoming established.³⁸ Even if this procedure, known as bioprinting, cannot yet be used in most cases, we are not far away from seeing the first printed body parts licensed.

Globalisation is moving forward, markets from east and west are networked and interdependent. In the healthcare markets, too, national borders are losing their significance and emerging economies are becoming established. Nevertheless, human beings' local roots will ensure, when they are ill, that there are limits to globalised medicine.

Economic globalisation continues relentlessly. Between 1950 and 2010, the global trade in goods – measured by exports – grew around 33-fold, while global GDP multiplied nine-fold in the same period. Trade flows are planned and optimised globally, companies in industrialised countries are manufacturing goods in the Far East and today's business world depends on the recruitment of global talents. Triggered by a global economy that depends on low-cost manufacturing locations for consumer goods, the emerging economies have gained not only economically, but also politically in significance, while the industrialised countries see their dominant position and the Western liberal order threatened in the longer term.

For healthcare systems, globalisation brings new opportunities. The emerging economies and wealthy Gulf states are building up or extending their healthcare systems. China's healthcare expenditure, at around USD 360 billion in 2011, has more than doubled since 2006 and is likely to rise to one billion US dollars by the year 2020. The number of hospitals is rising sharply and the country has already advanced to become the third largest market for prescription drugs after the USA and Japan. International pharmaceutical companies, hospital chains and insurance companies are storming the Chinese market. Joint ventures are often concluded with Chinese companies in order to obtain licensing approval from the authorities. However, the healthcare market is beset with hurdles for private-sector foreign companies, so a shakeout is expected in the next few years.³⁹

This development contrasts with the internationalisation of the healthcare system in the Gulf states. Although far advanced, unlike the emerging economies, the Gulf states' healthcare provision is built on the knowledge and experience of foreign doctors and managers, healthcare services are mostly bought from outside. For example, many branches of established large, international hospitals are now established in the Gulf states. The US-American Mayo Clinic and Cleveland Clinic and the Swiss telemedicine company Medgate have representative offices in the region.

However, there are limits to the globalisation of the healthcare business: consultancy firm McKinsey points out that it is hard for foreign private-sector insurance companies to operate profitably in the Chinese healthcare market.⁴⁰ And the dependence of Saudi Arabia's public hospitals on foreign skilled workers demonstrates the fragility of the local healthcare system there. Ultimately, however, human beings' local roots more than anything else set limits to the globalisation of medicine: patients' willingness to travel long distances is limited and is only likely to play a major role if healthcare services in their home countries are cut. Nevertheless, the importance of cross-border use of healthcare services in neighbouring countries will continue to increase.



As many people become increasingly insecure about the excesses and profit orientation of global companies, the fragile equilibrium between economy and society is being threatened all over the world. Citizens demand a fairer distribution of wealth. The state responds with more stringent regulation – including in healthcare systems. This may be a foundation for more fairness, but there is also a risk that it will bloc innovation and reduce medicine's efficiency. First and foremost, however, new ideological debates on principles and systems are being conducted that have little to do with added value for human beings.

The return of the strong state

The global debt and financial crisis has emptied government coffers in Europe and led to a reduction in public services. The call for governments to take corrective measures has grown louder and the regulatory environment has changed as a result, particularly for private industry. More stringent regulatory requirements are being enforced, the state is assigned more and more competences to oversee and sanction businesses. Not only prominent areas such as the banking sector are affected by greater regulation and protectionism, areas like social welfare and global trade are also included.⁴¹ All over the world, an era of re-regulation is looming in politics and business.

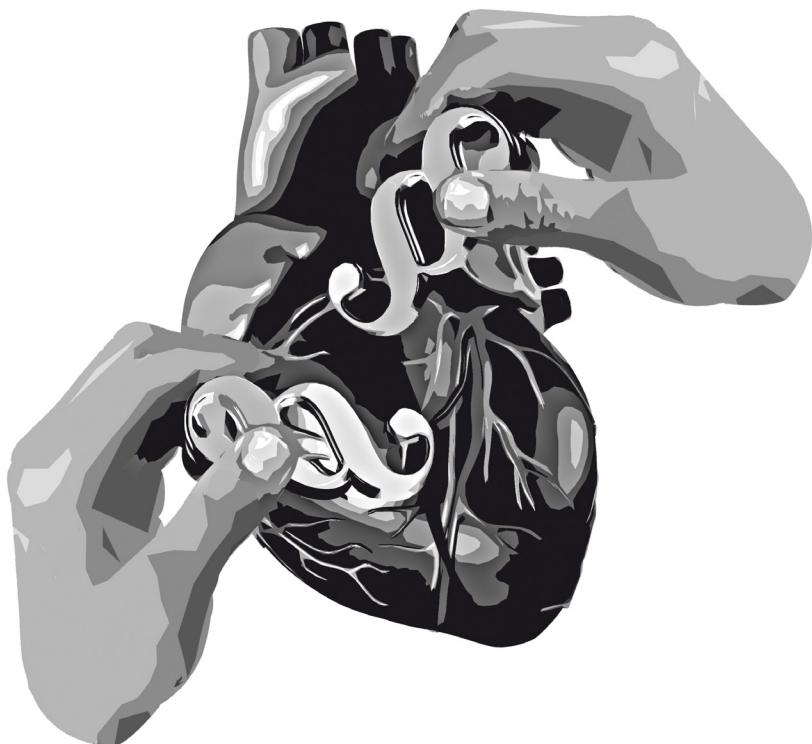
The regulatory boom is being particularly felt in the health sector: a significant majority of decision-makers in healthcare and pharmaceutical industries assumes that government and its regulatory bodies will have the biggest influence on the development of their companies in the future, even more so than customers.⁴² Reasons for the increasing state regulation and oversight of healthcare systems in the industrialised countries are, on the one hand, increasing cost pressure and the accompanying higher demands on measuring and ensuring efficiency and quality. Centralised control will be further encouraged in the future by the increase in the older population and in chronic diseases, the general change in the delivery of healthcare services as a result and broad national efforts to fight chronic diseases.

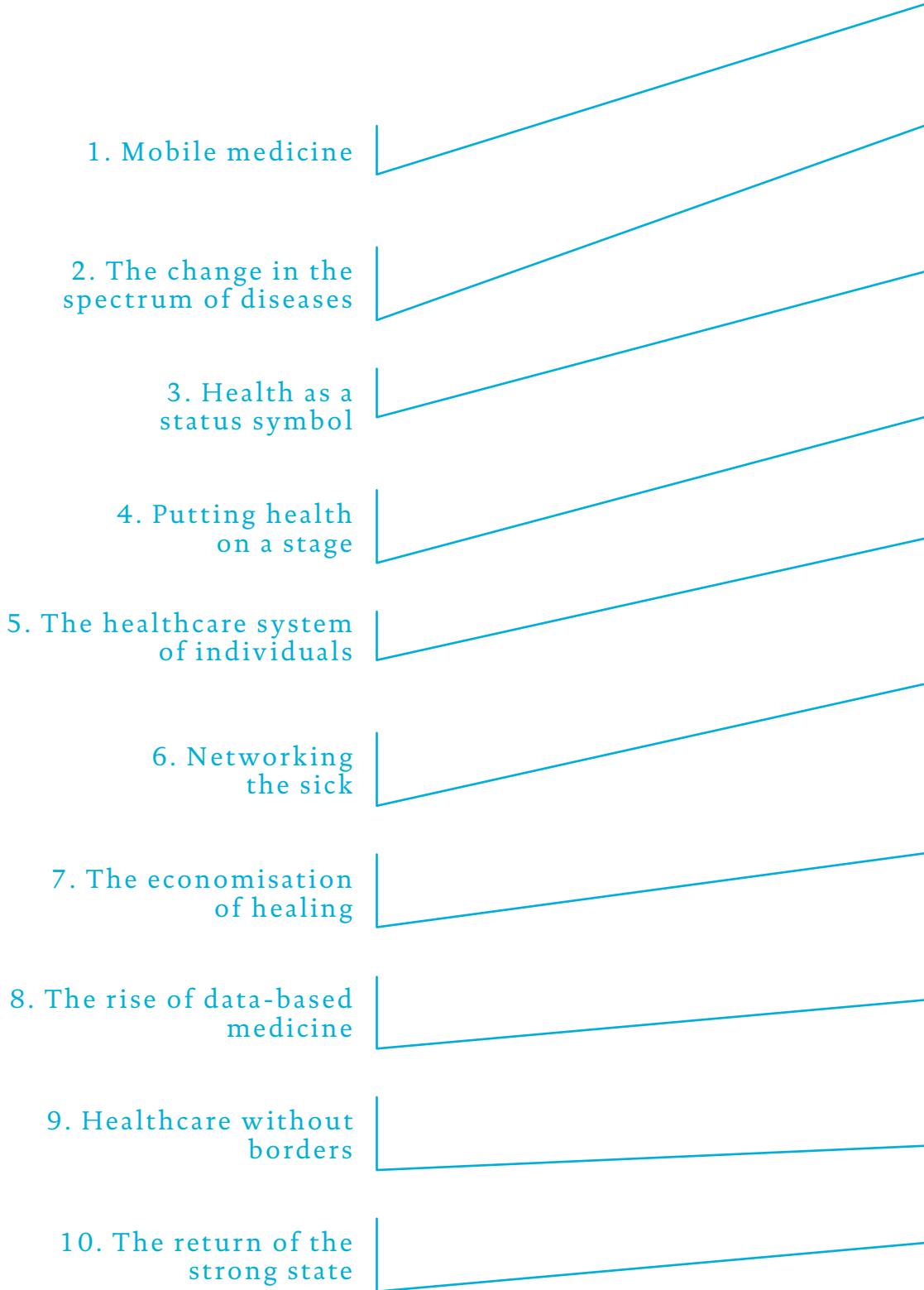
In the course of this development, regulatory controls will increase particularly in the healthcare systems of the developed world, which are strongly influenced by the state. For example, the licensing criteria for drugs and therefore pressure on the industry will increase. In addition, regulatory requirements will increase further because of new payment models, such as the “pay-for-performance concept”, in which payment is only guaranteed if the product actually has the desired effect on the patient. The increase in over-the-counter drugs and health products, in the areas of food supplements and functional food, for example, will also contribute to a rise in regulatory restrictions on product labelling and quality standards.

“Healthcare reform” has become a buzzword in the industrialised world. In the USA, President Obama made a major intervention into the healthcare market with the Patient Protection and Affordable Care Act 2010 to ensure that all citizens received care. This legislation divided political camps in the USA and sparked off an ideological debate about the state ensuring basic healthcare provision. That debate is raging in Europe as well. The question as to how to respond to the rise in healthcare costs still awaits a clear answer.

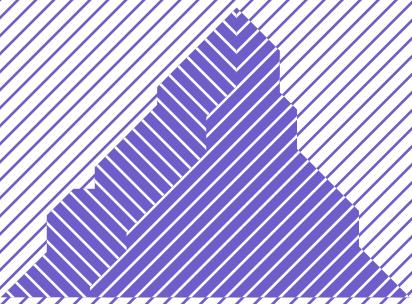
The Swiss healthcare system is also showing a tendency towards centralisation and increased regulation. More and more tasks are being shifted from the cantons to the Federal level, which in addition is taking on a stronger supervisory role in the area of quality assurance and the implementation of new standards.

Many healthcare reforms still fail on the power and influence of well-organised vested interests. Nevertheless, the signs all over the world point to a stronger role of the state, with consequences for business, society and politics. On the one hand, this forms a basis for making the system appear fairer to the public, on the other, however, there is a risk that more regulation will increase administrative expenditure, obstruct innovation and thereby also reduce the quality of what is offered to the patients. The assumption must primarily be that as insecurity arises there will be more debates about ideological principles and discussions of systemic issues that have no direct impact on the quality of the healthcare system.





- Greater mobility and flexibility in the population
 - Medical offerings round the clock
 - More out-patient treatments
 - Increasing demand for recuperative offerings due to increased stress
-
- Increase in chronic diseases in industrialised countries, in particular age-related, lifestyle-related and mental illnesses
 - More lifestyle-related illnesses such as diabetes in emerging economies
 - Alongside infections, sharp increase in number of cancer cases in emerging economies
 - Threat to public health from global resistance to antibiotics
-
- An aware lifestyle and good looks as an expression of health
 - Increasing pressure on individuals to be good-looking and healthy
 - Boom in cosmetic surgery and fitness offerings
 - Threat to solidarity between the sick and the well
 - Health-damaging behaviour as rebellion against social norms
-
- More “staging” of health and medicine as special experience
 - Increasing discovery of the body through electronic gadgets
 - Improved health and quality of life through measurements in everyday routine
 - Healthcare applications beyond medical purposes
-
- Medical treatments based on personal conceptions
 - Understanding of medical opinion as advice rather than instruction
 - Increased efficacy of medication through personalised drugs
 - More measurements of personal constitution and environment as a prerequisite for individual treatments
-
- Increasing longing to belong to groups
 - Growth of digital patient networks to exchange knowledge and experience
 - More emancipated patients because of digital networking
 - Democratisation of medical research through patient networks that gather data and conduct studies
-
- Increased pressure on healthcare services financed on the basis of solidarity to be economical and efficient
 - Healthcare system increasingly operating according to consumer market mechanisms
 - Growth of the consumer-oriented secondary healthcare market
 - Polarisation of healthcare provision into discount and premium segment
-
- Internet as most important source of health information
 - Growing cyberchondria (people imagining they have diseases on the basis of Internet descriptions)
 - State of health monitored by sensors in the surroundings and on the body
 - Better, evidence-based diagnoses through collection and analysis of data
-
- Healthcare systems in emerging economies being built and extended
 - China now one of the most important markets for healthcare goods
 - Increasing use of healthcare services in neighbouring countries
-
- State regulation intensifying, including in healthcare systems
 - Tendency towards centralisation and interventionism becoming perceptibly stronger, national bodies are gaining influence in healthcare provision



What obstacles have to be overcome

The healthcare systems in Western democracies are now confronted with major challenges on a wide variety of issues. These range from fragmented care provision through unclear accountabilities and duplication in oversight to new demands on a society faced with the simultaneous occurrence of an aging population and a shortage of care personnel. Today's healthcare system is strongly focused on the present – the main concern is therefore to address these challenges from a long-term point of view. The current problems are unlikely to be resolved in the next few years. Nevertheless, they have to be considered and solutions for the future developed today if tomorrow's healthcare system is to be more efficient, focused and holistic.

Strong fragmentation

Fragmentation is on the rise in the healthcare system because of mounting requirements on skilled worker specialisation and the resulting distribution of tasks. This is a prerequisite for quality and efficiency. However, as a result we lose sight of how things fit together, both in medicine and in healthcare services. There are no structures in place at present to enable connected and integrated healthcare provision and financing along a person's complete case history and across several providers - and this despite the fact that the need for integrated care will increase further with the rising number of chronically sick people. Ultimately, fragmented structures adversely affect the quality of treatment and also preclude any chance of consensus in health policy.

Care is fragmented,
not networked

No orientation after
leaving hospital

Financing is isolated, not
cross-functional

Non-profit organisations
act as lone warriors

With the increase in chronic and multimorbid illness, diseases are becoming more complex and more people have to live with them on an everyday basis. This calls for long-term, integrated care of people by different providers, which is currently lacking.

Supporting and integrated care is not yet a reality in many Western countries, there are gaps in the networking of care providers. Multimorbid patients with various or chronic diseases often have difficulty in finding the right care. After the end of hospitalisation, many patients have reported failings in post-surgery care: for example, they were not provided with contacts, clear instructions in the event of complications or plans for coordinated care for the period after they were discharged from hospital.

Financing for healthcare provision is fragmented at present and is handled by different actors in isolation rather than cross-functionally along the entire treatment chain. This breeds a lack of transparency and higher health expenditure because costs cannot be measured against the benefit that arises along several steps in the process of hospital treatment until reintegration into work and everyday living. The partial view also encourages a short-term perspective that reduces therapies to the small area to be financed.

Charitable and non-profit organisations in the health-care system are fragmented into a lot of specialised individual groups. As a result, their influence on health policy is limited. As representatives of the population and the patients, however, they would be in a position to help align the system better with the needs of human beings.

Lack of debate and structures that fail to meet needs

The framework and care provision structures in the healthcare system are increasingly failing to meet the needs and requirements of the population. The reasons lie not only in real developments that are changing what people need from healthcare – such as a rising number of elderly, chronically sick or more mobile people – but also in the absence of fundamental debates that would clarify what we as a society want, need and are prepared to finance – thus making it possible to work out appropriate solutions. For example, the cost/benefit ratios of expensive therapies and their financing are rarely discussed widely with the general public. Questions about whether and how drugs to improve concentration should be medically prescribed are largely restricted to expert circles. And there is no debate about practical concepts for dying at home. The fact that such important but difficult discussions are blanked out of the public view is partly why relevant topics are often identified late and need-based care structures are often unavailable as a consequence.

Holistic care

Cost and benefit
of therapies

Drugs for physical and mental
improvement

Expansion of distribution
channels

Dying at home

The public's demands on holistic medical care that ensures not only physical but also social and mental well-being are increasing. If the possibilities exist, even lack of scientific proof that they are efficacious is a secondary issue. This is also evident from the rising popularity of complementary medicine.

New therapies using complex biological drugs for small patient groups often have a controversial cost/benefit ratio. So far, however, there is an absence of societal debate or ethical guidelines for doctors on the use of complex therapies.

Many experts and doctors argue in a free society in favour of the legitimate use of available resources for enhancements – including for non-medical improvement of the human body. In many areas, there is no appropriate framework to regulate, for example, the procurement and financing of concentration-enhancing drugs or mood enhancers.

Supermarkets, department stores and the Internet will become more important as dealers in health products. The importance of digital sales channels in particular is growing. However, oversight and quality assurance will become more difficult for the regulator with progressive liberalisation.

Dying at home is a taboo subject in Western countries, most elderly people die in care homes, against their wishes. A need is arising both to reinforce the currently unstructured professional support for dying people and to take steps to banish the taboo on death.

High opacity and complexity

In most cases, data on the quality, costs and benefits of healthcare services is not gathered consistently or is unavailable. As a result, it is virtually impossible to locate inefficiencies, avoidable costs cannot be reduced and treatment quality cannot be improved. The financing flows in the system are also often opaque. Added to this is high complexity due to fragmentation of structures and service providers and to the complex functional relationships and feedback systems in healthcare. Increasingly, both patients and experts are losing their orientation, which is part of the cause of wrong use of services and a reluctance to effect reforms. In the final analysis, the high opacity and complexity within the healthcare system leads to a lack of clarity about what regulatory mechanisms lead to better care.

Lack of data

Patients without orientation

No understanding of quality of care

Reform fatigue

Unclear influence of regulation

Benefit of preventive care cannot be proved

There is a frequent lack of comparable data on quality, costs and benefits of healthcare services. Deficiencies and inefficiencies of therapies, surgery and preventive medicine are almost impossible to locate, costs cannot be reduced or treatment quality improved.

Human beings lose orientation in the healthcare system because of high opacity and complexity and the attenuation of the link between doctor and patient. As a result, hospitals and emergency services are being used more and more frequently for minor ailments, blocking financial and human resources.

The general public does not have the knowledge to assess the quality of care and the value of medical services. Patients therefore often rate hospital treatment as very good even in cases where they have to return relatively often because of complications or where high infection rates or duplications occur. Conversely, many skilled workers and hospitals lack knowledge about quality criteria that are relevant from the patient's point of view.

Both experts and citizens are becoming increasingly reluctant to address healthcare reform. One reason is a poor understanding of the changes in a complex healthcare system and their real consequences for the individual and the community. Another is the effectively organised vested interests of the actors in the system, which often stand in the way of healthcare reforms.

Mechanisms in the healthcare system that will lead to improved healthcare provision are still not understood. Treatment quality and patient satisfaction do not depend on the extent of regulation: no model - whether based on social insurance, government or the market economy – has been proved to be more effective than the others.

To date, prevention is hardly fostered in the healthcare system. This is partly because the long-term value of preventive measures is controversial and difficult to prove because of the many factors influencing people's state of health. Transparent, nationwide encouragement of prevention would support the broad-based fight against chronic diseases.

Inefficient processes and unclear competences

There are many actors in the health-care system, but it is not always clear exactly who does what in patient care or in health promotion and preventive medicine, or who should do what in the future. With new requirements coming from patients and the broader definition of health and new healthcare professions in the past few years, the tasks of hospitals, doctors, therapists and nursing staff are rapidly coming to overlap: doctors are offering preventive medicine, hospitals are treating people with minor ailments and optometrists are performing ophthalmological examinations. This uncoordinated confusion of business models is bolstering inefficiency and reducing the quality of care. At the regulatory level, too, the authorities' responsibilities overlap. Inefficiency and the confusion of competences result in unnecessary costs, disoriented citizens and a failure to combat widespread diseases.

Investments in the wrong place

Inefficient financing models

Fragmented funding

National strategies

Healthcare expenses are high, and furthermore the money is often not used where it could achieve the maximum benefit. In the opinion of experts, more targeted spending on fighting lifestyle-related diseases – for example on early recognition of type 2 diabetes – would improve public health, wealth and productivity in industrialised countries.

In many places, billing models used in medicine are counter-productive for efficient care provision. For example, time-based payment is used for medical services outside hospitals although many diagnoses and treatments are now based on standardised processes.

The participation of many different actors in financing the healthcare system and the large number of pots from which services are paid makes understanding the finance flows and eliminating inefficiencies a complex matter.

With the rise in the number of the chronically sick, new care structures are needed. This realignment of the system makes national strategies to fight diseases and regulatory/centralised state intervention more important.

Increasing polarisation of the public

A broad understanding of health that includes the mind and social life and makes practically every decision in life a decision on health has raised aspirations for good health and for a healthy body. The social pressure to be high-performing, good-looking and healthy is growing. Nevertheless, not every service provided by the healthcare system is accessible to all and a growing number of people depend on income-related premium reductions from the government. As a result, differences in income, origin and education are increasingly leading to a polarisation of the general public on health issues. Indications of the possible consequences are already evident today: multi-class medical care and the risk of decreasing solidarity between poor and rich, healthy and sick, young and old. This could also threaten the solidarity-based financing of healthcare services in the future.

Healthy and
good-looking at all costs

Declining solidarity with
the unhealthy

Risk of two-class
medical care

The borderlines of therapy and improvement are blurring. Progressive medicalisation of certain states of health is raising people's aspirations for their health and their bodies. As a result, society is coming to accept the use of optimisation methods. The pressure to be healthy, good-looking and high-performing is increasing for everyone.

Society is polarised on health issues. On average, people with a low level of education or income have less health competence, live unhealthier lives and are in poorer health. At the same time, more and more people in Switzerland are arguing in favour of sanctions on unhealthy behaviour, for example in the form of higher health insurance premiums.

The polarisation between poorer and richer strata of society is increasing. There is a risk of two-class or multi-class medical care.

Lack of and wrong incentives

As a result of a lack of or the wrong incentives in the healthcare system, today's provision of care does not yet meet the high requirements on efficiency and quality. On the one hand, incentives to incur avoidable costs are currently in place: for example, doctors are paid according to the amount rather than the value and quality of their services. On the other, absent or wrong incentives can also adversely affect public health and care provision. For example, there are few incentives in the healthcare system aimed at preventing and combating lifestyle-dependent diseases, which continue to lead to high sickness levels in the industrialised nations. In basic care, in contrast, faulty financial incentives have contributed to an oversupply of specialists and a lack of general practitioners in rural areas. And thanks to inadequate calculations in the allocation of risks, it still makes sense for health insurers to pursue young, healthy people and discriminate against the old and the sick. Unless existing incentive systems are reconsidered and new ones initiated, the risk of high and rising costs and of inadequate healthcare provision will remain.

Health promotion versus paternalism

Few correctly placed investments in preventive medicine

Faulty distribution of healthcare staff

Independence of patient organisations at risk

Unattractive working conditions in nursing

Lifestyle-dependent diseases incur most of the healthcare costs in Western countries. Incentives to promote a healthier lifestyle could reduce illness, but there is a risk of paternalistic behaviour by the state.

Up to now, the scant resources available for preventive medicine are not invested to optimum effect. The battle against alcohol abuse, mental illnesses and suicide is neglected although these lead to high costs and many deaths.

Healthcare personnel is wrongly distributed. An increasingly chronically ill public needs more general practitioners and nurses/carers providing holistic care. Despite this, there are more and more specialists and non-medical service providers who contribute to fragmentation and inefficiency in the healthcare system because they are not included in integrated care.

The dependence of non-profit patient organisations on money from government and industry incurs a risk that they will relegate their own agenda and patient concerns to the background in favour of pursuing strategies. Their legitimacy as representatives of the general public and the patients will be weakened as a result.

Staff turnover is particularly high among nursing staff because of unattractive working conditions, poor pay and lack of career prospects. Another reason is that most nurses are female and want to have children.

No or scarce resources

The demand for health services is growing, with demographic change, technological progress, higher incomes and people's requirements on higher standards of care as key factors. However, there is an increasing lack of human resources in basic medicine and in nursing and care, gaps in healthcare provision are looming. However, healthcare personnel is not the only shortage, the financial resources of private households are restricted and are already reaching their limits. To maintain a financeable and sustainable healthcare system, more efficient use of the available resources is essential.

Fewer young premium payers

Upward spiral of increasing services, providers and costs

More complex therapy and nursing/care

Drain on foreign healthcare workers reaching limits

Distorted perception of sources of costs

Feminisation worsens shortage of doctors

With rising life expectancy, the demand for therapy and nursing and the healthcare costs incurred are growing. As the young population shrinks, however, the number of people who could provide and finance the necessary care is getting smaller.

The higher demand for healthcare services is increasing the demand for healthcare professionals. However, more available human resources also drives a supply-induced demand for services. This cycle leads to continuous growth of the healthcare system and its costs.

With the increase in chronic and multimorbid illnesses, not only therapy, but also care is becoming more complex. More nurses with appropriate competences are needed, relatives and friends cannot provide the required high-level care or if they are involved could lead to problems in the quality assurance of care provision.

Many Western countries do not train enough healthcare professionals to satisfy the rising demand for health services. However, hires of foreign personnel are reaching limits: the drain on resources and know-how is attracting international criticism. In addition, sustainable healthcare provision cannot be ensured in countries that are highly dependent on foreign resources.

Healthcare costs are rising and increasing the financial burden on private households. The use of hospital services and the high density of hospitals are the main factors responsible for the cost increases. Nevertheless, the general public sees a large number of hospitals and doctors as having only a low influence on rising costs. Instead, responsibility is mainly assigned to unnecessary visits to the doctor by patients and to the drug manufacturers.

More and more doctors, particularly women, would like to work part time. However, the education system and working conditions in the healthcare system as it stands at present are a poor fit with this desire. As a consequence, there is a risk that the shortage of doctors could be made worse by the feminisation of the medical profession.

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Trends in the healthcare system over the coming decades

Looking at tomorrow's healthcare system, hypotheses describing a possible future can be formulated about core developments. These hypotheses present a clear-cut and critical summary of central trends that could shape the healthcare system in the near and distant future.

These are not to be taken as precise forecasts, but as outlines of points of convergence that will provide a basis for thoughts, ideas and concepts that can be used to push our thinking on tomorrow's healthcare system. For example, prevention and early recognition, automated and data-based recommendations on therapy and self-diagnoses will become standard practice in medicine. However, they will not only improve the quality of healthcare, but also undermine the health insurance model, help to create a society of potentially sick people and reduce the decision-making freedom of doctors and patients by causing rising insecurity. It can also be assumed that the conflict between individual decision-making freedom and state healthcare regulation will mount with cost pressure and that ideological debate will increase – with consequences for the controllability of the healthcare system. These hypotheses thus mainly indicate expected fields of conflict that will influence medicine, society, business and politics. In doing so, they also provide a basis for formulating areas for action which will enable the design of sustainable healthcare provision despite the great challenges.



The present system is not sustainable

The healthcare system's present structures and offerings are not equipped for the challenges of tomorrow. This is partly because of the existing infrastructure, and partly because of the continued dominance of traditional conceptual models and values.

First in line, however, is the present infrastructure, which cannot fulfil the needs of tomorrow's patients: traditional health centres such as hospitals and doctors' practices will no longer satisfy people's growing demands for flexible healthcare provision that fits in with their daily routines. In particular, care for the chronically sick in everyday life cannot be ensured to any great extent. At the end of life, too, there is a divide between wishes and reality. This is demonstrated today by the discrepancy between the preferred and actual place of death: the majority die in care homes instead of at home, as they would like to.

On top of the lack of an appropriate healthcare provision structure, people's ideas of hierarchical, expert-centred healthcare provision has become hidebound over the years. A change in the infrastructure and also the introduction of new conceptual models are therefore becoming more important in order to ensure sustainable, decentralised provision. This is all the more true because healthcare is becoming more complex – with more data, more complex therapy methods for multimorbid patients and increasing fragmentation of the actors – and the capacity of people and of the system to take action and make decisions is being reduced.

The prevailing mindsets and models are rooted in the framework of the past and are not adequate: to begin with, institutions and therapies today lack cross-functional processes to ensure that medical care is coordinated along several treatment steps from prevention to cure or rehabilitation. In parallel, however, the relevant public agencies are not highly networked and frequently by definition do not have the competences for innovation. In addition to the classic infrastructure – the hardware – the existing conceptual models – the software – in the healthcare system therefore also have to be reconsidered: the central focus is still sickness and not health, hierarchical care models which do not make human beings the central concern still predominate. The way to a sustainable healthcare system starts, accordingly, with new structures in public administration, at service providers and in industry, but above all with new values.



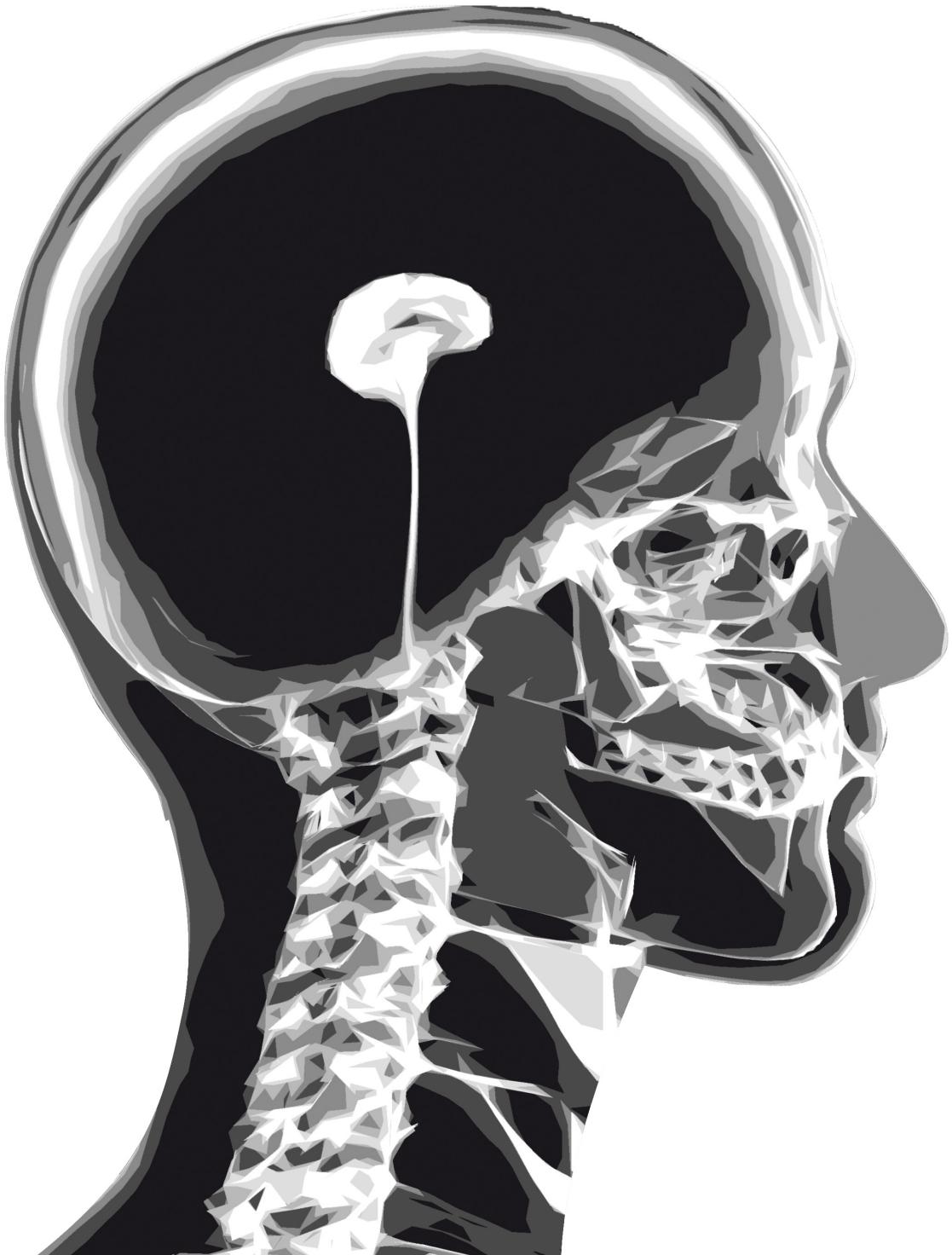
Healthcare becomes democratised

Now that the Internet has democratised access to knowledge, the democratisation of health is following. Medical information about drugs or therapies has been universally accessible online for years. Furthermore, with the spread of simple measuring instruments, it is possible for diagnoses and treatments to be carried out by the patients themselves rather than by doctors alone; diabetics, for example, can have implants and apps which release medication after the blood sugar is tested or remind sufferers of rules of behaviour. The doctor is therefore ceding to the patient his control over the physical measurement and treatment. However, not only are diagnoses and therapies being democratised, but science itself is becoming more accessible to the general public. In so-called “citizen science” projects, amateurs solve certain scientific problems under the guidance of researchers, for example in the form of online games in which proteins have to be folded or new antibiotic substances discovered. This can provide fresh ideas for research. “Biohacking” enables genetics fans to conduct their own garage experiments with biological material and electrical engineering. These possibilities are emerging partly because the equipment required, such as gene sequencers and 3D printers, is now less expensive and can be used by laypeople. One vision is the rise of “garage pharmaceutical start-ups”, which will revolutionise drug research and place it in the hands of consumers and patients – following in the footsteps of Bill Gates and Steve Jobs in the computer industry. In medical technology, patients or their relatives can already print tailor-made prostheses using 3D printers, in the distant future printing cells and organs will also be an option. The only things that will then be needed to produce individual healthcare solutions are instructions, templates and blueprints, which will be provided by doctors and healthcare market actors. However, do-it-yourself research has another direct added value: it will raise awareness among some of the general public about the opportunities and threats of handling new technologies, and complex areas like molecular biology will be communicated in an accessible and understandable way.



The pressure to increase prevention will rise

With the increase in lifestyle-related and chronic diseases, the quality of provision and the financing of healthcare systems around the world face a tough test. The number of diabetes and depression patients is rising apace in Switzerland and China alike, the costs of urgent treatment of their symptoms are already immense and will continue to grow. At the same time, half of all diabetes cases worldwide have not even been diagnosed, complaints that occur go untreated or are inadequately treated. As healthcare costs explode, however, the pressure to combat lifestyle-related, avoidable diseases will increase. As a consequence, stronger prevention and early recognition will become the core prerequisite for maintaining the quality of healthcare provision and safeguarding long-term financing. “Health taxes” on products with a high fat or sugar content, higher health insurance premiums or bonus/penalty systems for people with an “unhealthy” lifestyle are already being considered and in some cases actually introduced: unhealthy behaviour is becoming less and less socially acceptable and is incurring sanctions accordingly. This development is not just an expression of a trend towards more state regulation, but also of the fact that the healthcare system’s performance capabilities are reaching their limits. Rationalisation measures are consequently being classed as “economic necessity”. This heightens the conflict between the individual’s decision-making freedom and the state’s regulation of healthcare: the right to an unhealthy life clashes with the state’s supposed obligation to maintain public health and the affordability of the healthcare system. Programmes to encourage prevention will continue to be critically challenged against this background and ideologic debates will increase. As a result, however, there will also be a heightened risk that the system’s capacity to act will be blocked, the war on lifestyle-related diseases will not be rigorously conducted and sustainable funding of healthcare provision will be jeopardised thereby. The transition from a sickness-based to a health-based system is unavoidable.



Knowledge makes us sick

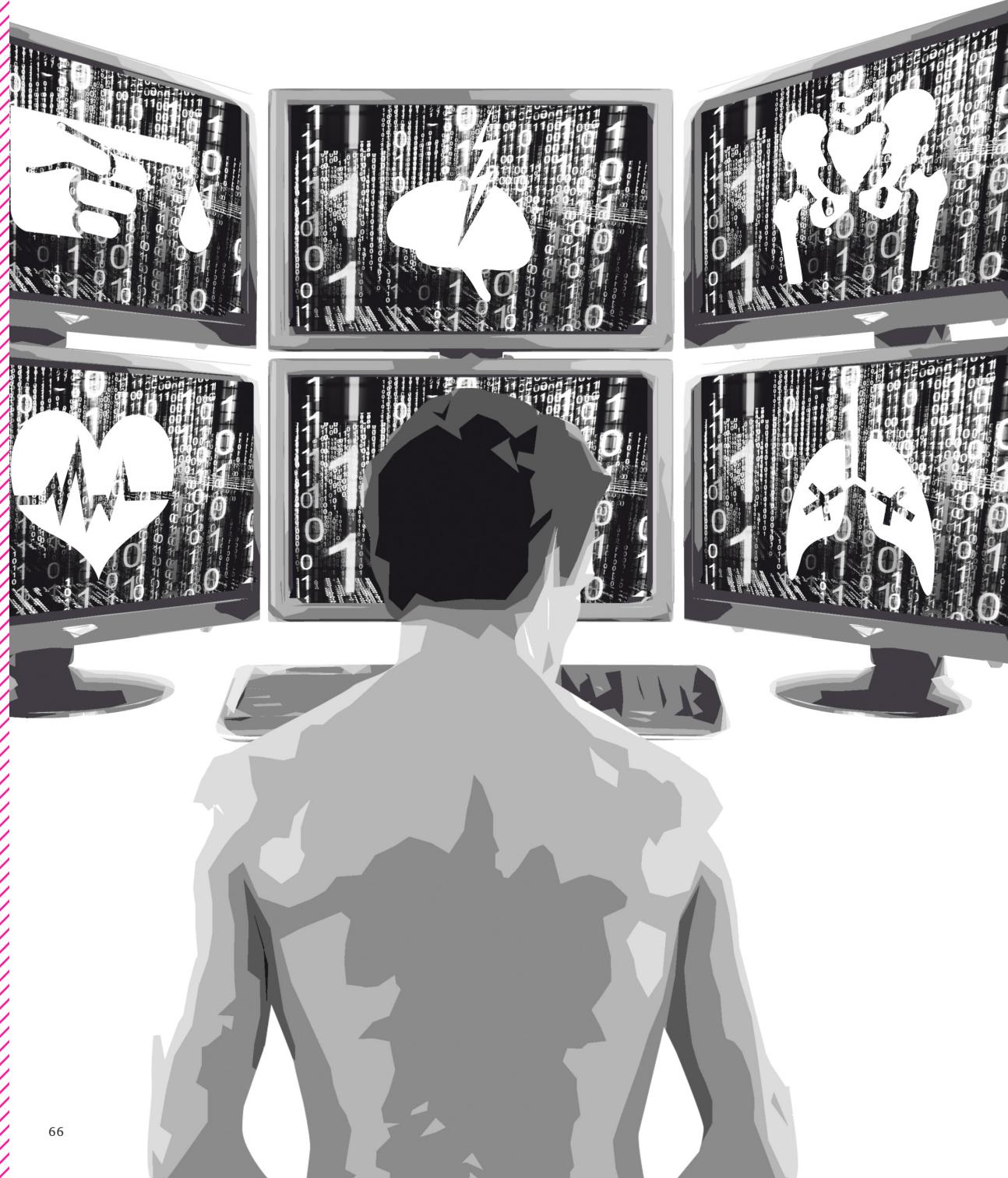
With growing knowledge about health risk factors and progress in diagnostics, the number of people who know about their own predispositions to diseases early is rising. Even today there are freely accessible apps on the web that will review a person's genetic make-up for health risks. In addition, existing diseases are being recognised earlier and earlier. Along with the technical opportunities, the range of services for early recognition of diseases will continue to increase, a new market for worried people will develop. This will lead to a change in the social perception of health. The only healthy people will be those who have not yet been tested. Our growing knowledge will not by any means lead to a greater number of healthy people, but to more potentially sick ones. However, this may also have a counteracting effect: since everyone will have something or other wrong with them, the social pressure to be healthy will ease: absolute health will no longer exist.

With the possibility of identifying diseases or predispositions earlier and earlier, modern diagnostics is, on the one hand, laying the foundations for a health-promoting lifestyle and more individual responsibility. At the same time, however, it also prepares a breeding ground for increasing fear of diagnoses, insecurity and health phobias: despite, or because of, the wealth of data, we do not know how to deal with the knowledge about our health. Our notion of health will also change with early recognition, because there will no longer be a clear dividing line between health and sickness. At the same time, there will be a growing risk that the predictability of diseases will undermine the health insurance companies' business model: known conditions cannot be insured. Against this background, the debate on access to personal data from predictive tests will be heightened. Finally, there will even be a risk of early recognition leading to self-fulfilling prophecies: people who know they have a predisposition to a complaint will behave accordingly and may then cause the disease to break out.



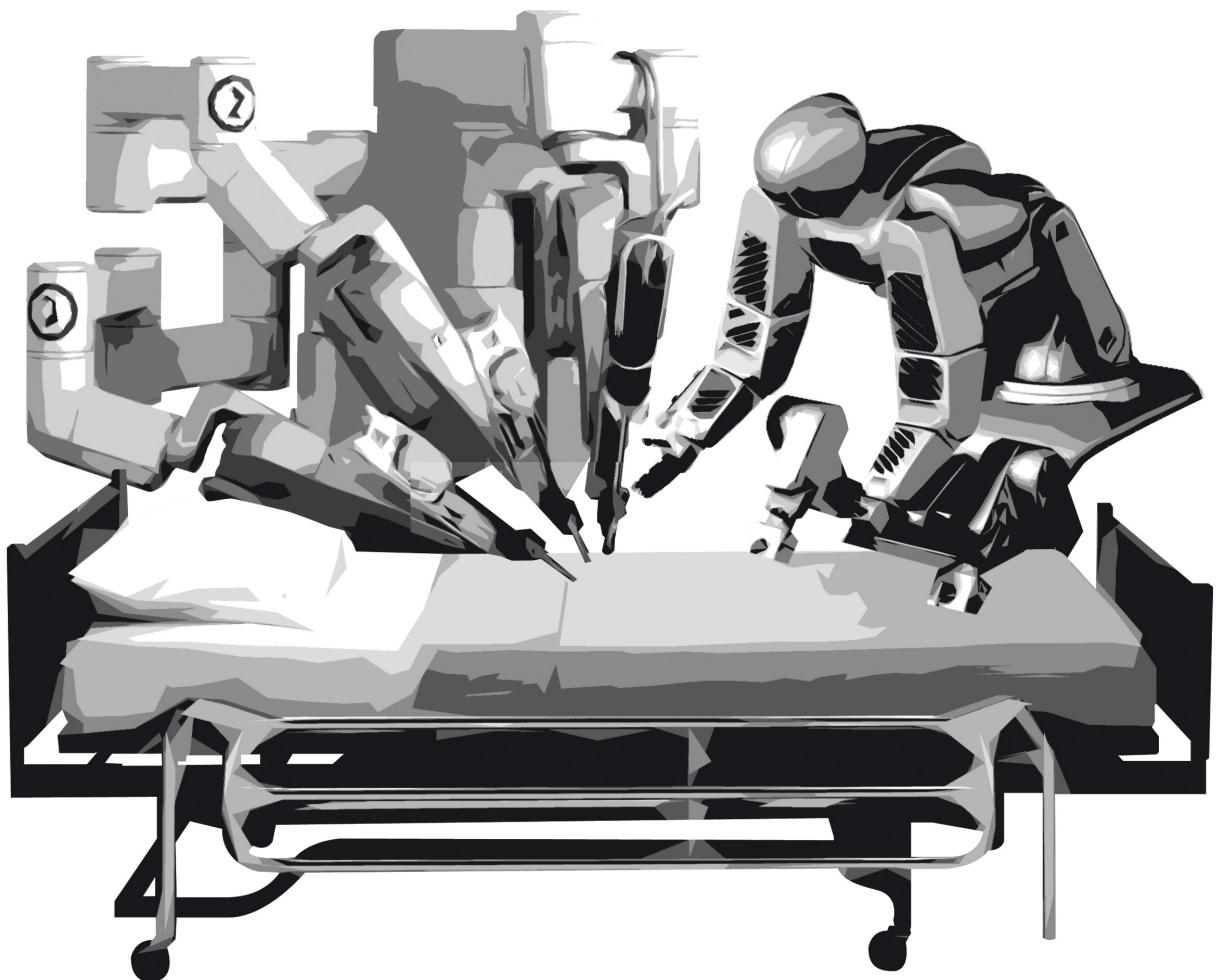
Health policy is social policy

The subject of health polarises the population. Classes with poor education and low income are particularly at risk because of their life styles and their health-related behaviour and incur above-average costs. Nevertheless, these risk groups in particular are not really reached by traditional preventive measures aimed at the broad public such as advertising campaigns, preventive examinations or offers of continuing education. Health-promoting changes in behaviour do not become established in these social strata. Preventive care aimed specifically at high-risk groups will gain in importance, as will corresponding regulatory incentives to pursue healthy behaviour. Until preventive measures take individual circumstances into account, untargeted preventive methods will continue to combat mere symptoms rather than causes, and hefty healthcare costs will persist for the high-risk groups. Any efforts in these areas, however, increase the risk of declining solidarity between healthy and unhealthy, rich and poor people. Maintaining this solidarity will become one of the greatest challenges of the healthcare system. Since health depends significantly on circumstances such as disposable income, mobility, living conditions and the social net, healthcare policy is also social policy. This trend will become more marked as the polarisation progresses: the healthcare and social systems will overlap more and more frequently when caring for sensitive groups of the population, the demarcation of competences and creation of interfaces between the two systems will take on central importance.



The enlightened patient is a myth

Medicine will become data-based. Empirical information instead of intuition and experience will form the basis of healthcare decisions, for both doctors and patients. While experts will consult more and more research outcomes and diagnostic and treatment data in order to select the most appropriate therapy and optimise care, patients will take measurements of their bodies themselves. Growing numbers are attracted to Internet communities such as the “quantified self” movement, where people use sensors to measure their own body and their environment for parameters such as stress, blood pressure or dust exposure. Yet the additional information does not just deliver benefits: as the volume of data increases rapidly, it becomes harder to turn it into decisions and actions. Because there are practically no objective, validated findings on specific topics, the supposed “best” actions and treatment options are confirmed here, refuted there, depending on what information is fished from the sea of data. Therefore, the more facts we have available, the more uncertainty we feel. Although high-performance computers and algorithms help to interpret medical data faster and more accurately and to make diagnoses, they remain confined to individual areas of application for the time being. This means that the well-informed patient who is enabled to make decisions remains a myth at present. That also applies to educated strata of the population, who also have difficulty with the various options in the healthcare system – be it the choice of an insurance company, of a doctor or of a therapy. The assumption that members of the general public gain high health competence through access to online forums or encyclopaedias is incorrect. On the contrary, the flood of data leads to more uncertainty. Pseudosciences that explicitly use intuitive, traditional treatment approaches in their positioning frequently profit from this. At the same time, with the advance of data-based medicine human judgement is becoming all the more central: while the majority of routine examinations and treatments will be run by computers in the future, doctors will have the task of interpreting more complex data and putting it into context, thereby helping patients to find their way more easily around the data-based healthcare system.



Human beings take a back seat

The technisation of medicine continues to advance. The use of computers and robots in the care of humans is becoming taken for granted: apps and sensors monitor patients' health during their everyday routine, presence computers and other telemedical interfaces network doctors and patients at any distance and robots will more and more frequently carry out simple treatments and interventions. However, the technisation of medicine will also risk human beings and their emotional needs becoming lost among the machines and equipment. Patients' desire for emotional care will therefore increase with the level of technisation, all the more so because the rising need for nursing gives increased importance to an area where emotional care is crucial. As a result, the humanisation of care will gain in significance. Healthcare instruments and products will be adapted so as to appeal to the patients' emotional level; this may range from robot nurses that resemble humans or animals as closely as possible to coupons for emotionally supportive group discussions which will be offered together with the diabetes kit. Systematic consideration of the patient's need for emotional care on the part of industry, doctors, nurses and carers, vendors, insurance companies and policy-makers will determine how the public perceive the quality of the healthcare system and their care in the future.



The state becomes the healthcare provider

With rising cost pressure in the healthcare system and increasing regulation, more and more areas of care provision will become economically unattractive to private-sector suppliers of health services: industry, service providers and insurance companies will focus on their core competences to preserve their competitiveness and will increasingly offer profitable services only. Consequences of this reduction in diversity of the offering will be care provision gaps in the healthcare system and a return to a focus on isolated areas of specialisation. The state will therefore intervene more and more with regulatory measures and financial resources to ensure adequate provision. This is already happening with rare diseases: since therapies for such illnesses are often economically unattractive due to a combination of complex research and small markets, governments create special incentives such as market exclusivity and simplified licensing conditions to encourage industry to develop therapies. As the cost pressure grows, the risk that fewer therapies will be available for illnesses with lower profitability and higher risks increases. As a consequence, state coordination of services will become more important on the one hand, since the required total network in the healthcare system will be lost as industry increasingly restricts itself to profitable areas. On the other hand, this could mean that the state will increasingly conduct research and development and will be the provider itself in unprofitable areas. Its contribution could range from the provision of insurance benefits to government drug development.



Where new solutions are needed

Due to its high complexity the healthcare system cannot be reconceived with a simple blueprint, however, it is possible to identify crucial parameters. These key points need to be further elaborated with concrete areas for action and possible solutions in a second step. Finally, measures have to be developed to implement the change in reality.

Since radical reforms are practically impossible – and mostly undesirable – in democratic systems, a balance between long-term goals and pilot projects is the only way to approach the future. In this process, progress will result from combining long-term goals with small-scale implementation. One prerequisite is to have the available funds for a suitable iterative approach. However, it is much more important to develop a culture that fosters a framework in which the healthcare system will reinvent itself over the years in a process of taking forward and backward steps, preserving things that work and revamping what can be done better. Such a culture challenges existing institutions and the main actors to not only master everyday problems but also constantly to look to the future and summon up the courage to push their thinking forward.

Foster decision-making competence:
reduce complexity,
provide direction



A large part of the general public cannot cope adequately or cannot cope at all with the complexity of today's healthcare system. Patients are overwhelmed by selecting a service or a doctor, medical details are often worded in a way that is difficult to understand or hard to access. It is almost impossible to judge which foods are really healthy. There is a lack of quality-tested, individual and understandable basis for decision-making so that people can navigate independently and competently in the system.

High complexity is not only characteristic of orientation in the jungle of services and products, but also relates to the system itself: it bears the stamp of federal structures with overlapping competences and high provider fragmentation. As a consequence, vested interests and a lack of transparency often get in the way of long-term solutions, non-partisan measures become more difficult. The system is increasingly blocking itself, with reform fatigue as the consequence.

The long-term goal is to establish clear structures and offerings that enable citizens, service providers and also decision makers to find their way around the healthcare system. At the individual level, user-oriented, clearly understandable navigation systems are needed that help people to find the right service.

This could be done, for example, by way of a database containing the possible forms of therapy for a specific diagnosis and assessments of the institutions and service providers that offer them.

In a broader context, this information could be downloaded from a public healthcare portal where every citizen can obtain an overview based on his or her needs of the services and products in the healthcare system, their quality, costs and availability. To translate these for citizens, the most important medical parameters could be presented in the form of a “healthcare cockpit” so that a patient will understand quickly whether his or her organ functions are in order or when they are adversely influenced by his or her behaviour. In addition to concrete guidance, general health competence should also be promoted among the general public, for example by involving schools and companies in teaching health knowledge and providing guidelines for orientation within the healthcare system.

On the system level, methods to improve the controllability of the healthcare system are needed in order to be able to respond to the challenges – such as the increase in chronic and lifestyle-related diseases. This can be done by means of a review of the federalist structure of powers and/or clearer allocation of the participants’ competences on the legislative level. The centralisation of certain tasks, particularly in areas which are neither profitable in a market economy nor politically easy to implement – such as health promotion and preventive care – would help to increase the transparency and controllability of the healthcare system.

To improve transparency and reduce complexity, another central focus should be to foster networked thinking. For example, Internet platforms could feature short videos providing basic knowledge and orientation in the healthcare system in a simple form. At the same time, interactive infographics could help people to understand how changes in one sub-area affect other parts of the system. This would make sense in particular when a referendum is forthcoming: the visualisation would help the public, not to mention politicians and experts, to understand the impact of the results of the vote on the overall healthcare system even before the vote is held.

In order to make the healthcare system simpler, we need ways to improve controllability. These can be introduced through a review of the federalist structure of powers and/or a clearer allocation of the participants’ competences on the legislative level. To improve service transparency, one goal, for example, would be to conduct standardised data surveys of costs, benefits, and the course and quality of treatments, accompanied by central research into care provision. Encouraging systemic thinking could also play a central role. This could help people to understand which other parts of the system are affected by changes in one sub-area using detailed interactive infographics.

Develop holistic treatment chains:
increase the patient's benefit,
innovate the entire system instead of
individual services



In the light of the growing importance of health promotion and preventive medicine – and likewise in view of the increase in lifestyle-related and chronic diseases – the focus of the healthcare system has to go beyond the traditional urgent treatment. At the level of the “value chain”, health promotion, preventive medicine and early recognition should therefore be intertwined with treatment, rehabilitation and palliative care. This means encouraging holistic supply chains in which people have the opportunity to obtain a wide variety of networked preventive methods and cures – from dietary advice to a CT scan, rehabilitation therapies or assisted suicide – across several providers and if possible through a central point of contact. This would depend on collaboration between medics, paramedics and other actors in the healthcare system. This applies not only to medical treatment, but also to emotional care, which is likely to become more important in the age of the rising technisation of healthcare provision.

The long-term goal at the heart of the system is consistent alignment with the needs of the population – not with the existing competencies and structures. In order to achieve this, a market economy model would be conceivable in which various qualified service providers develop their own offerings – either partially, in cooperation with others, or along a treatment chain. Patients would have the opportunity to select the provider whose network responds best to their needs. A model of this kind could contribute to the formation of cross-area structures and attenuation of stand-alone solutions.

However, a further central element in the design of treatment concepts would be required: financing across several treatment steps rather than payment for individual services and products. This would lead to greater leverage, which could be used to define holistic problem-solving offerings. Such integrated financing models would be useful not only in networking providers, but also for social insurance providers, so that benefits from accident insurance companies, health insurers, invalidity insurance or unemployment insurance could be integrated or at least be paid in a coordinated way. There is a possibility that total costs across an entire treatment chain could be reduced by giving more costly therapy at the time of the illness, whose additional costs would be more than compensated elsewhere: for example, if the health insurance organisation pays for treatment that is more expensive than the standard method or for additional services during illness, but these help to avoid the payment of unemployment or invalidity benefits and therefore reduce a patient’s long-term economic costs.

Improve efficiency:
not cheaper, but more
benefit for the same money



Most healthcare systems in industrialised countries display inefficiencies, considerable ones in some cases. US economist Michael Porter, for example, worked out how expensive a laptop would be if it was paid for through the American healthcare system. He reached a total of USD 50,000. This price is likely to be lower in Switzerland or other European countries, but here too the processes and treatment paths in the medical sector are far from functioning efficiently. The inefficiencies are expressed, for example, in the form of treatment errors, duplicate examinations or by patients going to the wrong points of contact. They not only lead to avoidable costs, but reduce the quality of care provision.

The causes of inefficiency in the healthcare system are diverse and range from missing data through technological progress to rises in the required safety standards.

The majority of those involved profit from this inefficiency: the citizens, because it gives them the freedom to use services as they please, and the providers, because they gain financially.

Against the background of rising costs, however, it can be assumed that most healthcare systems can only maintain the extent of their services if the maximum value is reaped from available resources. A number of changes are needed to achieve this.

The central focus is on improving transparency about the quantity of services provided and their cost/benefit ratio. This should be based on standardised, continuous gathering of data on the costs, benefits, course and quality of treatments, accompanied by central research into care provision which will analyse the results and suggest improvements. Reducing the high fragmentation of the system should continue to have priority. In a federal system like Switzerland, in particular, the introduction of larger geographic care structures is often discussed.

It is also important to disentangle the complicated financing flows, for instance by reducing the number of different institutions that distribute the consumers' insurance premiums and direct payments before they go to the provider of the product or service – in particular, this would effectively mean a reduction in the number of insurance companies in the current healthcare system. Furthermore, in order to combat inefficiency, incentives need to be put in place for consumers and patients so that services are used where the relevant illnesses can be most effectively and cost-efficiently treated.

In most healthcare systems, regulatory restrictions are in place because of high safety requirements, and these make the introduction of new, efficient mechanisms difficult. Nevertheless, it should be possible to adopt methods from other industries. The formation of more public-private partnerships could help to transfer innovation into fairly rigid large organisation and public agency structures; they could learn from start-ups or non-healthcare companies. Great Ormond Street Hospital for Children (GOSH) in the UK has given a practical demonstration of what this means: to improve its interface management in transfers from surgery to intensive care, it involved Ferrari's Formula 1 team. With more effective process maps and descriptions, such as are common in Formula 1 pit stops, GOSH was able to significantly reduce the rate of errors occurring in both equipment and information.⁴³

Another approach would be to change the business and financing models for medical services. They would no longer be billed on the basis of time alone, but according to clear criteria such as the quality, value and effectiveness of the care. Applied to the healthcare system, such solutions could help to counter the fragmented way of thinking, improve quality and reduce costs.

Align innovation with social added value:
concentrate on value to humans
instead of product features



At present, innovation in medicine and the healthcare market is more or less equated with new products or services. With the broader definition of health, which also includes a healthy everyday lifestyle above and beyond treatment, and with the insight that good healthcare provision includes integrating different disciplines to form a holistic treatment chain, innovation should also be defined more broadly as “social innovation”. In addition to the technical parameters of new products or methods, their added value for the individual or society should play a central role. Diagnostic devices for self-use only offer a benefit if they are easy to operate and the test results are comprehensible. In particular, however, it must be ensured that the findings can be used to work out the optimum therapy. For example, nursing robots can only reduce the problem of a shortage of nursing staff if they are accepted by those in need of care. Studies have shown that the friendliness of the robot’s appearance is more important than the effective performance of the sensors.⁴⁴ Technical performance is therefore not the only crucial factor for the success of a new product, but also a design which ensures that people can and will use it.

As a result, innovation also has to include embedding the new products and technologies into the total system. In many cases, it is actually necessary to develop new forms of organisation in order to integrate innovations into society. One example from the past is the insurance system, which was introduced as a consequence of the industrial revolution to protect against the increasing risk of illness, accident and unemployment. Today, the rise of personalised medicine and democratisation in the healthcare system may make similar structural changes essential.

With the increasing importance of holistic care including health promotion, more and more areas of life from mobility through the unemployment rate to the construction of homes have an effect on public health. As a result, the majority of responsible political institutions are also becoming actors in the healthcare system. Accordingly, social and economic foundations for new products and business models will have to be created. In combating lifestyle-related diseases, for instance, this could mean effecting a change in values that will favour prevention, for which suitable incentive systems or education programmes have to be developed before or during the introduction of preventive offerings.

For public agencies – whose competence lies by definition in administration rather than the creation of new solutions – to be able to meet this challenge, new ideas to improve government innovation are needed. One possibility would be the “acquisition” of new solutions, similar to the practice of large companies which remain innovative despite their scale and the accompanying inertia by purchasing promising technologies. Government collaboration with scientists and entrepreneurs, but also with designers, will also become more important in order to rejig the capabilities of the healthcare systems.

Create access:
make health available everywhere



The present structure of healthcare provision does not take the population's increasingly flexible and mobile lifestyle sufficiently into account: for example, the model of the doctor's practice has barely changed in the last decades and has not adapted to the needs of a large part of the public. It is becoming more important to embed opportunities for both diagnosis and therapy even more firmly in people's everyday lives, for example close to centres of day-to-day living such as in railway stations and supermarkets, at work, in cars or on trains. An increased number of analogue, easily accessible healthcare installations such as 24-hour mini-clinics, diagnosis and therapy machines at central locations or intelligent alarm and navigation systems in the car and at home will become more important, as will wearable diagnosis and therapy devices and virtual offerings such as telemedical consultation with the doctor. This is not only because people live more mobile lives, but also because these approaches take the needs of the rising number of chronically sick and elderly people into account: more opportunities for diagnosis and therapy have to be available for these target groups in and outside the home, if possible without requiring physical access to the doctor.

New forms of cooperation between insurance companies, service providers, trade, industry and politics are essential for the broad implementation of mobile medicine. In addition to the mere availability

of mobile offerings, structural changes are needed to embed them in the healthcare system, for example clearly organised financing by the social insurance bodies or the coordinated introduction of electronic patient files for the collection and management of personal data. The EU-financed “My Health Avatar” project, for example, aims to create a “health avatar” that will provide a virtual map of a person’s health from birth to death by gathering individual medical data.⁴⁵

However, creating access also means developing guidance systems that ensure that consumers and patients find the right services and the appropriate providers. The quality of care also has to be ensured for easily accessible offerings, such as diagnosis machines on trains. Moreover, access to services is also determined by their form. With preventive care, health promotion or rehabilitation in particular, a playful approach may help to improve the offerings’ acceptance by the general public. For example, hospitals sometimes use computer games in activities to remobilise patients, and children can be motivated to take more exercise or clean their teeth by games on the smart phone.

In addition to availability in the right places, socio-economic factors primarily determine access to medical care. For example, low-income strata of the population in particular have to be addressed in a more targeted way, and easier access to healthcare services has to be facilitated for them: these are the people particularly at risk from disease, who generate above-average healthcare costs. At the same time, they have less disposable income to spend on medical activities. While wealthier segments of the population tend to enjoy more check-ups, early recognition and wellness applications, one section of the population does not even use basic healthcare because the cost of the insurance deductible is too high. New financing methods – such as income-dependent premiums or bonus/penalty systems – as well as new care models are needed so that essential services and also preventive measures remain accessible to all. Since the causes of disease frequently lie partly in the living conditions and lifestyle of low-income individuals, better integration of medical and social care would be one solution. For example, doctors could issue a prescription if necessary entitling holders to specialist support to work towards a healthy lifestyle or for sports and preventive care in the areas they live in.

Initiate debates on fundamental
issues and long-term projects:
rethink the healthcare system



Medicine and health are polarising society more than ever today, the gap between poor and rich, healthy and sick and young and old is widening. Fundamental issues arise about the limits of the growing craze for youth in the aging society, the rising stigmatisation of those sectors of the population with unhealthy lifestyles and mostly low incomes, and the increasing possibilities of improving body and spirit through medicine. These developments call for debate on values, solutions and appropriate new guidelines and regulatory incentives. New technologies such as genetic diagnoses, sensor monitors in everyday routine or life-prolonging but expensive drugs also call for an assessment of their value and their risks – and for readily available decision-making bases so that politicians and the public can deal with them.

To counter the polarisation and use the technologies without restricting research, those topics requiring clarification first have to be identified systematically and early. The pros and cons also have to be analysed in a way that is easy to understand and the most non-ideological discussions possible have to be conducted with the public, experts, business and politicians.

An approach that links two differently oriented discussion platforms could be conceivable in this context. The first forum would address decision makers from different areas of the healthcare system, who would come together regularly and agree at a high level on goals for a sustainable healthcare system. They would issue recommendations and initiate pilot projects. The goals would be to achieve interdisciplinary cooperation, reduce the influence of vested interests and obtain new solutions. It would be useful to implement incentive systems that, on the one hand, encourage people to practice long-term thinking when developing solutions and, on the other, work against the possibility of actors considering short-term advantages.

In parallel, a second discussion platform on the citizens' level could be created. This one would have the aim of informing the general public about fundamental and ethically or morally complex developments in healthcare and engaging them in a debate on values. The discussion here would not be primarily among decision makers but between thought leaders from the healthcare system and the public, in virtual livestream or in analogue format. They would present the advantages and risks of relevant developments while the audience would comment online or on site and could vote symbolically on scenarios. There would be a two-way exchange of views between the first and second forums: the committee of experts should present a topic publicly on the citizens' platform at least once a year, while citizens can propose relevant topics for the expert forum's agenda.

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W.I.R.E. is an interdisciplinary think tank which engages with global developments in business, society and the life sciences. The focus of its work is on critically examining established points of view, providing strategic consultancy and developing ideas and innovative products. At the same time, W.I.R.E. acts as a platform where actors from business, society, research, politics and design can exchange ideas, placing its expertise at the service of selected companies and institutions. In addition to its partnership with Bank Julius Baer and Collegium Helveticum of the ETH Zurich and the University of Zurich, W.I.R.E. disposes of an international network of experts, thought leaders and decision makers.

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Gerd Folkers was appointed Professor of Pharmaceutical Chemistry at the ETH Zurich in 1991. Prior to this, he gained his doctorate at the University of Bonn in Germany and, after a variety of assignments abroad, worked at the Pharmaceutical Institute of the University of Tübingen in Germany, where he completed his habilitation with a thesis on drug design in 1990. He is a member of the Swiss National Research Council and an Executive Board member of several start-up companies. He founded a spin-off company for a virtual teaching platform in the field of biomedicine and is author and editor of numerous articles and books on drug research and development. He has been Director of the Collegium Helveticum, a joint institute of the University of Zurich and ETH Zurich, since 2004. The Collegium Helveticum serves as a model for the implementation of a scientific culture that investigates complex subjects for which one single discipline can no longer find solutions.

Healthlab

A significant part of the results in this book is based on the “Healthlab” project, which the think tank W.I.R.E. conducted between 2009 and 2013. The aim was to network experts from all parts of the healthcare system for a period of four years and to reflect rationally and impartially on the key future challenges and areas for action behind closed doors. These debates produced not only some of the statements in this book but also a variety of concepts that the participants developed and formulated on the basis of their personal experience. The ideas and food for thought here are not necessarily the opinions of W.I.R.E.

In this function, “Healthlab” took a pioneering role in the Swiss healthcare system by linking knowledge and opinions using an interdisciplinary approach and having representatives of industry, medicine, science and design reflect together on the structures of tomorrow’s healthcare system. The project was made realised with the support of partner organisations Sanofi, Amgen, IBM, Galenica and PricewaterhouseCoopers, whom we would like to thank at this point for their courage and far-sightedness. Above all, we would like to thank the 40 experts who supported the project over the four years with knowledge, time and commitment. A particular debt of gratitude goes to the Collegium Helveticum of ETH Zurich and the University of Zurich as well as to Julius Baer, W.I.R.E.’s strategic partners.

Healthlab partner organisations

Sanofi

Sanofi was created by the merger of Sanofi-Synthélabo and Aventis. Today, it numbers among the world’s leading pharmaceuticals companies. Around 17,000 researchers at 20 different sites across three continents are involved in the development of new and innovative drugs.

Sanofi is one of the largest pharmaceuticals companies in Switzerland. The Swiss facility is headquartered in Vernier (Geneva) and has around 150 employees.

Amgen

Amgen, the world’s largest biotechnology company, produces and distributes biopharmaceutical products made using recombinant DNA technology. The company, which has its home in Thousand Oaks in the state of California, USA, was established in 1980 as Applied Molecular Genetics Inc. and is one of the pioneers of industrial biotech.

Amgen assigns top priority to the development of new therapies for diseases that are not currently treatable or for which only inadequate treatment is available. Because of their cellular origins and the complex manufacturing process, Amgen’s biopharmaceutical products are as unique as humans themselves. Amgen got a foothold in Switzerland in 1989 when it established a European headquarters – the Swiss facility followed in 2002. At present, around 300 employees work in Zug. In addition to drugs marketing, the Swiss site is very important for clinical research. Amgen Switzerland works with around 50 hospitals in this area.

IBM

100 years of innovation have made IBM the world’s largest information technology company. It is IBM’s supreme goal to be leader in the invention, development and manufacturing of information technology products. These encompass the whole spectrum from computer systems, software, networks and storage technology to

microelectronics. Globally operating teams develop customised solutions to optimise business processes together with the clients and are available with services relating to all aspects of information technology. IBM offers industry-specific and cross-industry solutions to meet the needs of clients of every size.

IBM Schweiz AG was founded in 1927 as Internationale Geschäftsmaschinen-Gesellschaft AG. In 1937, the name was changed to Watson Business Machines AG, and in 1943 to IBM Extension Suisse. It received its final name of IBM Schweiz in 1970.

Galenica

Galenica is a diversified corporate group operating in the healthcare market. Its interests include developing, producing and distributing pharmaceuticals, managing pharmacies, offering logistics services, offering databases and establishing networks.

The Galenica Group has two business units: Vifor Pharma and Galenica Santé with Retail, Logistics and HealthCare Information divisions. It aims to take a leading role in the market in all its activities: by playing an all areas of the value chain and thereby gaining optimum knowledge about its markets and their development and networking the actors in the healthcare system.

PricewaterhouseCoopers

PwC Switzerland helps companies and individuals to create assets – with more than 2,600 employees and partners at 14 different locations throughout Switzerland. PwC Switzerland is part of a network of member companies in 157 countries with more than 195,000 employees working to deliver added value with services in the areas of audit, tax and legal advice and business consultancy. In its healthcare consultancy work, PwC supports hospitals and other service providers in mastering current challenges.

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For reasons of linguistic simplicity we usually use the masculine form in this publication. This form always also includes females. It should be noted that grammatical gender is not identical with biological sex.

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This text is a short version of the original German book "Hacking Healthcare – Das Gesundheitssystem verstehen und weiterdenken" published by NZZ Libro (ISBN 978-3-03823-655-9)

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“If you can’t get rid of the skeleton in your closet, you’d best teach it to dance ...”

— GEORGE BERNARD SHAW —

The future of the healthcare system is characterised by opposing perspectives: on the one hand, our life expectancy is rising, leading to a shift in the spectrum of diseases towards higher numbers of chronically ill people and increasing healthcare costs. On the other hand, progress in biomedical research and the digitisation of medicine promise ever higher quality in the provision of healthcare. Visible on the horizon is the dawn of a new age of personalised and tailor-made medicine. While costs continue to rise and rigid structures resist reforms, a growing segment of the population is demanding to play an active role in shaping the provision of healthcare – as citizens, patients or even software developers.

These polarised developments represent the complexity of the system, which renders a holistic view and long-term planning increasingly difficult. In order to develop sustainable structures, more than forecasts are needed. We need concrete ideas and concepts for improving the healthcare system in small steps.

This book provides ideas and approaches for doing so. It presents hypotheses and areas for action that may be helpful not only in rethinking the system of tomorrow, but also in redesigning it – or in 21st century jargon: hacking it.



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Julius Bär