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# Plasticity of Health

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## Abstract

Health is the most important construct of our life. In particular, the healthy human organism is capable of regenerating and remodelling in response to environmental demands. However, this is only possible to a certain extent. Health and what is implied by the term “health” involve a dynamic process of adaptation to a constantly changing environment. Supporting health and well-being is a multidimensional act that can be promoted and maintained by different ways of living, curative actions, mental interactions (resources, resilience), public interventions, and global developments and crises as well as by the design of the setting. In ancient times, Buddha suggested that without health, life is not life; it is only a state of languor and suffering, an image of death.

The 21st century enabled us to live in improved living conditions. However, although our health status changed, many chronic stages of diseases were integrated into our lives. Understanding and consideration of possible relationships or forces should empower us to create a healthy generation in a healthy world and environment, despite financial crises, political interests and ideological and political wars. Salutogenetic, pathogenetic, environmental and social views of health promotion can help to form a multidimensional approach to supporting health and abolishing diseases. The development of a generational plan to sustain human nature and health is the challenge of our century.

**Keywords:** health promotion, prevention, health care, public health, health

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Published online: 10.04.2016  
www.gjom.de

### How to cite:

Leischik R, Dworrak B, Strauss M, Przybylek B, Dworrak T, Schöne D, Horlitz M, Mügge A. Plasticity of Health. *German Journal of Medicine*. 2016; 1: 1-17 DOI:10.19209/GJOM000001

# Introduction

Health is a human right.<sup>1</sup> However, the list of non-communicable diseases (NCDs) is becoming larger and more complex. Moreover, rapid globalization, urbanization, an ageing society, and an increase in chronic diseases pose new, complex challenges to all health care systems.<sup>2</sup> The utopian dream of universal well-being suggested by the WHO<sup>3</sup> requires a dynamic process of adaptation to a constantly changing environment as well as appropriate political

and financial circumstances.<sup>4</sup> In particular, utopias and new ideas are necessary to develop resistance to new circumstances and to adapt biological and political processes into personal/interpersonal reality. Health can be influenced by different forces. Social forces, economic factors, the personal ambitions of certain politicians, and ideological and religious doctrines are never the real causative agents of history, although they do occur.<sup>4</sup> Rather, for health, the main factors have been known since ancient times: God, gods or evil spirits were there in the beginning and “arranged” or were held responsible

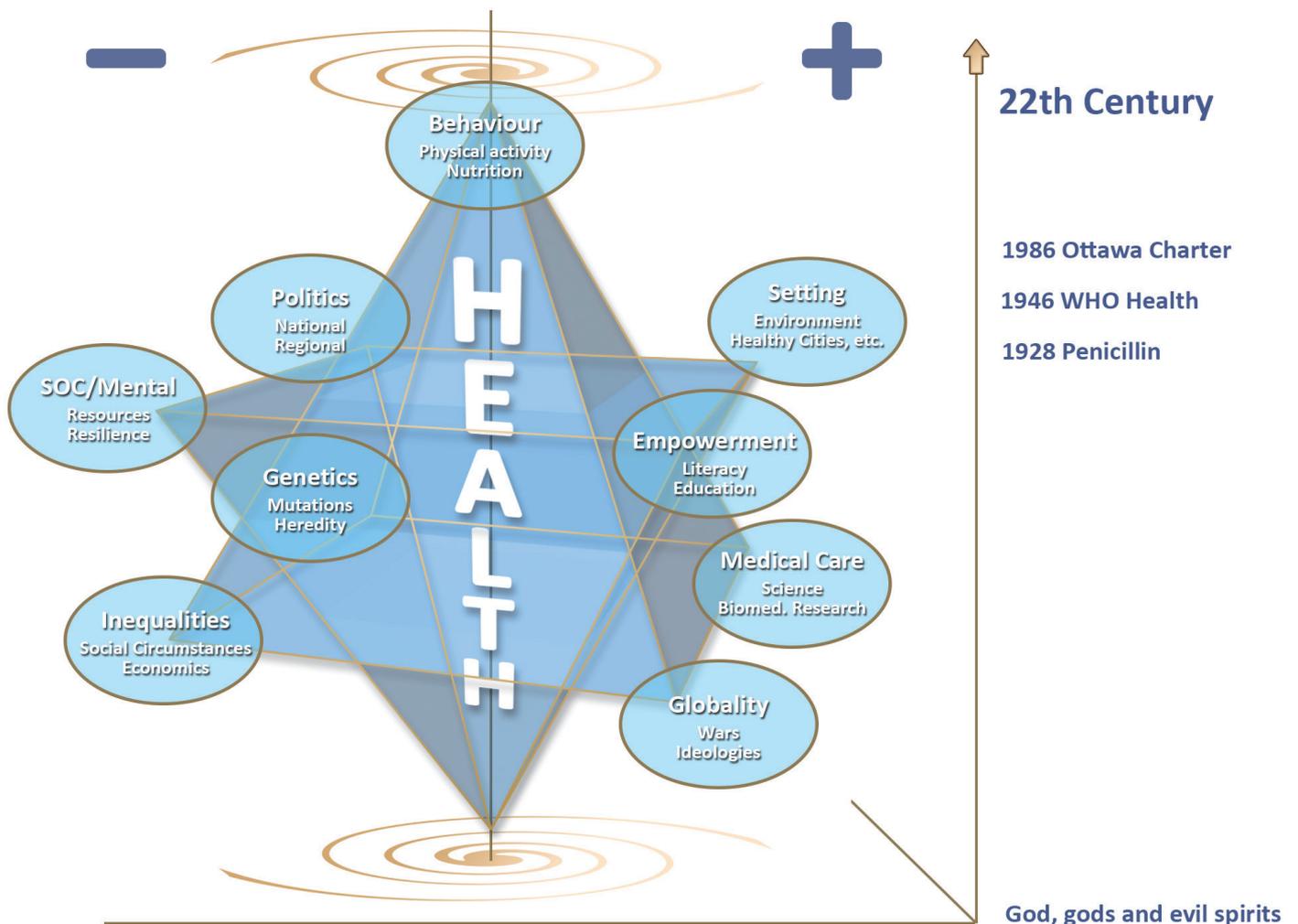


Figure. 1. Health plasticity and influencing factors in 3D dimensional imagination regarding of time.

for health conditions. Surprisingly, this idea currently still dominates in religious doctrines, despite the biomedical age. Later, Hippocrates saw “nature” itself, or environment/ecology (e.g., bad water), as the main force influencing health. In 1948, social circumstances were described by Rudolf Virchow as potential factors that influenced the typhus epidemic in Silesia. In 1854, John Snow celebrated removal of London’s Broad Street pump as the first public health intervention against cholera. One of the earliest formulations and applications of public health was defined by Winslow.<sup>5</sup> The direct influence of the environment (e.g., the city) was described by Park in 1915.<sup>6</sup> Furthermore, the term “human ecology” was introduced by Park, Burgess and McKenzie.<sup>7</sup> The idea of psychological ecology related to health was put forward by Barker.<sup>8</sup> Maddox<sup>9</sup> and Green and Kreuter<sup>10</sup> outlined the influence of the environment on health as well as the impact of health promotion on the individual. An ecological approach for the implementation of healthy behaviour is fundamentally associated with multilevel interventions in education, architecture, traffic solutions, urban planning and political will.<sup>11</sup> Social determinants of health are multidimensional, and it is very obvious that social inequalities lead to different effects on health.<sup>12</sup> Marc Lalonde, the Canadian Minister of Health in the 1970s, was the first person who suggested the global idea of health promotion as a political need<sup>13</sup>; his ideas were integrated into the Ottawa Charter in 1986.<sup>3</sup>

## Social inequalities and economy

Social inequalities are one of the most important determinants of health<sup>12,14-20</sup> Socioeconomic status seems to be strongly associated with adult mortality<sup>18,20</sup>. Wealth appears to be the strongest predictor associated with death. However, it is more connected to cardiovascular and all-cause mortality than to cancer mortality in England<sup>20</sup>. Inequalities

in disability free life expectancies of older people in countries with developing economies are great and range from 13% in China to 54% in India<sup>21</sup> Educational differences in disability vary in European countries across educational groups. Disability advantages/disadvantages depend on efficiency of national or private policies and income.<sup>22</sup> One of the largest problems is access to medical care and support for patients with low socioeconomic status (SES).<sup>23,24</sup> In cases of children who are underinsured or uninsured, access to health care or the quality of health care is especially suboptimal.<sup>25</sup> Young people’s health is particularly affected by socioeconomic inequalities.<sup>17</sup> For cancer care in particular, the availability of resources varies by economic status between low-income countries and middle- or upper-income countries and is dependent on urbanization and governmental or international leadership.<sup>26</sup> Among the developed countries, it is not the richest societies that have the best health, but rather those that have the smallest income differences between the rich and the poor.<sup>15</sup> In fact, a large majority (70%) of 155 analysed papers described health as poorer in societies where income differences are bigger.<sup>27</sup>

SES is a composite of income, social status, and education and can be estimated based on occupation or work status. SES gradients in health can be large and are increasing because the gap between the rich and the poor has grown. The view of SES as a composite of different factors that interact can impact interventions and policies. The social gradient will increase when a financial crisis or political disturbances such as wars, economic sanctions and waves of refugees emerge.

The banking crises from 2007-2009 were more costly than expected, with losses of approximately 30% or more of gross domestic product (GDP) having been documented.<sup>28</sup> These crises led to increased national debts<sup>28</sup> and a reduction in governmental assistance for health. However, despite the financial crises and fiscal cutbacks in many developed countries, total development assistance for health (DAH) remained steady, reaching an all-time high of \$31.3 billion in

2013.<sup>29</sup> A report by the Institute for Health Metrics and Evaluation also showed shifts in sources of financing. As funding from many bilateral donors and development banks has declined, growth in funding from the GAVI Alliance; the Global Fund to Fight AIDS, Tuberculosis and Malaria; non-governmental organizations; and the UK government has increased to counteract these cuts.<sup>29</sup>

Over the last few years, Sub-Saharan Africa has received increased DAH, whereas this type of assistance has decreased in middle- to upper-income countries. In this problematic region, the disability-adjusted life years (DALYs), calculated based on the Global Burden of Diseases, Injuries, and Risk Factors Study 2010,<sup>30</sup> that can be attributed to major infectious diseases, HIV/AIDS, malaria, tuberculosis and associated maternal and paediatric conditions are relatively high, at 35.6%. In accordance with this fact, Sub-Saharan Africa received 46.5% of total allocable aid in 2011. This example of global aid funding shows that the health support-related problems in middle- and upper-income countries are different. In more developed countries, there is a different spectrum of diseases in comparison with that in developing countries, leading to the SES gradient in health inequalities (especially in NCDs, with a focus on diseases of the cardiovascular system).

## Setting

The term “setting” is a fundamental term in health promotion because it characterizes all outstanding social circumstances of individuals in their environmental context.<sup>31,32</sup> Environmental stress pioneers pathways to psychiatric disorders and pathological behaviours.<sup>33,34</sup> The setting can be focused on the living areas (geography, ecology), the social institutions (school, university, occupation) or the regional multidimensional context (such as the state or city). Thus, “setting” is a multidimensional term with a growing influence. In this article, it is distinguished from the “world setting”, which is linked

more to globality (see Figure 1). Certain intellectual sources from ancient Chinese, Babylonian, Hebrew, and Greek civilizations exist,<sup>35</sup> and early publication on this topic occurred in 1920.<sup>5</sup>

### Healthy state, healthy city

“Hygeia” was a first utopian vision of a healthy city, as sketched by Sir Benjamin Ward Richardson, a self-proclaimed disciple of Chadwick.<sup>36</sup> His 1875 presentation described “A community so circumstanced and so maintained by the exercise of its own free will, guided by scientific knowledge, that in it the perfection of sanitary results will be approached, if not fully realized, in the coexistence of the lowest possible general mortality with the highest possible individual longevity”.<sup>37</sup>

Typical examples of programmes for a healthy state are represented by the one of the first global announcements from Lalonde<sup>13</sup> and by currently existing effective programmes in Canada<sup>38</sup> and Australia.<sup>39,40</sup> The first real programme for a healthy city was sketched by Park in 1915.<sup>6,7</sup> He suggested that human behaviour in the city environment is dependent on physical geography, the city plan, colonies and segregated areas, buildings, traffic, politics and “morals”. The problems and influence of a city structure regarding health and behaviour are well known and broadly discussed.<sup>41-43</sup> The development of healthy cities is a firm component of European research and programmes,<sup>44,45</sup> and the WHO “Healthy Cities” project is a global movement. In particular, nearly 100 cities belong to the WHO European Healthy Cities Network. Over 75% of Europeans and the majority of the world population live in cities, several of which are in excess of ten million people. Ways of living are influenced by buildings, noise, transportation, small flats and problematic social circumstances. There have been many efforts to construct and plan healthy and green areas,<sup>43</sup> as demonstrated by community gardens in certain areas.<sup>46</sup> Roads and cars (similar to the motorways of the 1930s) still have a higher priority in our environment than building paths that could help

to shape everyday life (shopping, participating in the social life of the city/town) by encouraging physical activities. However, today's bicycle technologies (bicycle, tricycle, e-bike) and various possibilities for constructing paths for pedestrians, cycle traffic, and wheeled walkers (road surfaces, illumination, car-free zones) provide plenty of opportunities to increase the amount of physical activity and even to dispel the elderly's fear of falling victim to car traffic while on the move. In this context, the automobile industry should modify its present psychological and economic attitudes to contribute to these efforts. The creation of shopping and social areas within traffic-free towns that are safely accessible by physical activity other than driving is a contrasting setting approach to the giant shopping centres outside cities that are accessible exclusively by car. One typical positive approach is demonstrated by the plan laid out by the Mayor of London<sup>47</sup>; here, new ways to integrate physical activities were introduced into a city that is overloaded by car traffic.

### Ecology

Human health and ecology have a reflexive relationship. As Sandifer et al. stated in a previous article, "it has long been recognized that human health is markedly affected by environmental conditions".<sup>48</sup> In this context, throughout human history, ecosystems have been used and altered to increase demographic growth. Ecosystem services (ESs), which are the "goods" produced by ecosystems (for instance, food, the drinking water supply, fibre, and timber), can be defined as the benefits that humans gain from ecosystems.<sup>49,50</sup> However, exploration and alteration have degraded ecosystems over the course of decades; this degradation can result in a decline in ESs and biodiversity.<sup>48,49</sup>

Nevertheless, there is an increasing demand for drinking water and food (as well as other ESs), which can trigger further alteration and utilization of ESs.<sup>51</sup> This results in a conflict of interest because studies have shown that there is clear interdependence between human well-being and the ecosystem's

status.<sup>52</sup> In addition to economic value and the direct consumable goods, ecosystems provide indirect services, such as water purification and pollination.<sup>50</sup> These indirect services influence human health and can be divided into two pillars: first, psychological services (the aesthetic value, "being with nature" and recreational aspects), which determine the psychological well-being of a population and decrease depression (also an important component of health), and second, ecological or socioecological services. These services are crucial for water and air purification, regulation of infectious diseases and provision of resources for medicines, among other aspects. Hence, ecosystems, or the physical environment, can have effects on the life expectancy of a population (such as due to exposure to pollution, living in a rural or urban environment, and access to natural or more altered anthropogenic ecosystems).<sup>53</sup> To maintain the positive trade-offs of ESs for human health, more investigation of their effects is essential. Analysis of the relationship between human health and ecosystems is multilevel and multisectoral,<sup>54</sup> as several institutions and organizations affect health as well as ecosystems and vice versa. There must be a sustainable, integrated and well-planned ecosystem management approach because it is fundamental to preserve and manage the supply of ESs and to enhance human health.

## Empowerment: education and literacy

Empowerment (health literacy, or one's power to make decisions about one's own health) is a central point of the Ottawa Charter of 1986. Empowerment should be considered in the historical context and can be seen as an important new direction to liberate one from the paternalistic orientation of the health system and foster empowerment. Over the past few centuries, physicians themselves have greatly contributed to making patients care dependent.<sup>55</sup>

The term “health literacy” is often used in connection with the idea of empowerment and is understood as the capacity of the individual to acquire health information and to seek prevention and health. Both components are crucial aspects of health promotion. Additionally, Antonovsky described empowerment as the ability to swim in a dangerous river.<sup>56,57</sup> The first researcher in this area, Antonovsky also presented the image of a non-swimmer as a metaphor for a man at the moment of his birth, starting his “health career”, who must first learn to swim better before confronting a hazardous river. In this way, for the first time, Antonovsky confronted the pathogenetic approach to disease treatment with a salutogenic solution to health care. Antonovsky made it clear that we have to talk about health formation/development, and not only about curative treatment of illness. These two concepts should not be regarded as opposite, but rather as mutually complementary. In his perception, health evokes an image of a constant conflict between negative and positive influences; it is a matter of heterostasis (a term used in health promotion/salutogenesis), and not homeostasis (a term used in pathogenesis). The pathogenetic concept can be compared with a damaged road being repaired by curative measures. The salutogenic idea presented by Antonovsky specifically considers life as a treacherous river where rapids, floating beams and dangerous fish pose risks. A swimmer may avoid these dangers, provided that he can swim well. To make the task easier, certain opportunities can be created around the river; here, the swimmer will be able to recover, and the river will flow more slowly. Heterostasis focuses on visible health as a result of the eternal fight between contrary forces. This is certainly a simplified idea, evolving from the epic struggle between good and evil found in many religions. This concept is also reminiscent of free enthalpy and entropy: an organism is never at a standstill, but rather always in constant interaction.<sup>56,57</sup> Regardless of the actual situation, this approach provides a medical perspective because it brings about a change from a static point

of view to a dynamic one. This perspective paves the way from fateful pathogenesis to active health care before disease can even develop. Such an approach is needed much earlier than any treatment among the chronically ill.<sup>58-60</sup> Even if treatment quality may increase to a large extent due to these programmes, they provide new, increasing momentum and a fee-based framework for additional players in health administration without any increase in empowerment and health literacy. Antonovsky’s concept and salutogenic approach focus not only on developing “disease management programmes” (DMPs) but also on introducing measures to prevent illnesses and the negative influence of overload by stressors. DMPs are, to a certain extent, domino pieces in a curatively/pathogenetically oriented system, lacking the depth of the basic salutogenic idea. Undoubtedly, disease control/management generates turnover for health promoters, (whereby care quality improves slightly).<sup>61</sup> The actual tasks of shaping the setting approach and of building the empowerment of the individual can easily be forgotten in the course of creating administrative operations via DMPs. Salutogenesis (health promotion) will achieve one of its goals if, for example, we succeed in preventing the individual from being a diabetic. This implies that if the individual has been brought up to be immune against the “sugar industry”, he should be physically active enough, and thanks to his education/literacy, he should be able to afford high-quality, fresh and “sugar-free” food. Unfortunately, qualitatively better food requires a better financial status, which can be impaired by social inequalities. In this regard, higher taxation on sugary drinks and subsidies for water could be an interesting solution.<sup>62,63</sup> This approach, however, is often blocked by the lobby of soft drink corporations, which frequently appear as sponsors of “healthy” lifestyles and sports.<sup>64</sup> It should be noted that in this context, non-alcoholic beer (richer in calories than water, at 20 cal/100 ml) is often praised as a healthy sports drink. Additionally, many large events today are scarcely conceivable by the public authorities and society without the sponsorship of

beverage corporations. As a consequence, parents and educators must be trained regarding the early-childhood phase of development, and early health education ought to be provided in nurseries and primary schools as well as continued through further schooling. Moreover, regular health education should be offered in professional life and adulthood. Health education is currently delivered by numerous economic groups via the Internet and in newspapers (pharmacy reviews as well as many health publications in renowned newspapers). The wellness market and private health companies have taken over preventive training measures in a relatively uncontrolled fashion. The launched programmes posed another problem as well: they focus on co-operation (and networking) among professional participants in the health system, instead of educating/empowering patients or, even better, “not-yet patients”. Many providers in these networks particularly hope to gain positive, synergistic and economic benefits for themselves. Although the commercial advantage for organizers is central, it is certainly not for “not-yet patients”. Therefore, plenty of salutogenetic/health promotion programmes depend on the public sector.

This is the case because in times of financial crisis, the state primarily invests more in the banking sector, and consequently, health insurance companies are not able to expand health promotion due to increases in curative expenditures. In December 2015, the British National Audit Office published a second report on the costs of the bail-out: “The scale of the support currently provided to UK banks has fallen from a peak of £955bn to £512bn, but the amount of cash currently borrowed by the government to support banks has risen by £7bn (to a total of £124bn) since December 2009”.<sup>65</sup> For German taxpayers, the German bank rescue was estimated at 33 billion Euros per year.<sup>66</sup>

At present, lay movements (self-help groups, internet forums and social networks) take on an important role in health education and advice, with often valuable results. Unfortunately, public authorities evade this important responsibility (certainly due to the lack of funds to finance it), and public advice

centres should be free of religion-related or other conflicts of interest. This requirement is definitely very difficult to achieve in the denominationally oriented German consultancy world. Although topics related to empowerment are very popular in Europe, their successful implementation remains weak.<sup>67</sup> Poor literacy skills among adults are also common in developed countries,<sup>68</sup> and poor literacy is linked to poor health outcomes.<sup>69</sup> Worldwide, there exists an increasing need for the participation of patients in health care,<sup>70</sup> and patient education can improve self-management of hypertension and diabetes.<sup>71,72</sup> In this sense, lawmakers and health insurance companies are supposed to shape health literacy and education from a very early stage and to continue in this way across all ages, into the elderly stage.<sup>73-75</sup>

## Sense of coherence: salutogenesis and mental well-being

The creation of and change in public health performance and health promotion over time are challenges in the human world.<sup>76</sup> Antonovsky found that curative treatment alone is not enough to promote health.<sup>57,77</sup> and his idea was the cornerstone for the house of salutogenesis. Based on Antonovsky’s studies, it can be assumed that any individual can develop constructive forces on his own<sup>57,77,78</sup> to positively shape his health and even to prolong his life without any help from curative facilities.<sup>77</sup> Terms such as “sense of coherence” (SOC)<sup>57,77</sup> and “resources”<sup>3,57</sup> have thus become immensely important. This context is changing over time.<sup>79</sup>

To address the question of what moves people between the poles of health and sickness (according to Antonovsky, ease and dis-ease, respectively), Antonovsky sought ideas providing answers. He formulated the concept of “generalized resistance resources”, which connect to an individual or a

collective to create a situation that enables a positive solution under stressful circumstances. The resources decide if someone considers a stress inducer/stressor as an overload or a challenge; overload can lead to a disease, but challenge can be positively overcome without any major risk of damage, and the resources are needed for a positive process to occur. Antonovsky labelled these resources as an SOC. According to Antonovsky, the SOC helps to cast the environment as having cognitive, instrumental and emotional meaning and to positively handle stress impulses for the benefit of health. A strong SOC includes feelings of meaningfulness, comprehensibility and manageability. It is not only a concept of optimism and the will to survive but also about special interaction between cognition, behaviour and motivation.<sup>56</sup> In his salutogenic model of health, Antonovsky suggested the following major resistance resources: material, knowledge, identity, coping strategy, social supports, commitment, cultural stability, religion, philosophy, and preventive health orientation.<sup>77</sup> The SOC concept<sup>57,77,78</sup> is not a culturally bound construct, but rather an internal master plan that includes the control/ability to solve problems and encouragement to involve solution-oriented friends/networks in the solution process. Many “integrated chronic care model” programmes focus on administrating risk factors and forget the depth of health promotion/salutogenesis (see the Ottawa Charter (World Health Organization, 1986)); these programmes do not include enough mental empowerment to solve problems or to strengthen literacy.

In studying resilience, there are three critical conditions: (1) growing up in distressing life conditions and demanding societal conditions that are considered significant threats or severe adversities; (2) the availability of protective factors, including internal assets and external resources, that may be associated with counteracting the effects of risk factors; and (3) the achievement of positive adaptation despite experiences of significant adversity.<sup>80</sup> A broad definition was given by Masten and colleagues, defining resilience as the process of,

capacity for, or outcome of successful adaptation despite challenging or threatening circumstances.

Politics: global, national and regional

From a global political perspective, the objectives of the health promotion defined by the Ottawa Charter are very ambitious. The Millennium Development Goals, adopted in 2001 and finalized only in 2008, include 8 goals, 21 targets, and 60 indicators. Focusing on social development issues, such as poverty, hunger, education, and women's empowerment, the Millennium Development Goals encompassed 3 health-specific goals: improving child health; enhancing maternal health; and combatting AIDS, malaria, and other diseases. These goals captured much of the world's attention: global health assistance tripled, from \$12 billion in 2001 to \$36 billion in 2013.<sup>81</sup> Health promotion is considered as an essential component of life and constitutes a process by which all people can achieve a higher level of empowerment/self-determination/competence to address health. This should ensure complex physical, mental and social well-being. So far, the objectives have not been met,<sup>81,82</sup> but they are still being pursued.<sup>67,83</sup> Politically, the objectives are formally known and adopted, but their practical implementation is sadly still in its infancy.<sup>67</sup> Because the focus of salutogenesis is switching from the individual to communities and to a broader social strategy, there is a need for a social policy change and wide co-operation between public authorities and promoters of health care on all levels of health promotion and salutogenesis.<sup>84</sup> At this point, the concept of social capital should be mentioned: social capital is based on trust, reciprocity, social networks, common standards of conduct, commitment and team spirit.<sup>85</sup> These relationships can strengthen the sense of identity, responsibility and the health of communities (“bonding capital”) where new resistance resources are mobilized. The term “social capital” has become one of the most popular exports from sociological theory and implies diverse applications,<sup>86</sup> particularly for health development. The implementation of human resources such as

engagement, friendship, responsibility and co-operativeness holds unprecedented opportunities for the maintenance of health or a state of preservation in chronic diseases.

The global purposes and problems of health development were correctly identified by Gostin and Friedmann.<sup>81,82</sup> These authors found that national strategies and internationally defined objectives often drift apart.<sup>81</sup> Moreover, globalization may certainly have an adverse impact on national health strategies (such as due to wars/financial crises and refugee issues). In the case of global objectives, it is necessary to concentrate on countries with low or middle income.<sup>87</sup> As a master plan for implementation, political will and the five Ps (position, perception, players, power and persistence) are indispensable for the necessary changes in each country.<sup>88</sup> The European efforts of the Nordic Health Promotion Research Network<sup>89</sup> and the European Healthy Cities Network sufficiently provide positive incentives and are waiting to be implemented.<sup>45</sup>

## Medical care and scientific approach

To create a healthy 22nd-century society, we must differentiate between “health and medical care policy”, which addresses the management of the health care system, and “policies for health”, which work to address the broad range of factors that support “health”. The health of a population is largely affected by factors outside the health sector, such as the environment, education, housing, transport, and work. The WHO plays a central role in communication about and sketching of global health care and medical care coverage.<sup>16</sup> Disease eradication is one of the great plans,<sup>90</sup> but new biological and climate developments can harm all plans.<sup>91,92</sup> Molecular genetics and genetic engineering might play a role, but we have to be aware of all ethical challenges.<sup>93-96</sup> Parents’ decisions to terminate pregnancies are never

easy,<sup>97</sup> but the situation is even more difficult in cases of, e.g., diseases such as Hutchinson disease, which are aggravated in later years but that are compatible with health and activity at young and middle ages.<sup>98</sup> Finding ways to adapt natural tendencies and to address all socioeconomic, biological and political challenges will play a central role in the management of the health of future generations.<sup>99</sup> The development of affordable and high-quality health care is another challenge in managing health care, and increasing quality and decreasing cost is a distinct possibility.<sup>100,101</sup> The increases in medical spending since 1960 and further increases in cost among the elderly, associated with a high cost per year of life (up to \$145000/year in persons >65 years old) have to be considered. The international and national focuses on the rise in medical spending and on fair distribution of health are challenges of the 21st century.<sup>16,102,103</sup> The development of medical care on different continents is also dependent on medical research, increasing knowledge and intelligent planning.<sup>104,105</sup> The general ageing of the world community has to be considered as well; we have to develop policies for active healthy ageing and protection against dementia, which has been linked to older age and which might entail additional costs.<sup>106-108</sup>

## Behaviour: physical activity, nutrition, and demographic change

Supporting healthy behaviour is the main goal of health promotion, and healthy behaviour is a result of a multidimensional approach that is influenced by all factors described in this article. Healthy behaviour is not only physical activity but also a construct of mental, educational, and environmental situations that enables us to live a healthy life.

Physical inactivity is the biggest public health problem of the 21st century.<sup>109-111</sup> Sedentary behaviour and

low physical activity lead to negative telomere length changes and increased intima thickness in the carotid artery along with metabolic syndrome.<sup>112</sup> Physical inactivity is thought to be responsible for up to 25% of all cases of breast and colorectal cancer, up to 27% of cases of diabetes mellitus, and up to 30% of cases of ischaemic coronary heart disease.<sup>113,114</sup> According to the demographics of the German population, the share of individuals over 64 years old will increase by 24.5% in 2040, and the share of 20- to 65-year-olds will decrease by 14% at the same time. Moreover, the proportion of individuals over 80 years old will grow by 179.1%.<sup>16</sup> A high rate of immigration is factored into these estimates. This means that health promotion is crucial to increase the number of active years and to keep the elderly fit to minimize health care costs. Health promotion is also a method to manage the care of the elderly. For that, new jobs need to be created in order to employ numerous health promotion measures in old age, including preventive home visits and community centres for assisting and advising the elderly. Similarly, settings must be provided to support an active lifestyle<sup>115-117</sup> because physical activities improve health, prevent atherosclerosis<sup>112,118,119</sup> and prolong life.<sup>117,120,121</sup> Accordingly, a task for public authorities is to create opportunities for physical activities, such as bicycle tracks, paths for physical activities, green spaces and community gymnastics facilities. If at least one traffic-free street is created in every town, many young and old people alike will gladly move in and around the city on their own. However, if cities are mainly designed for car traffic (for historical and economic reasons), physical activities will decrease. It is appalling that “the coverage of transport hides the traffic reality of millions of people” because up to 97% of newspaper reports focus on cars, and only 3% of them address public transport, bicycle and pedestrian traffic.<sup>122</sup> Only 3% of all city routes in Berlin may be used by cyclists, serving as safe and proper ways, and 58% of Berlin roads belong to motorists.<sup>122</sup> According to the Berlin Senate, the share of bikeways will be increased to 20%. Additionally, due to environmental

pollution, it is time to rethink transport. Carefully thought-out and modified bikeways allow all forms of movement. In addition to the measures for enhancing purely physical activities, steps to improve cognition are indispensable. These steps include education, physical exercises, drug-counselling services, possibilities for social contact and training groups to support cognition. All measures would be helpful<sup>123</sup> to prevent various forms and causes of dementia. Because of its complexity, the problem of mental health cannot be fully discussed here and will require a separate article. The most important aspect remains to provide possibilities for improving physical activities as the “polypill of the century”.<sup>110</sup> To achieve this goal, balanced integration of private and public forces will certainly be necessary, with a sense of economic reality in mind.

## Conclusion

Since the Ottawa Charter in 1986,<sup>3</sup> not only mental function but also social and living circumstances has been a focus. Improvement of human empowerment and change in settings are key tasks for both the present and the future. Change in the importance of different factors that influence health (Figure 1) can result in a 3D time model of health moving down to the idea of God and gods that “shape health”, instead of up, towards the 22nd century, envisioning a better global and individual world, as in the Ottawa Charter (see supplementary movie online). Currently, our world is full of inequalities that lead to different health performance.<sup>14,16,124,125</sup> World health coverage is one of the most problematic issues.<sup>16</sup> Further areas of interest are local differences in the development of health caused by different industrial and social developments.<sup>14</sup> For example, changes in social life and in nutritional behaviour in Asia, Africa and Arabic countries lead us to expect a greater-than-normal increase in diabetes.<sup>126,127</sup> In this context, the important problems of North Americans<sup>113</sup> and Europeans<sup>128,129</sup> health developments might be seen

as relatively unimportant.

The worldwide increase in NCDs is connected to deficient implementation of internal and external salutogenetic/health promotion ideas in local areas due to industrial and economic developments. In the countries that realize different programmes, we can recognize a decrease in cardiovascular diseases,<sup>130</sup> for example, whereas countries with failed health programmes are unsuccessful.<sup>131</sup> The goals of investing in children and of fostering a healthy society/environment could hardly have been formulated more accurately than by Ilona Kickbusch in 2008: “creating a healthy generation”.<sup>39</sup> It is important to note the following, in the sense of the movie “Back to the Future”: the 1986 Ottawa Charter was a remarkable phenomenon that changed the world.<sup>132</sup> What happens in the future now depends on us. The generation game is open, and we have today to decide where we will be tomorrow<sup>133</sup>: moving towards God, gods and evil spirits or towards the 22nd century (Figure 1).

## Acknowledgement

Special thanks go to Frank Blumberg for graphical preparation of Figure 1.

## Conflict of interest

None declared.

## Funding

None

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