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## **A Holistic View on Health: On the Necessity to Combine the Molecular Analysis of Health and Disease with the Sustainable Development Goals (SDG) of the United Nations**

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“The Future is Open” as the philosopher Karl Popper has written. However, our future is, will be and always has been, determined by research and by new technologies emerging from new knowledge. This process of a future driven by science and technology continues to gain speed in these days. We have to make sure that today’s amazing developments are used to benefit all of humankind. This is what people expect from the progress. Science per se is not good nor bad. Technologies on the basis of great science can be directed to the benefit of, but also against the people. This has been shown by the many wars and other man made catastrophies. On the other hand, modern life and our high living standards in many parts of the world would not be possible without the progress in science and technology.

“I am of the opinion that the only purpose of science should be to improve the conditions the human existence.” („Ich halte dafür, dass das einzige Ziel der Wissenschaft darin besteht, die Bedingungen der menschlichen Existenz zu erleichtern.“ was the way Bertold Brecht expressed the purpose of science in “Galileo Galilei (1938)”. Science has a great responsibility and we in academia have to live up to the expectations of Berthold Brecht and the people he had in mind. However, if we aim to “... improve the conditions the human existence...” it is not sufficient to focus on one specific research topic as important as it may be. We have to consider the world around us and be ready for interdisciplinary and transdisciplinary research to tackle complex problems. We have to have the totality of living conditions e.g. socio-economic, cultural aspects and environment in mind – in short: we have to take a holistic approach.

Health and wellbeing are what people are most concerned about.

Health is the most important value for the individual and for society.

Health is more than medicine.

Health is a human right – but when it comes to health, the world is in a worrisome state despite all the great progress, which we have seen in the past years. Infectious diseases are an immediate threat to mankind and a Virus as other infectious agents know no national borders. The Covid 19 pandemic is again teaching us this lesson. Pandemic preparedness remains on the world agenda but the chief causes of death are now shifting dramatically also to non-communicable diseases. The burden of disease of e.g. obesity, diabetes, cardiovascular diseases, cancer and mental health are increasing in all countries around the globe – rich and poor. In addition, food and nutrition, pollution, climate change, political instability in many regions, economic crisis, migration and flight are all contributing factors in major health issues. Meanwhile, the world’s population continues to grow and to age. The global burden of disease remains, and is even on the rise in some areas. Equity remains a challenge. This may not be completely new but it is urgent for us to act. Climate is just one example that action is needed – now! We are not making good use of our scientific and technological possibilities and we are not living up to the expectations of the generations of our children and grandchildren.

Ever since the first World Health Summit (WHS) on the occasion of the 300<sup>th</sup> anniversary of the Charité-Universitätsmedizin Berlin, we have been working towards one goal: improving health for everyone on the planet. We have to respond to the most important global health challenges and must find fast and efficient ways to bring medical advances to the places where people are in need. But each of us can do very little alone. That's why from the beginning, the World Health Summit has brought together stakeholders and decision-makers from every sector, from all over the world. By combining forces from academia, the private sector, industry, civil society and politics, we have been able to achieve change and improve health worldwide. And there are now some very promising leads on how we can do even more.

The "M8 Alliance" of 25 Academic Health Centers and Universities around the globe and the 130 Academies of Medicine and Sciences in the InterAcademy Partnership (IAP) provide a unique think tank for the World Health Summit program in academic freedom (Figure 1). These colleagues provide us with experiences and ideas from around the world. We try to help setting the global health agenda including the G7/G20 Summits and stimulating the building up of global health structures, careers and programs in institutions and nations - and inviting politics, industry and civil society to cooperate in a transparent way.



Figure 1: The "M8 Alliance" of 25 academic health centers and universities around the globe.

A milestone – and an encouraging sign – is the prominent position that health topics have assumed on the agendas of the G7 and G20 meetings. From the very beginning, the World Health Summit has enjoyed support from the highest level of politics, with ongoing high patronage from the Chancellor of Germany, the President of the French Republic and the President of the European Commission.

The Sustainable Development Goals (SDGs) and Agenda 2030 provide the framework for a holistic health approach in every area of policymaking. We do believe that such a holistic approach to health, is frequently discussed but is still largely neglected by too many people with responsibility and by too many institutions and urgently needs strengthening. In fact, the fragmentation of approaches, disciplines, particular interest groups and ideologies is obvious in science as well as in politics, private sector and civil society. The challenge of the future is to cope with complexity. Global Health is one of the most complex issues – it would be a great example to develop a comprehensive holistic and successful model fitting for the great variety of good intentions and fragmented efforts (Figure 2).

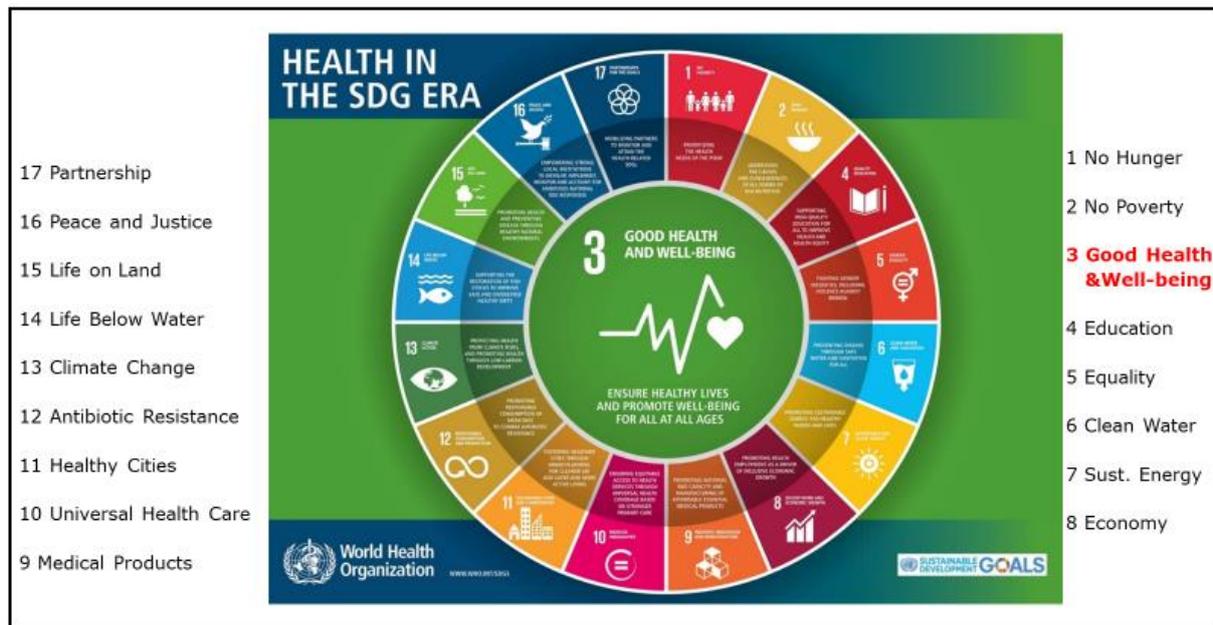


Figure 2: The need for a holistic view on our planet: Health as a unique entry point.

It is encouraging to see important NGOs, private foundations and other key organizations playing an increasingly supportive and coordinated role in achieving the Sustainable Development Goals in tandem with the United Nations and the World Health Organization. We need efforts that are transdisciplinary, science-based, cross-sectoral and concerted. They are vital to set the global health agenda for the years to come. Participants from all over the world bring different views, experiences and priorities. They aren't only welcome – they're the very essence of the World Health Summit vision, mission and philosophy.

### Health Needs an International Holistic Forum: The World Health Summit

The World Health Summit (WHS) was established in 2009 as an international, interdisciplinary conference in Berlin. From the start the goal was to find faster, more efficient and more equitable ways to advance health on a global scale. This could not be achieved through bringing together research and academia alone, many other stakeholders were required: politics, civil society and the private sector. The WHS highlights the joint efforts in working towards one goal – improving health for everyone on the planet.

From the very beginning it was clear to us that science has to take more responsibility and that it was important to create a novel forum which had the *whole picture* as its guide.

From the very beginning, the WHS has enjoyed support from the highest levels of European government, with the consistent high patronage of the Chancellor of Germany, the President of the French Republic and the President of the European Commission. Several heads of state, leaders of international organizations and NGOs, CEOs of industry and leading members from academia have confirmed their participation in the 10th anniversary summit in 2018 - ten years on, the World Health Summit has become the foremost international multisector strategic forum for global health. It has also generated regional conferences and expert meetings on specific topics around the globe.

From the beginning it was the hallmark of the WHS to include the best of science and all aspects of its translation into global health. The goal, however, was to go beyond medicine and to develop a truly holistic view of health encompassing all complex aspects of biology, medicine and the specific conditions we live in, our environment in the different parts of the world and importantly our behavior, lifestyles, social and economic determinants as well as the various cultures around the world (Figure 3). This interface is clearly reflected at the 10<sup>th</sup> anniversary in 2018 in Berlin: on this occasion the World Health Summit is organized jointly and back to back with the "Grand Challenges Partners" including

Grand Challenges Canada, the German Ministry of Education and Research, USAID, the Wellcome Trust and the Bill and Melinda Gates Foundation.

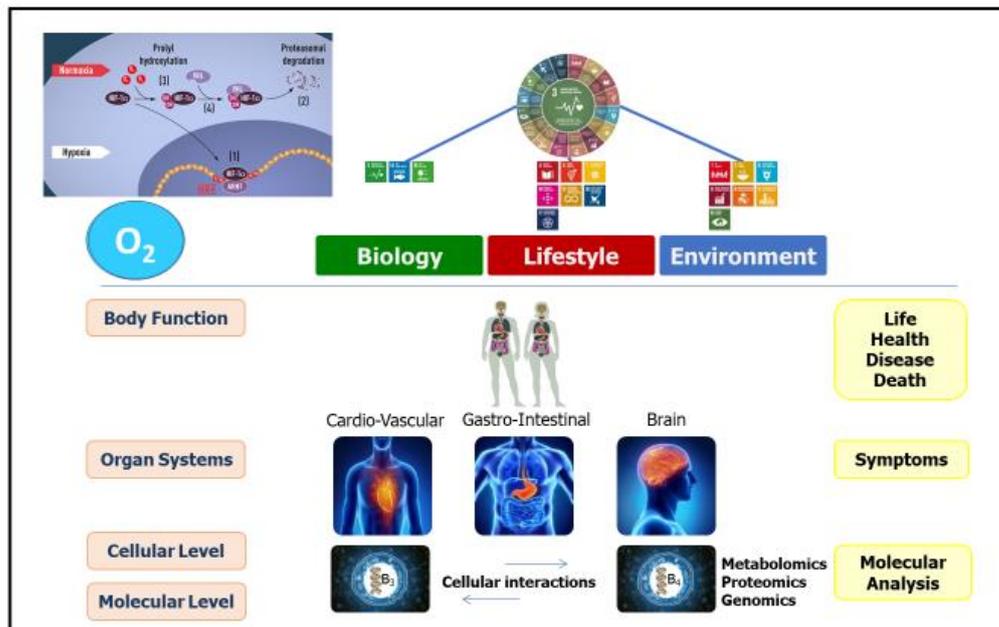


Figure 3: A truly holistic view of health encompassing all complex aspects of biology, lifestyle, and environment.

The WHS can look back on several major scientific and political milestones: in international scientific cooperation the start was the founding of the M8 Alliance of Academic Health Centers, Universities and National Academies of Medicine and Sciences – the Summit’s academic think-tank from its very early days. This M8 Alliance importantly includes the InterAcademy Partnership IAP of all 130 National Academies of Medicine and Science around the world. The World Health Summit contributed to political agenda setting and the prominent position which health topics have assumed on the agendas of the G7 and G20 Summits since the Heiligendamm G8 Summit in 2007, strongly and independently also supported by the National Academies of Sciences and based on the increased commitment of several countries including Germany to global health. Issues that have been addressed at the WHS by leading international experts contribute to set the political health agenda and vice versa progress continues to be discussed on the programs of the WHS. New topics of global health are continuously added to the plenary sessions or smaller workshops of the WHS. Two major meetings per year and the expert meetings around the world provide now a reliable international platform for acute burning and long-term global health issues open to all stakeholders. Programs such as The Young Physicians Leaders (YPL) and the New Voices program have helped a young enthusiastic international global health community to flourish. The WHS continues to be a major stimulus to foster national and international science and education programs and sustainable structures for teaching and research of global health at universities. The last 10 years have shown a remarkable development of global health research, international programs and teaching in many institutions beyond the members of the M8 Alliance.

### Medical Research is an Important Basis – but Health is More than Medicine

The Sustainable Development Goals (SDGs) of the United Nations and the Agenda 2030 with the World Health Organization (WHO) as the main player in global health, have provided the framework for and are based on a holistic approach to health in science and policy. The World Health Summit and the M8 Alliance share this holistic view and concept with the UN and WHO. This facilitates the participation of so many important organizations to play increasingly supportive roles in achieving those goals. This joint commitment and collaboration is necessary if we want to live up to the expectations and hopes of so many people around the world. With this great and productive diversity of actors, stakeholders,

institutions and expertise in global health, it will be increasingly important and urgent to agree on such an inclusive and holistic view of health and on a common basis of facts, concepts and approaches. The “health in all policies” project of the InterAcademy Partnership (IAP) is an important part of this strategy.

The multidisciplinary and multisectoral approach in the political arena and of the WHS importantly is also driven by strong and new scientific arguments. Complex environmental factors, climate, pollution, preservation of nature, biodiversity and animal health have clearly been shown to be closely linked to and to have major effects on human health. This is the basis for the important concept of “One Health” and “Planetary Health”. Since the dawn of civilization there was no major distinction between diseases affecting humans and animals, and the interplay between their respective ecosystems was well accepted. Hippocrates' treatise “On Airs, Waters, and Places” explicitly recognized that the environment is inherently interlinked with health. Such thinking was revived in the 19<sup>th</sup> century by Rudolf Virchow, who proclaimed that “...between animal and human medicine there are no dividing lines – nor should there be,” which then heralded the necessity of the control of zoonoses such as the highly pathogenic avian influenza, Ebola and rabies as well as the increasing challenge of antimicrobial resistance (AMR). Now we have precise knowledge of the exact transmission pathways from animals to man and back to animals. We have increasing insight into the vectors and hosts and we learn to control, treat and prevent infections.

This mandates interdisciplinary research closely linked to multi-sectoral policies and regulatory guidelines concerning poultry and livestock production, as well as marketing practices, food safety policies and guidelines, legislation of the use of antibiotics in animals and their enforcement. At the international level, this has led to increasing collaboration between basic sciences and political agencies such as the World Health Organization (WHO), the Food and Agriculture Organization (FAO) and the Organization for Animal Health (OIE).

### **Scientific Contributions to Achieve the Sustainable Development Goals (SDGs) of the United Nations We Need**

Basic research remains an increasingly important part in our efforts to work for a better future. Understanding complexity will remain the basis for unifying theories and holistic concepts. The Darwinian revolutionary hypothesis on the origin of species is such a strong unifying hypothesis. This has now become in recent years a new and very precise science that has been termed “Evolutionary Medicine” and “Evolutionary Global Health”. Such a development has become possible by the development of revolutionary new methods including genomics and genetics and the molecular analysis of the evolution of plants, animals and man. These new insights have helped to develop a new theory of life. It provides new insights as to why human biology is the way it is, why people are frail and why they get sick and how to preserve better health rather than simply focus on treating diseases. A better understanding of the evolution of life on earth including health and diseases at the genomic and molecular level also provides a scientific rationale for a holistic approach to health and disease integrating the complex interactions between our biology, the environment and our behavior. The gap e.g. between our evolutionary ‘old’ biology and our modern, fast-changing, frequently man-made new environments such as cities and nutrition, helps to explain many diseases of civilization.

The SDGs respond to these complex interactions and provide a framework for a holistic answer to the ensuing challenges. Implementation of the SDGs started worldwide in 2016 in a process also referred to as “Localizing the SDGs”. All over the planet, individual people, universities, governments, institutions, and organizations of all kinds select “their goals” according to their expertise, capacities, means and knowledge. In each country, governments must translate the goals into their national legislation, develop a plan of action, establish budgets and openly and actively search for partners. The big challenge is to maintain the holistic view while encouraging diversity.

The World Health Summit's hallmark is this interdisciplinarity and the multistakeholder participation and interaction - this is one of the reasons the leaders of Ghana, Norway and Germany have invited the WHO Director General to present at the WHS 2018 an action plan for the implementation of the SDGs including all relevant organizations and coordinated under the leadership

of WHO. It reflects the importance of a forum which has the whole picture as its guide. “Good health and wellbeing” may be specifically mentioned just in SDG 3 but it is included in all 17 SDGs: from SDG 1 “no poverty”, SDG 2 “no hunger” to SDG 16 “peace, justice and strong institutions” to SDG 17 “partnerships for the goals”. Health is an extremely good entry point to the complexity of the SDGs because it is easily understandable as an important concern for life and death for the individual person and for society at large.

Improving global health requires input from many disciplines beyond and above medicine, biology, agriculture, nutrition, oceanography and including the social and environmental sciences, humanities and engineering, allied health professions, all of which are essential for the implementation of health policies and programs. This need for interdisciplinary action extends to “Health in All Policies”, an approach to public policies across sectors e.g. research, education, health, digitalization, (Figure 4). economy, energy, foreign policy, security and finances that systematically take into account the health implications of decisions of each of the government ministries and sectors to seek synergies and avoid harmful health impact to population and global health. Such initiatives have been asked for since the Alma-Ata Declaration in the 1970s but the results are far from being satisfactory in most countries. Climate is just one powerful example of how global trends (and actions to deal with them) affect health and require a “Health in All Policies” approach to be addressed effectively and avoid counteractive actions.

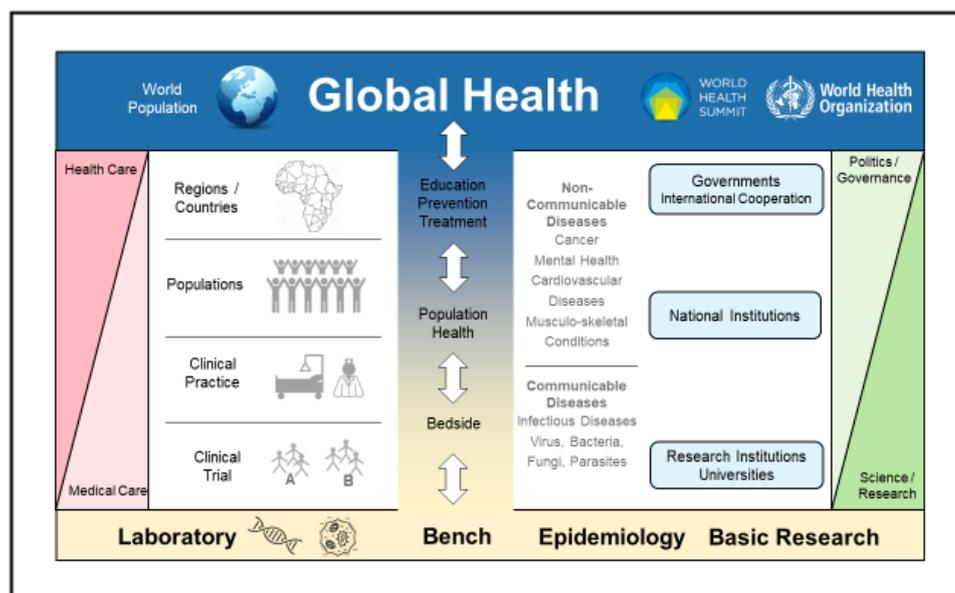


Figure 4: A holistic concept of refined transformative translation: From bench to bedside to global health (and back including reverse innovation).

Diversity of participants from all parts of the world, different cultures, professions, interest groups makes the meeting productive and inclusive.

The holistic view on health has made the World Health Summit a unique forum to garner the best of science, high-level political, civil society, academic and industry engagement in global health in Berlin, the city of Berthold Brecht. “I am of the opinion that the only purpose of science should be to improve the conditions the human existence.” (Galileo Galilei (1938). We believe that Berlin is an excellent place to remember Berthold Brecht. Berlin is a City of excellent science but also a place where we can learn lessons from history! There were times in German history when science was not free. Scientist like any other profession are not immune to opportunistic ideas and actions. We have learned our lessons, in Berlin perhaps more direct than in some other places. Science has to take responsibility for a better life of humankind. Technical applications of research need to improve the conditions of human existence. For this we have to consider the whole world around us, we have to have the totality

of living conditions, socio-economic and cultural aspects, environment in mind – in short: we have to take a holistic approach. Almost all disciplines in the sciences from biology, medicine, to physics, mathematics, chemistry, philosophy can contribute to the noble goal of SDG 3: “Good Health for All”.

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