



YEARBOOK 2015

SCIENCE INNOVATION POLICIES

DIGITAL HEALTH

Vast amounts of data and analytical power: Balanced with concern for privacy, technology holds massive promise for health.

CLIMATE CHANGE & HEALTH

To ensure a livable world for future generations, we must limit the effects of climate change—and prepare for what's on the way.

REFUGEE HEALTH & MEGA DISASTERS

Victims of war and catastrophes have special health needs. Treating them right is a long-term investment.

HEALTH IN THE POST- 2015 DEVELOPMENT AGENDA

Development goals have shifted the focus from states and sectors to individuals. What does that mean for future policymakers?

EXCELLENCE IN MEDICINE



The Charité - Universitätsmedizin Berlin is one of the largest university hospitals in Europe. Indeed, with over 16,800 employees the Charité is one of the largest employers in Berlin, generating more than one billion euros each year. Day after day our highly-committed staff dedicate themselves to the motto: "Research, Teaching, Healing, Helping". Within this remit, the Charité achieves excellent results both in terms of pre-clinical research and in the clinical development of drugs and medicinal products. In addition, the Charité is an innovative force within the healthcare system. It successfully brings together scientific rigour, compassionate medical care and a creative, entrepreneurial approach to university medicine and healthcare delivery.

Editorial

Dear Friends, Dear Colleagues,

2015 will be remembered for magnificent accomplishments in science and medicine. But there have also been unprecedented developments in an area that affects all our lives intimately and directly: global health. Here it's often the catastrophes that linger in public memory; the aftermath of the Ebola epidemic, for example, or the never-ending stream of reports placing the current number of refugees and displaced people around the world at all-time highs. We're fighting microbes that have evolved resistance to drugs—pathogens that are now reappearing in regions where they were once nearly banished, and spreading to new ones. We're witnessing the rising toll of climate change, which now affects the health of billions of people. As the organizers of the World Health Summit, we hear all of these calls to action.

The M8 Alliance of Academic Health Centers, Universities, and National Academies is now six years old. In 2009, its members came together at the first World Health Summit, which has become a unique forum for promoting global health through networking and dialogue between medical practitioners, academia, governments, the private sector and civil society. Over the past six years, the M8 Alliance has developed into a respected and authoritative voice when it comes to decision-making on global health issues. And just as important, we have built new bonds of friendship, trust, and collaboration among the world's leading academic health centers.

Based on that solid foundation, 2015 has been a unique and pivotal year. This year's WHS Regional Meeting, which was held in April in Japan, led to an M8 Alliance statement focusing on resilience and action—action to overcome the challenges of rapidly aging populations, responding to and preparing for future crises, and fostering new leaders. While every M8 Alliance member will confront these challenges to resilience in its own way, each of us will continue to learn from the others, and we will share our experiences with the world.

The latest of our successful meetings, the World Health Summit 2015 in October in Berlin, brought together more than 1,500 participants from 90 countries, professionals from academia, politics, the private sector, and civil society. Working together for three days, they



forged new alliances to highlight the importance of cooperation across sectors. As a result of this meeting, the Berlin M8 Alliance statement has now called on world leaders to take bold action for global health, highlighting five central topics that urgently need to be addressed.

After six years spent building a strong base, 2015 may be best remembered as the year we mobilized that base to take action. The M8 Alliance will encourage and support specific actions by its members as they build on its unique cross-sectoral network, and as they set examples that will benefit the entire global healthcare community.

The world is right to expect much from the M8 Alliance and the World Health Summit. As we enter a new phase of action to implement concepts and ideas, let us continue working together to fulfill our founding mission: to improve global health. This year's World Health Summit program reflected that spirit, and it can be seen in every line and image in this WHS Yearbook as well.

Thank you all for your support!

PROF. SHUNICHI FUKUHARA
WHS President

PROF. DETLEV GANTEN
WHS President

Contents

OPENING

- 3 **Editorial**
Shunichi Fukuhara, Detlev Ganten
- 6–7 **Welcome Messages**
Angela Merkel, François Hollande, Jean-Claude Juncker



CLOSING

- 96–98 **About the M8 Alliance**
About the World Health Summit / Imprint

1 THE DIGITAL HEALTH REVOLUTION

- 10–11 **Introduction**
- 12–13 **“To modernize we will need technology”**
Said Aidi
- 14–15 **Digital Contribution to Health and Well-Being in Europe**
Günther H. Oettinger
- 16–17 **The Route to Better Value in Healthcare**
Joseph Jimenez
- 18–19 **Giving More People More Access to More Knowledge**
Lydia Pintscher
- 20–21 **Digital Health—The Future of Medicine**
Bodo Kress, Roland Göhde, Uta Meyding-Lamadé
- 22–23 **Health in Numbers**

ANNUAL DISCUSSION

- 24–31 **“Investing in the rest of the world is an investment in our future”**
Mark Dybul, Ada E. Yonath, Friedrich von Bohlen und Halbach



2 CLIMATE CHANGE & HEALTH

- 32–33 **Introduction**
- 34–35 **“We have to act now”**
Sir Andrew Haines
- 36–37 **Climate Change and Health**
Detlev Drenckhahn
- 38–39 **How to Minimize the Negative Health Effects of Climate Change**
Robert Sebbag
- 40 **Academies of Medicine: Influencing Global Health Policy**
Lai-Meng Looi, Detlev Ganten
- 41 **IAMP Statement**
Statement on the Health Co-Benefits of Policies to Tackle Climate Change
- 42–43 **Health in Numbers**



WORLD HEALTH SUMMIT 2015

- 44–45 **WHS 2015 Report: Call to Action**
- 46–52 **Moments from the WHS Berlin**
- 48 **Faces and Voices in the Crowd**
- 50–51 **WHS Startup Track**
Digital Health's Promise
- 54–55 **M8 Alliance Statement**
World Health Summit—Berlin

3 REFUGEE HEALTH & MEGA DISASTERS

- 56–57 **Introduction**
- 58–59 **“Many sane people have paranoid fears”**
Sir Robin Murray
- 60–61 **One World, One Health**
Lothar H. Wieler
- 62–63 **Global Forced Displacement and Health: Challenges for Humanitarian Action**
Florian Westphal
- 64–65 **Sexual Violence: A Global Challenge for the Health Sector**
Klaus Beier, Christine Heim
- 66–67 **Health in Numbers**

M8 ALLIANCE SPECIAL

- 68–71 **A Unique International Network of Excellence**



WHS REGIONAL MEETING ASIA—KYOTO 2015

- 72–73 **Meeting Emerging Challenges**
- 74–75 **M8 Alliance Statement**
WHS Regional Meeting Asia —
Kyoto and Fukushima 2015

4 HEALTH IN THE POST-2015 DEVELOPMENT AGENDA

- 78–79 **Introduction**
- 80–81 **“We must change our paradigm”**
Dorcas Makgato-Malesu
- 82–83 **G7—Working Towards Global Health**
Hermann Gröhe
- 84–85 **Toward Individualized Cancer Medicine**
Otmar D. Wiestler
- 86–87 **Paving the Road to Sustainability**
Ngozi Okonjo-Iweala
- 88–89 **Partnership and Innovation to Advance Global Health and Accelerate the End of AIDS**
Mark Feinberg
- 90–91 **Stem Cells in Disease Modeling and Regenerative Medicine—Perspectives, Challenges and Realities**
Daniel Besser
- 92–93 **Health in Numbers**

World Health Summit 2015

Welcome Messages



Germany holds the G7 Presidency in 2015. Health matters are a key item on our agenda. We are primarily focusing on infectious diseases, which are one of the most common causes of death worldwide. The Ebola epidemic in West Africa was a painful reminder of what a devastating impact the uncontrolled outbreaks of such diseases can have.

Close international cooperation is vital in order to be better prepared for such epidemics in the future or, in the best-case scenario, to be able to prevent them in the first place. Whether it is a matter of being able to provide rapid emergency aid at any time or of promoting research in the fight against antimicrobial resistance and neglected tropical diseases, we can only overcome such global challenges if we work together across national and cultural borders and across the scope of professional and political competence.

The World Health Summit is an excellent venue for expert discussion on the health topics that move us worldwide. We can expect it to deliver valuable input, also as regards the G7 objectives and the post-2015 agenda for sustainable development.

As patron of the World Health Summit, I would like to welcome all the participants to Berlin. The conference will open doors for you to new insights, contacts and collaboration. This personal benefit can pay dividends to many people. The hopes of countless numbers of people are resting on this. I am extremely grateful for your great dedication in so many fields.


DR. ANGELA MERKEL
 Chancellor of the Federal Republic of Germany



The world climate conference (COP21) will be held in Paris this December. Health and climate are both inextricably linked and interdependent. This was the theme of the World Health Summit 2014, whose participants stressed the importance of international solidarity.

We have witnessed this solidarity in recent months, when the Ebola virus once again struck West Africa. To be effective, this solidarity must be based on exchanges and shared knowledge and experiences. Therefore, by maintaining education as one of the six main themes of the 2015 World Summit, there is no doubt that its organizers wanted to highlight the importance of the training period for future health actors to raise their awareness of the main issues for the future: education, prevention, detection.


FRANÇOIS HOLLANDE
 President of the French Republic



As President of the European Commission, I am convinced that, by working together in a focused way on certain health-related issues, we can ensure longer, richer lives for the citizens of Europe and the world. I aim to focus on the issues that matter and make a difference; and to concentrate on those areas where European action can really add value to people's lives. Although national health policy remains a national competence, there remains a lot we can do together.

There are many pressing trends in healthcare. First, we all see the epidemics that can devastate developing countries. Fresh outbreaks like Ebola grab the headlines, while others such as HIV and malaria continue their grim toll. Our common humanity compels us to respond: and I am glad the EU is mobilising in this fight, with political, diplomatic, humanitarian and financial tools—not to mention some promising new research into Ebola treatments.

Second, we have a population that is getting older. In Europe today, we see 65 as the age for retirement; but, not so far into the future, one in three adults could be over that age. That poses a challenge for our healthcare systems: set up to focus on acute conditions; but which now must deal increasingly with chronic, degenerative illness. This will call for a systemic change, blurring the boundaries between health and social care, and between home and hospital; and also calls for investment to fight such chronic conditions.

And third, there is a growing resistance to antibiotics—a resistance which already today causes 25,000 deaths a year. This is a major public health challenge—calling for a coordinated, committed response.

Yet, alongside these trends, we have many opportunities to improve efficiency, accessibility and resilience of healthcare. From electronic prescriptions to tele-monitoring, digital technology can offer Europeans better-quality care. I would like to see a Europe that is able to exploit those new opportunities: innovative, investing, and digital.

The EU can help Member States address the challenge of increased calls on health services, and more complex technology. Under my Presidency, the European Commission will support the EU's capacity to deal with crisis situations in food safety or pandemics; especially Ebola. We will develop EU policies on medicines and pharmaceutical products—while taking fully into account that medicines are not goods like any other. We will develop expertise on how health systems perform, feeding into our broader economic policy coordination. And we will ensure that the healthcare sector—like so many others—is able to capture the benefits of a borderless digital single market.

In these areas and more, we can work more effectively when we work together. I wish you all the best doing so at the World Health Summit.


JEAN-CLAUDE JUNCKER
 President of the European Commission

**BERLIN
INSTITUTE
OF HEALTH**
Charité & Max Delbrück Center

SOMETIMES WHEN THINGS SEEM FAR AWAY...

... it is because they are. That is why we are committed to bringing bench and bedside closer together. Our Shared Research Space integrates basic research, clinical activities, and first-class infrastructure that provide the basis for groundbreaking future medical innovations.

bihealth.org

The Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC) comprises more than 60 independent research groups and a dozen state-of-the-art technology platforms. With more than 1,600 employees and guests, it is the largest biomedical research center in Berlin, Germany, ranking 14th worldwide in the fields of molecular biology and genetics*. At the MDC, nearly 400 PhD students – enrolled at universities in Berlin and abroad – are working towards their academic degrees.

The MDC carries out basic biomedical research with the aim of understanding the molecular basis of health and disease. The center is committed to translating these findings as quickly as possible into clinical applications to help improve the diagnosis, treatment, and prevention of diseases. Together with the Charité – Universitätsmedizin Berlin, the MDC has expanded its translational research activities through the establishment of the Berlin Institute of Health (BIH) in 2013.

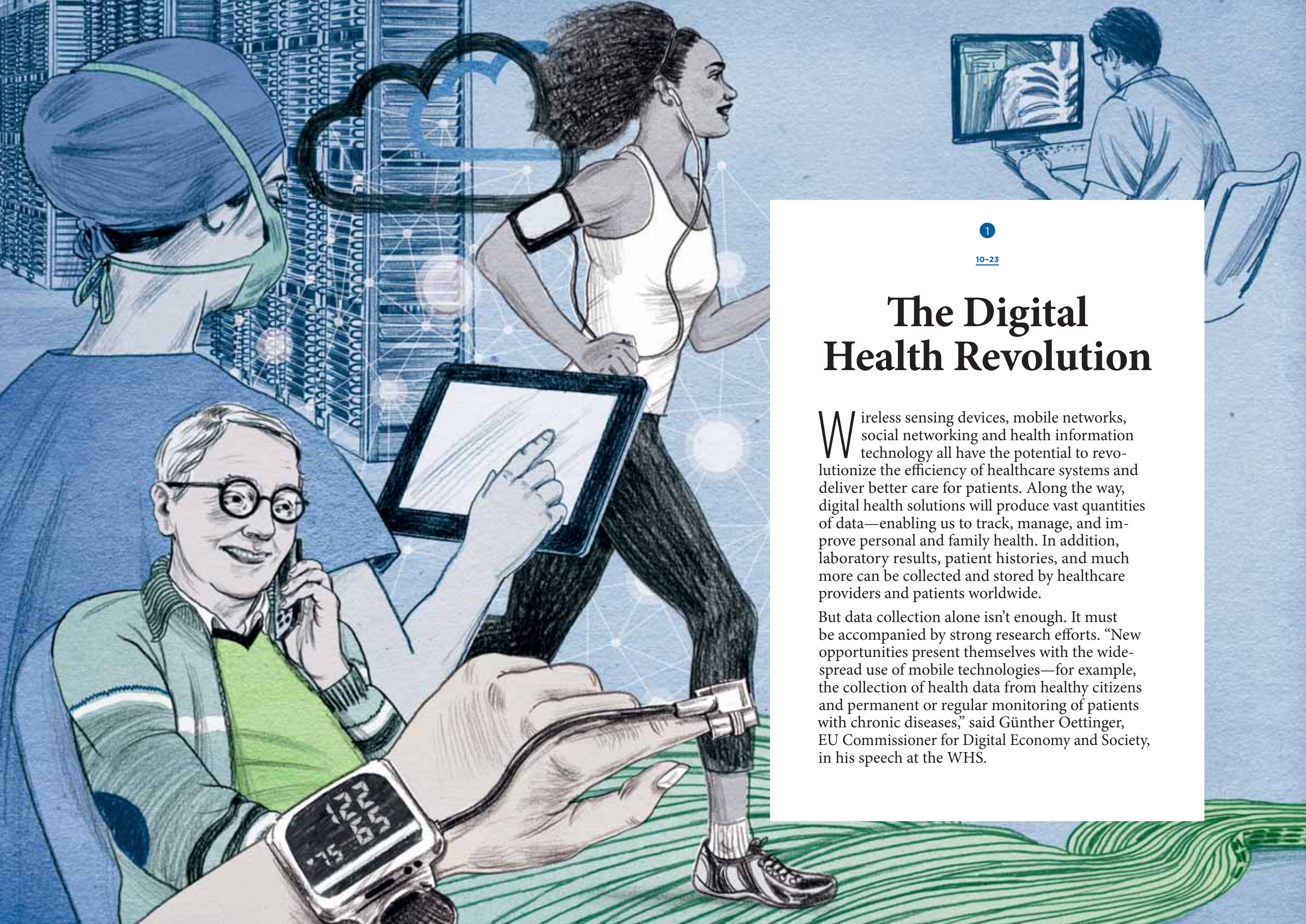
* Thomson Reuters' ranking of the world's 20 best institutes in the field of molecular biology and genetics.

 **HELMHOLTZ**
| ASSOCIATION

MDC MAX DELBRÜCK CENTER
FOR MOLECULAR MEDICINE
IN THE HELMHOLTZ ASSOCIATION

www.mdc-berlin.de

Picture: FLASH OF INSIGHT – A single neuron (green) growing on a lawn of glial cells (red) and branches. The branches are the dendrites. Illustrated blue are the cell nuclei. © Florian Hetsch / MDC



1

10-23

The Digital Health Revolution

Wireless sensing devices, mobile networks, social networking and health information technology all have the potential to revolutionize the efficiency of healthcare systems and deliver better care for patients. Along the way, digital health solutions will produce vast quantities of data—enabling us to track, manage, and improve personal and family health. In addition, laboratory results, patient histories, and much more can be collected and stored by healthcare providers and patients worldwide.

But data collection alone isn't enough. It must be accompanied by strong research efforts. "New opportunities present themselves with the widespread use of mobile technologies—for example, the collection of health data from healthy citizens and permanent or regular monitoring of patients with chronic diseases," said Günther Oettinger, EU Commissioner for Digital Economy and Society, in his speech at the WHS.

INTERVIEW

“To modernize we will need technology”

Saïd Aïdi is Tunisia’s Minister of Health, a position he has held since February 2015. Before taking over the leadership of the Health Ministry he was Minister of Vocational Training and Employment. Aïdi was born in Tunisia and worked for many years in the human resources sector in France for companies including IBM. He founded his own consulting company, Atlasys, in 2004. After the Arab Spring, Aïdi returned to Tunisia as a politician. He spoke to the WHS Yearbook about the pitfalls of relying too heavily on technology and the promises of digital health.

You come from a technology background in business, and yet you emphasized in your talk at the keynote on Digital Health that technology for technology’s sake is not good. Could you explain what Tunisia is getting from the digital health sector?

Saïd Aïdi — It’s a guarantee of failure. We always need to ask ourselves if the technology is critical for us. We’re convinced that to transform or to modernize, we will need technology. But we need first to assess and really comprehend the situation of the health sector in Tunisia.

That means for health sector reforms in Tunisia, prevention is key. For prevention, we have identified how to promote health education. And here, the digital approach is critical, especially with the new generations. They are all connected, all using smartphones and so on. But it’s also critical to manage all of the clinical, non-communicable diseases such as diabetes or hypertension with the help of technology.

Can you give an example of how you used digital technology to reach young people?

We have set up an “End Tobacco” program to help young people—and not-so-young people—stop smoking, for example. It’s also something that we can use for diabetes to remind people when they have to take their treatments and check their blood sugar. It’s also something that we are putting in place for prenatal care to help future mothers and sensitize them to the importance of breast-feeding, because that’s something that is important for us too.



And how is this digital? Are you sending people an SMS?

Through cell phones, through tablets or SMS, we’re trying to create a give and take between the citizen and the digital health system. He can ask questions when he wants to stop smoking; when he has difficulties, he can get answers and this helps him stop. We have already had some success.

For the prevention of diabetes, once we have identified the patient and the diseases he has, we can send him an SMS to remind him that he has to take a test or take his medicine. We will also use it for road safety campaigns. It’s an important way to remind people with this kind of information.

“To be successful with our reforms, it’s important to bring all of the actors—health professionals, civil society, politicians, the youth—together.”

We also need to put in place a digital medical filing system. This requires us to put in place new technology, but to also be sensitive about protecting personal data. We need to retrain our health professionals to help them approach digital health records properly. It’s not easy to convince doctors to share information. We’ll also need to address the doctors’ business model—and understand how to make it work better. The objective is, as you can imagine, decreasing the number of consultations and the number of prescriptions, and putting together all of the patient’s data so health professionals can access it everywhere, at any time.

Coming from your background—working at IBM, having your own technology company—and going into politics and public policy, were there changes you had to make to your mentality to work in this new environment?

Obviously. It’s why I always say technology for technology’s sake is a guarantee of failure. We first need to think about the patient and what the patient needs, and then how to make things easier for the health professional, and not more difficult. When it comes to technology, I was in the human resources sector, so I can say this helped me approach the issues the medical sector faces.

Of course, we have another part of the digital health strategy, which is new equipment. These innovations are not linked directly to the patient. Rather, it’s between the professionals of the health sector and the technology companies to develop better ways to manage

all of the diseases. We’ve set up something called the HTA, or Health Technology Assessment, to be sure that we have the required equipment—not more, not less.

Are there some lessons that you have brought from the human resources business?

Yes. My background may have helped me in this period of the history of Tunisia. Our citizens—and this is good—are asking for more quality and more humanity, also in their relationships with doctors. The doctors have always been humane, but with the new situation in the country, maybe they’re thinking more about what the patients require and how we can manage their ambitions given the limitations and capacity of the health sector in Tunisia.

To be successful with our reforms, it’s important to bring all of the actors—health professionals, civil society, politicians, youth—together. They may not necessarily have the same point of view, but they have to work together to make the reforms we need to succeed over the next decade in Tunisia.

That brings us to the last question, which isn’t exactly about health: What does the 2015 Nobel Peace Prize mean for Tunisia?

It gives us a big responsibility. This is recognition that dialogue is key in Tunisia, and I think for humanity in the new century. We need dialogue. It comes as we work to create a Second Republic in Tunisia. For me, the prize symbolizes our capacity to live together, to disagree without fighting, and even from our disagreement to build something better for the community and for the nation.

The majority of Tunisia recognizes that Tunisia faces many challenges, but is on the right path to becoming successful in this part of the world. It’s also a conviction that we have—that I have, at least—that we are living through a kind of a rupture in the relationship between different components of society. Not only in Tunisia, but the whole of humanity. We have to reinvent economics, or create a new development model for the coming century. ●



H.E. SAÏD AÏDI
Minister of Health | Tunisia

ESSAY

DIGITAL CONTRIBUTION TO HEALTH AND WELL-BEING IN EUROPE

The challenge is big. European systems for health and social care have been successful for many decades, contributing to our improved health, well-being, and increased longevity. Yet these systems need to evolve if we want them to effectively address the challenges of tomorrow.

Our aging population needs more care and for a longer time. Europe's 65+ population will almost double from 87 to 152 million by 2060, as will the number of those in need of long-term care: from 20 to 39 million.

By 2060, the costs of the EU's public spending on health-care are expected to increase by 23 percent from 6.9 percent to 8.5 percent of GDP, and spending on long-term care by 71 percent from 1.6 percent to 2.8 percent of GDP. Based on the 2014 figures, this would amount to estimated extra spending of €228 billion and €172 billion, respectively. Chronic diseases today account for over 70 percent of total healthcare costs.

As Europeans, we value solidarity, equity and "access for all" to quality care. To preserve these values, we need to adapt and ensure sustainability. Our systems are looking to become more person-centered, providing care at home and enabling quality living with chronic conditions. Our citizens look for healthier lifestyles. Digital solutions have a lot to offer both to our systems and to our people—and there is strong evidence digital solutions deliver. Especially when combined with new mindsets, skills and organization.

PART OF THE ANSWER IS DIGITAL

Digital innovation can contribute greatly to controlling rising costs, sustaining or increasing the quality of

care, and at the same time, generating economic growth. Many chronic conditions like diabetes, heart and respiratory diseases are also lifestyle dependent, and can be prevented or more effectively managed. Digital applications empower patients and enable better use of data. They give us a "response-ability" to manage our own health, supported by doctors and caregivers.

GAIN AND MAINTAIN THE TRUST OF mHEALTH USERS

mHealth applications provide great opportunities. More than 100,000 mHealth apps are already available for lifestyle and health monitoring to support behavioral change and self-management. It is no coincidence that the app categories with the highest growth potential are remote monitoring (53 percent) and consultation (38 percent).

Data generated by mHealth apps can be used for prevention, research, therapy, personalized care and adherence to treatment. mHealth can improve access to more relevant data and health outcomes. For example, in the case of mental disorders, daily monitoring may provide a better indication of a patient's condition than a quarterly visit. Empowering people to decide how to use their health data is a prerequisite for getting us all involved in our own health management. Our right of access to personal digital health data has not yet been realized in practice in all European countries, and we must address that.

DIGITAL SUCCESSES ARE READY FOR SCALING UP

Innovation is an essential element of the EU response to demographic change. The partners of the European Innovation Partnership for Active and Healthy Ageing are sharing innovative digital solutions and integrating them into our health and care systems. For example, Northern Ireland's Department for Health, Social Services and Public Safety (DHSSPS) has achieved efficiencies of £48 per month per patient with its medication adherence program. The Andalusian strategy for active aging targets senior citizens in the region and improves their well-being with a focus on healthy living and social participation. The region created 322 non-profit organizations and over 2,600 jobs in this field. The region of Southern Denmark identified health and innovation as one of its priorities for "smart specialization." Over 700 additional jobs have been created in the region, and a positive economic impact estimated at €3.7 billion in company turnover has been achieved. Many more examples exist to support the positive impacts of investing in digitally supported innovation for health and aging.

TO INNOVATE IN HEALTH AND CARE WE LOOK BEYOND HEALTH AND ICT

We must increasingly take into account how other sectors can impact health and care and provide fresh stimulus for economic growth. Promising areas include smart homes that support independent living, connected and autonomous vehicles, robotics and communicating wearables. Developments in energy efficiency technology, the Internet of Things, Big Data, privacy, Industry 4.0 and others are all inherently linked in solving our societal challenges of today and tomorrow. Synergies in these areas will enable the evolution of our digital economy and society.

With digital innovation, Europe can reap the benefits of the Silver Economy. Demographic change is a mighty economic and societal challenge that we can turn into an opportunity, but we must act quickly and with determination. An important focus of my mandate as European Commissioner for the Digital Economy and Society is to support research and innovation, to remove barriers and create the right conditions for digital solutions to improve health and well-being in our digital society.

Research and innovation is supported via the EU's program Horizon 2020. It is allocating €7.5 billion in funding to better understand health, aging and well-being; digitally enabled solutions for active and healthy living; and eHealth and mHealth.

The right infrastructure and support to deploy innovation together with a well-functioning Digital Single Market are all needed to achieve these goals. Digital health services strongly depend on high capacity, ubiquitous and flexible networks. Broadband coverage in rural areas is still substantially lower than in urban areas, with big gaps between countries ranging from 44 percent to full coverage. The

Commission's Communication on a Digital Single Market Strategy for Europe has reaffirmed the importance of investment for closing the digital gap between urban and rural areas. With the project Connected for Health, we are exploring opportunities for open fiber-to-the-home networks for healthcare in sparsely populated areas of Northern Europe.

The Commission's work on eHealth is consolidated in the four main working areas of the eHealth Action Plan 2012–2020: interoperability, research, international cooperation and support for large-scale deployment of innovation. Active stakeholder participation is a prerequisite for success, as demonstrated in the follow-up to the mHealth Green Paper and preparation of a Code of Conduct addressing citizens' concerns about data privacy, security and quality of well-being apps. The analysis of health-app data from thousands or even millions of users (so-called "Big Data") may substantially improve public health policy.

These markets, tailored for health, well-being, care and active aging, are still growing. To unlock the market potential, public authorities can broaden financial support and reimbursement instruments, e.g. measures to promote age-friendly living, including building and renovation. At the same time, people should be inspired to invest in healthy living rather than recovering from sickness. According to Euromonitor, the global spending power of the now elderly "baby boomer" generation will reach €13 trillion by 2020. Addressing the needs of older people can create a massive pull-effect on existing or emerging markets. For example, the market for smart homes is expected to grow to €46 billion per year by 2020.

The Juncker Commission is committed to a new start for Europe, delivering jobs and growth while tackling societal challenges. Developing the Digital Single Market and boosting digital investment in health and care offers plenty of opportunities in this regard.

Digital innovation can be a crucial enabler, but it will only work if we work together across sectors and succeed in making technology meet the real needs of people.

When our systems for health and care "go digital," we may aspire to keep care provisions affordable, improve health outcomes and the quality of life of our citizens in ways otherwise unthinkable. ●



Written by
GÜNTHER H. OETTINGER
European Commission | Commissioner,
Digital Economy & Society | Belgium

ESSAY

THE ROUTE TO BETTER VALUE IN HEALTHCARE

Our healthcare systems today are siloed and focused on transactions. We need to move to a new system where pharmaceutical companies, payers, regulators and governments are jointly accountable for a shared objective: a positive outcome for the patient.

Health systems around the world face a mounting crisis. By 2050, for the first time in history, seniors over the age of 60 are projected to outnumber children under the age of 15. As the population grows and global demographics tip toward the elderly, demand for healthcare is expected to rise substantially.

At the same time, chronic disease is forecasted by the World Health Organization (WHO) to grow to over 70 percent of the disease burden by 2025. As lifespans increase, these numbers are likely to continue to rise, placing an enormous burden on healthcare systems and budgets. This growing demand for healthcare is coming at the same time as incredible advances in science and technology. A new wave of innovations is on the horizon with the potential to not only transform lives, but also add to demand for these new therapies and services.

However, our current health systems are not yet ready to meet these challenges. Today's healthcare delivery model looks much as it did in the 1950s: big hospitals that primarily focus on reactive care to treat people with acute illness.

According to the most recent data available from the Economist Intelligence Unit, global healthcare spending reached US\$7.1 trillion in 2013. With people living longer and diseases shifting to long-term, chronic conditions, this model is not sustainable.

We need a new system where pharmaceutical companies, payers, regulators and governments are incentivized to work together to remove waste from the system and

improve the quality of care. We need to shift from a system that is siloed and focused on transactions to an integrated one where all parties are jointly accountable for a shared objective: a positive outcome for the patient. If you look at healthcare delivery today, you find that most systems do not know precisely where they spend their money and what they get for it. They don't actually know if they are improving patient outcomes, nor how much they spend to get an outcome.

Where data exists, we see huge variation across countries in terms of major outcomes indicators. If you look at WHO life expectancy data, across European countries, the difference is 9 years. But this variation is not correlated with spending. More spending does not mean better results.

For example, patients with heart failure in France—a country which is considered to have very good healthcare, and where each hospital is paid the same amount for the same service—have a 20 percent higher chance of dying early in some regions compared to the national average. Yet patients in other regions have a 50 percent lower chance of dying early. This data from French Epidemiology Bulletin BEH shows that the same amount of spending does not equal the same results. Data in the British Medical Journal shows that 50 percent of clinical interventions today are made without evidence of effectiveness. This means that our systems are paying for a huge amount of ineffective interventions.

How can we address this and shift our healthcare systems to focus on patient outcomes?

The first step is to systematically track interventions and outcomes for each patient in real-world practice. By combining this information with cost data, systems could then identify ways to improve value.

- » They could identify and stop ineffective treatments.
- » With better evidence for clinical decision-making, they could make treatments that deliver better outcomes available to more patients.
- » And by facilitating early intervention, they could prevent unnecessary disease progression and costly complications.

I believe the pharmaceutical industry also has to play a part in this transition. This is why over the past several years Novartis has been moving away from the industry's traditional business model of simply selling pills toward an outcomes-based approach. We are thinking beyond the pill and about what else it takes to truly improve outcomes and ultimately value. Let me give you a few examples:

- » We are working on better diagnostics to ensure only patients with a good chance of response are receiving a given medicine. Those with a low chance of response or a high chance of side effects receive an alternative. This will improve outcomes and reduce waste. One application of this approach is in the area of breast cancer, where treatment success depends on specific genetic mutations.
- » We are also teaming up with tech companies to provide adherence support in the form of devices, apps, and smart pills. These are intended to help patients take their medicines as prescribed and their physicians to intervene when adherence or tolerability undermine treatment success.
- » And we are developing home monitoring solutions, together with predictive models to allow physicians to intervene when needed. For example, with technology that can predict acute heart failure episodes, hospitalizations can be prevented. Our objective is to facilitate smarter use of resources while sparing patients unnecessary pain.

However, we also understand that change is needed beyond what we can deliver with ever better medicines and supporting technologies. The system change we need requires a true multi-stakeholder approach.

This is why the European Pharmaceutical Industry has committed 100 million euros to a collaborative programme called "Big Data for Better Outcomes." In this program, we want to facilitate a shift to outcomes-oriented healthcare by taking three key steps:

- » First, defining and prioritizing outcomes and aligning with stakeholders on how to measure them.
- » Second, increasing access to high-quality outcomes data by combining existing datasets and developing plans to fill gaps while protecting patient privacy.
- » And third, analyzing outcomes variation to find out what works best for which patients and to identify best-practice treatment.

Recently the industry launched the first wave of projects under this programme, one focusing on Alzheimer's disease and one focusing on hematological malignancies. We plan to launch projects in cardiovascular disease and multiple sclerosis in the next wave, and further projects are being initiated as we speak. We hope that many stakeholders will apply to become partners, including payers, providers, and patient groups.

Moving from the current system to one that focuses on outcomes and maximizes value is a daunting challenge, but it can be met. Doing so will require courageous leadership, a fundamental change in how we keep people healthy and a focus on financial sustainability. This is the right thing to do for patients, for healthcare systems, and for society. ●



Written by
JOSEPH JIMENEZ
Novartis International AG | CEO |
Switzerland

ESSAY

GIVING MORE PEOPLE MORE ACCESS TO MORE KNOWLEDGE

Everyone needs access to knowledge. Information on health-related topics is vital for scientists and non-scientists alike. But are we giving everyone access to the information they need to do good research and make the best decisions?

Take Wikipedia for example. Nearly half a billion people every month visit it in search of knowledge.

Wikipedia is the number one source for information about health-related topics worldwide. It is available in nearly 300 languages—all created and maintained by volunteers. The knowledge each of these Wikipedias covers varies widely. Vital information on Ebola, for example, is only available on about 1/3 of them, and the quality of the content is very different. Similar disparities can be seen on the rest of the web. This means not everyone has access to the same amount and quality of information—an inequality that we need to address in a world that is becoming more and more dependent on easy and equal access to information. How can we use open data to support knowledge sharing, especially in languages that are generally underserved when it comes to medical information?

The Wikimedia movement has always relied on volunteers to contribute to its encyclopedia and many other projects. These projects are usually split by language, and the only shared content to illustrate their content was multimedia files. Additionally, the information was stored in a way that is not machine-readable, limiting its reusability outside of the Wikimedia movement and making it harder to build new tools around the data. In order to give more people more access to more knowledge, a breakthrough was needed. The editors needed new tools to allow them to work more efficiently and collaborate more across

language and cultural barriers. Reusers of Wikimedia's content needed it to be more accessible on a large scale in a machine-readable way. In 2012, a new Wikimedia project was started to make this a reality by centralizing the storage of open data throughout the world: Wikidata.

Wikidata centrally stores information such as what causes a disease, or who discovered a vaccine. It is:

- » an open and collaborative project. It can be accessed and edited by anyone—just like Wikipedia. It is read and edited by both humans and machines.
- » a multilingual project, meaning its data can be accessed by anyone regardless of their proficiency in English.
- » a secondary database. It stores data points and references for them. It does not try to determine truth. It is built to handle even conflicting data side-by-side so the consumer can decide which reference to trust.

Wikidata serves four major use cases that can all be utilized to make health-related information universally accessible:

THE BACKBONE OF WIKIPEDIA

The moment someone enters a data point, it is immediately made available to all of the nearly 300 language editions of Wikipedia. This way a single edit by one editor

(like adding a link to an image of a common virus) can provide more knowledge to many more people than if they just made the edit to an article in one language. This is work at scale and across language and cultural barriers. Smaller language communities especially benefit from this, as they can leverage the work of many more people than they previously could in making knowledge available in their respective language. This makes Wikidata a perfect place to spread health-related information at scale and make it available to previously underserved groups.

A DATA SOURCE

All of the data in Wikidata is available for anyone to use, share and remix—without any restrictions (under CC-0, public domain). This makes it possible for the data to spread even further than just in Wikipedia. It is used to build apps and enrich other content. For example, a website offering medical advice can use the data about significant people in the history of medicine instead of starting to research it from scratch and maintaining it itself. They are free to concentrate on the core of their content, thereby serving their users better and spreading health-related information further.

A HUB

Wikidata maintains links to other databases and similar resources for many of its concepts. It is a hub to the world's knowledge on nearly any topic. It is easy to go from a medical procedure to a database that tracks where it is performed. Wikidata itself does not store all of the world's information, but is a window to it.

A CONTROLLED TAGGING VOCABULARY

Wikidata has unique identifiers and names in many languages for all of its concepts. This makes it a perfect multilingual tagging vocabulary. Research documents and scientific papers can be tagged using Wikidata's IDs in a language-independent way. Only in this way is it possible to easily distinguish between gift (English word, Wikidata identifier Q184303) and Gift (German word for poison, Wikidata identifier Q40867), as one example.

And this is just the beginning. Wikidata is just one way in which open data gives more people more access to more

knowledge every single day. In the coming years we will see more projects like it. The conventional thinking about open data is that a government institution or company publishes a data set that can then be consumed by others but is read-only. In order to reach the full potential of open data, we need to go a step further. Truly open data needs to be editable and expandable so more people can take ownership of the data, improve it, spread it and make it do things we have not thought of. This is the beauty of open data. We often fear that if we give people this power they will abuse it. With the right tools in their hands and the opportunity to be a part of the solution to their own problems, they will instead amaze us with ideas and solutions we have never thought of. When we open up data we help spread health-related information far beyond our current reach. ●



Written by
LYDIA PINTSCHER
Wikimedia Deutschland – Gesellschaft
zur Förderung Freien Wissens e. V. |
Product Manager | Germany

ESSAY

DIGITAL HEALTH— THE FUTURE OF MEDICINE

Many rural regions suffer from a shortage of doctors and poor health infrastructure. Modern technology and the widely available 3G network make it possible for patients in underdeveloped countries to be treated nevertheless. The solution is here now: digital health.

Digital health means applied information technology (IT) in medicine. Without IT, medical treatment and care, as well as medical administration, might be difficult and inefficient today. Therefore, digital health is nothing that awaits us in the future; it is here already. While IT develops from day to day and capacity and reliability in networks grow, the influence of IT in medicine increases every decade and every year. This revolution meets the challenges of specialization in medicine. High quality medical treatment in hospitals takes place in interdisciplinary teams in which all members are specialists in their field. Specialists are rare even in highly developed countries, so that it is sometimes difficult to hire specialists for each subspecialty. This leads to a shortage of specialized services. For instance, in Nairobi, no neurosurgeon or interventional neuroradiologist is actually present. If a patient suffers from subarachnoid hemorrhage due to an arterial aneurysm, this patient has to die because nobody is available to treat him. But shortage is not only a matter of specialization. In some regions of the world (rural, dangerous, underdeveloped) without physicians, a nurse takes care of patients. Even in those regions, 3G networks are widely available so that telemedicine could very well bring the doctor to the patient. Telemedicine transfers patient data from place A to B, or gives the physician the opportunity to see and examine the patient via videoconference. In the following, some examples are given:

LABORATORY EXAMS IN POINTS OF CARE

Point of care laboratory analyzers work with prefabricated kits that are easy to handle. A health point nurse takes blood from the patient, applies a dedicated volume of blood to the kit and the analysis commences. Via an

interface, this machine can be connected to a PC or mobile phone to connect to the Internet. Via a browser-based protocol which is datasecure (e.g. https), the data can be transferred to a center where a physician evaluates the data and gives recommendations concerning the treatment. This has proven helpful for diabetes patients. Patients in rural areas being treated via such networks have a better outcome than those that are not. As diabetes is one of the major risk factors in cardiovascular disease, this would mean a significant reduction of risk, even for patients in underdeveloped countries. Patients in rural areas being treated via such a network have a better outcome than those who are not.

MONITORING OF HEART PACEMAKERS

Modern heart pacemakers are able to connect to a PC via an application. This application makes it possible for last week's data records to be transferred to a dedicated center where the patient is monitored. There, the cardiologist can go through the data and if everything is normal, the patient does not have to travel.

NEUROLOGICAL ACUTE AND INTENSIVE CARE

A showcase project in Brunei Darussalam has successfully proven the feasibility of telemedicine in the daily routine covering the whole neurological spectrum. We have successfully established a telemedical network between the Department of Neurology and the Department of Neuroradiology of Krankenhaus Nordwest (KHNW), Frankfurt, Germany and the Brunei Neuroscience Stroke and Rehabilitation Centre.

This telemedical network includes acute 24/7 support, training programs, regular conferences and lectures, as

well as building up all necessary neurological laboratories. The electrophysiological advanced training consists of theoretical and practical exercises. For practical exercise, the EMG machines are positioned in front of the workstation, and different examination methods are gradually performed and announced. Individual steps can be supervised and reproduced. Errors can be checked, improved or steps may be explained again. EEG education includes basic principles and individual examinations. Pathological findings are demonstrated and taught. Besides that, it is feasible to analyse EMGs, EEGs and CSFs done in Brunei by Bruneian staff with the help of telemedicine.

Furthermore, clinical examinations can also be taught via telemedicine. Patients are demonstrated and discussed, and specialists on the telemedicine tool can examine the patient (e.g. pupillary reaction) by themselves.

Daily teaching ward rounds are effective where doctors report the history of the patients, demonstrate physical symptoms and signs, and carry out a differential diagnosis afterwards. Diagnostic consequences and therapeutic strategies are discussed and can be done with telemedical equipment. This includes a training program for specialists in neurology.

REHABILITATION (APHASIA)

The benefit to the patient is to have continuous therapeutic training in the comfort of their own home. After a stroke, it is very common to have communication problems, and this condition is known as aphasia. With the help of telemedicine, patients with aphasia can be treated after their hospitalization and can stay comfortably in their own home. The only equipment needed is a laptop or desktop PC, including loudspeaker, microphone and camera. On the other end, a speech therapist is equipped with the telemedicine tool.

RADIOLOGY

Since images (such as cross sectional images) have always been digital, telemedicine was first applied in the field of teleradiology. The DICOM standard made it easier to share these images, and as a result, teleradiology has been done for almost 20 years and counting. Two challenges needed, and in part still need to be overcome:

- » Teleradiology under emergency conditions. Cross section imaging datasets often contain more than 1GB—transfer of such big data takes time. Given a long distance connection (>10,000km) and an answer time of the protocol of 250ms between images, a dataset with 2,000 images takes 7 minutes to send. One solution provided for by modern technology in teleradiology is packing these images into containers so that the entire bandwidth can be used.
- » Data security. To avoid unlawfully disclosing medical data to unauthorized individuals, images have to be transferred via a virtual private network (VPN) connection or encrypted browser instead of email or messenger.

Modern teleradiological applications have solved these challenges so that the combined expertise of a musculoskeletal radiologist, a neuroradiologist or an oncological radiologist can be gathered even under emergency conditions—fast and respecting the patients' data.

CONCLUSION

The fast developing field of IT is a driver in the everyday life of society as well as for telemedicine, which therefore is progressing at a fast rate, making it possible for more and more patients to receive high-quality treatment after being professionally diagnosed. Even though no one can foresee the future, we are convinced that the above-mentioned patient in Nairobi, who is suffering from a subarachnoid hemorrhage due to an aneurysm, could very well be treated by a European neuroradiologist via telemedicine by 2025. ●

Krankenhaus Nordwest (KHNW), Frankfurt, is a member of the BDI initiative German Healthcare Partnership (GHP), which, together with the World Health Summit (WHS), its scientific foundation M8 Alliance and the Fraunhofer-Gesellschaft established the WHS Science & Industry Circle. The WHS Science & Industry Circle aims to foster cooperation between the multiple stakeholders in the health-care sector and furthers the transfer of knowledge between science, manufacturers and end-users such as medical professionals.



Written by
PROF. BODO KRESS
Krankenhaus Nordwest | Head of
department of Neuroradiology |
Frankfurt | Germany



Written by
ROLAND GÖHDE
German Healthcare Partnership |
Chairman of the Board | Berlin |
Germany



Written by
PROF. UTA MEYDING-LAMADÉ
Krankenhaus Nordwest | Head of
department for Neurology | Frankfurt |
Germany

HEALTH IN NUMBERS

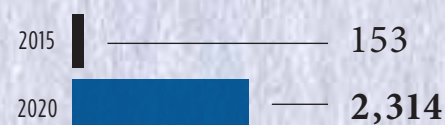
The Digital Health Revolution

The use of technology in the healthcare sector is expanding rapidly, and not just in the developed world. Ubiquitous smartphones, smart policy and improved data analysis could revolutionize healthcare in the future.

The number of autonomous Internet-connected devices such as cell phones—devices that communicate directly with one another—now doubles every five years, growing from **12.5 BILLION IN 2010** to an estimated **25 BILLION NEXT YEAR** and **50 BILLION BY 2020**.

Sue Halpern in nybooks, 2014

INFOGRAPHIC



There are over 153 exabytes of stored healthcare data, expected to be 2,314 exabytes by 2020. 1 Exabyte = 1,000,000,000 GB

International Data Corporation (IDC) EMC Digital Universe, 2014

172

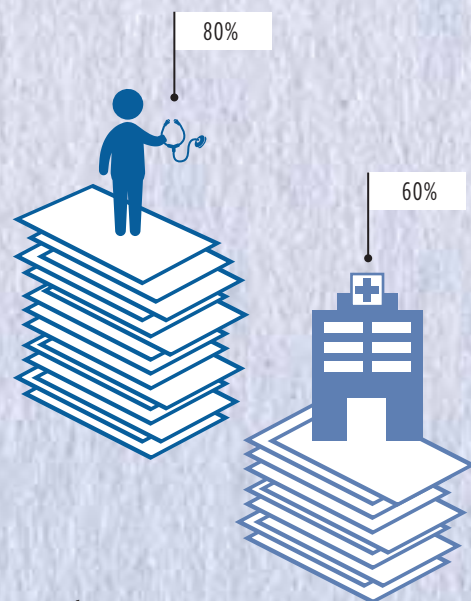
KEY NUMBER

Projected sales of smart wearable items projected to increase from 29 million items in 2014 to 172 million items in 2018.

CCS Insight, 2015

FACT

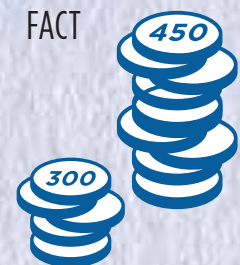
Spurred by US\$28 billion in incentives to date, nearly 80% of doctors and 60% of hospitals in the USA have converted from paper files to electronic health records, known as EHRs, since 2009.



ONC Report, Wall Street Journal, 2015

Invested funding in Digital Health companies increased rapidly from **US\$1.2 BILLION in 2010 UP TO US\$6.5 BILLION IN 2014**. *Statista, 2015*

FACT



If the potential of big data is fully exploited, it could account for US\$300 billion to US\$450 billion in reduced healthcare spending in the US alone.

R&R Market Research, 2012; McKinsey, 2013

STATEMENT

“A NEW ERA OF DIGITAL HEALTH HAS ENTERED ALMOST EVERY AREA OF OUR LIVES. INFORMATION TECHNOLOGY IS HAVING A MAJOR, AND EVER INCREASING, IMPACT ON THE AREAS OF MEDICINE AND BIOMEDICAL RESEARCH.”

OTMAR D. WIESTLER
President of the Helmholtz Association

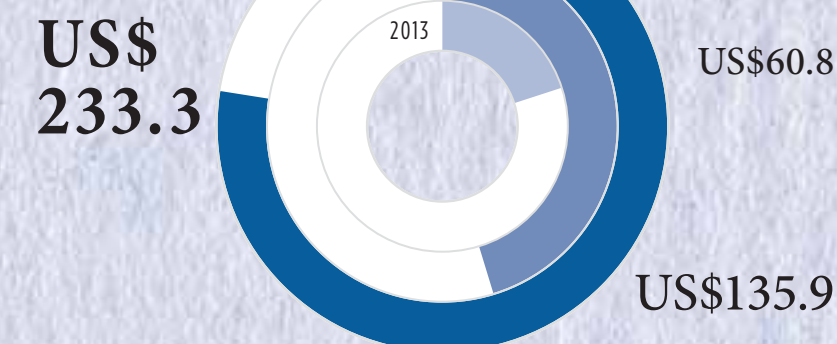
Typical 500-Bed Hospital

500	Beds
8,000	Employees
400	Applications
500	Databases
1,000	Interfaces
10,000	Desktops
500	Owned/controlled Tablets
2,000	Owned/controlled Mobile Devices (provisioned)

> 50 PETABYTES OF DATA

International Data Corporation (IDC) EMC Digital Universe, 2014

INFOGRAPHIC



The global digital health market value is projected to grow from US\$60.8 billion in 2013 to US\$135.9 billion in 2017, and US\$233.3 billion by 2020. *Statista, 2015*

FACT



Studies have shown that sending text messages to patients can prevent 1 in 6 from forgetting to take or stopping their medication.

Wald et al., PLOS ONE, 2014

“Investing in the rest of the world is an investment in our future”

DR. MARK DYBUL

Prof. Ada E. Yonath is a Nobel Prize-winning Israeli chemist and Director of the Helen and Milton A. Kimmelman Center for Biomolecular Structure and Assembly of the Weizmann Institute of Science. Dr. Mark Dybul is a former American diplomat who heads the Global Fund to Fight AIDS, Tuberculosis and Malaria. Dr. Friedrich von Bohlen und Halbach is a German biotechnology entrepreneur and Managing Director of dievini Hopp BioTech holding GmbH & Co. KG. For the WHS Yearbook, they gathered to discuss the challenges facing the global health community today, from refugee health to the need for Europe to invest in the rest of the world.



—

“We can’t achieve any of the SDGs if we don’t have gender equality. It really underlies all of them.”

—

DR. MARK DYBUL
*The Global Fund to Fight AIDS,
 Tuberculosis and Malaria |
 Executive Director | United States
 of America*

Is the tech community doing enough to address global problems? Or are they focusing on solving luxury problems that offer the biggest financial return instead? What other opportunities are there, and how can we incentivize that better?

von Bohlen — I think digital health is not only a question of how we better bring molecular information into individualized therapy, it is also about very simple questions, for example: How can I bring radiology results from remote areas in Central Africa to places where people who really understand how to read images and graphics can help doctors make treatment decisions?

I think there is a high-end problem, challenge and opportunity here in the Western world, and I think there are pretty basic developments that can help the rest of the world. The tech sector is making incredible progress—it is unbelievable what has happened in just the last ten years. I am very, very optimistic that things will happen in the course of time Americans think along rather than that of Europeans.

Dybul — We don’t see a lack of innovation when it comes to solutions applicable to low-income countries. In fact, there is tremendous progress. The difficulty we see is getting them to market in a systematic way. We have to figure out how to work on a national and regional level to develop systems that can work across countries or across regions. If not, we’re not going to improve health. We are going to have a mess.

There is huge opportunity in the developing world, though, because there aren’t systems in place. In Europe and the US, you are retrofitting an old system, which is very difficult to do. That is why a cell phone drops ten times taking the train from, say, Washington to New York, and yet you can be in a rural village in Africa and it works perfectly well. To me the question is how we work together to build systems that will work.

von Bohlen — The medical doctor of the future will have an iPad or tablet to use as a resource, giving him access to everything he might not have at his fingertips. Not to say that we will replace him: Provocatively, I always say there are more pilots today than there were in the 20s, despite the invention of the autopilot.

Where does basic science fit into this?

Yonath — Science will always progress, even if there is not enough incentive in the form of money or support. Scientists will always do something that is new and look for new information and new knowledge. You cannot stop that. Nor should they—unless it is clearly awful, like the atomic bomb for instance.

So is basic science benefiting from the proliferation of digital tools?

Yonath — Well, it should. But there are big gaps, especially when it comes to communication. Look at genetically-modified crops: Genetically modified organisms (GMOs) are

practically not allowed in Europe. But 400 years ago there were attempts to improve the quality of crops, some of them successful. Now we’re doing the same but we understand the basic mechanics of it. So why is it forbidden? Because the politicians don’t understand and are afraid.

von Bohlen — Americans definitely have no problems with this. I think in Europe the problem is twofold. First of all, society is very anxious about any kind of change. In Germany, we behave as if the only goal remaining is to protect wealth, instead of understanding that wealth can only come from investing in innovation.

The other point is that genetics is something we three feel comfortable with, but go out on the street and ask ten people what a gene is, and probably no one will be able to tell you.

Yonath — So teach them, instead of being afraid.

von Bohlen — Exactly. It is about education. Take IT: The mechanics of information technology are something most people don’t understand, but IT is something everyone understands is useful because they can use it in their everyday lives. If they saw the practical advantages of genetic engineering, they would have a different take on it. But those are more difficult to show.

Are you saying Europeans are afraid of science?

Yonath — Science started in Europe before there was America.

Dybul — Don’t forget China did a pretty good job, too, a few thousand years ago.

Yonath — Yes, but Italy, France, Germany, and England formed the basis for today’s science. Back then, they could explain to people who were less educated what they were doing. Yet somehow, in this generation, owing to the increasing complexity of the scientific aspects alongside the global drift to popularization, often scientists find difficulties in engaging. Uneducated people and the politicians are acting accordingly.

Dybul — What we have now is rapid access to information in a way that we didn’t have before. Now, information and wisdom don’t always go together. The young people I run into think they should have your job tomorrow. They don’t see that you shouldn’t move from the last person hired in a lower administrative position straight to running the company. They think they should be in charge—tomorrow.

They have knowledge, but they don’t necessarily have the wisdom to use that knowledge in the right way. That can take more experience.

So how do we close the gap between information and wisdom? We are not engaging in those dialogues, but young people are. I get to work with and see young people on a regular basis, and they are engaging in fascinating dialogues online and in person. They are more committed to service than almost any generation has been. They are more committed to the world and seeing it as an

interconnected place than we ever were. In many ways, they are more concerned about people in other countries. So the opportunity is huge.

von Bohlen — I agree that the science in Europe has been good and is good. But if you compare Europe to the United States and Israel, what is very much missing is the entrepreneurial side.

Dybul — We are so stuck in the problems right in front of us that it's harder to take on the big picture issues. It's true even in science. What am I going to do today? Am I going to produce a new widget or am I going to challenge the Big Bang theory?

von Bohlen — Right—people are afraid of the risk, and afraid of what this kind of science can bring them. Going back to GMOs: What is the big difference between a genetically-modified crop versus a gene test in oncology? It's obvious the gene test in oncology may save your life. With GMOs, the benefits aren't immediately obvious.

Yonath — It may save the life of people who are starving.

von Bohlen — This is not a problem in Germany. The problem in Germany is that the Green Party tells you the gene may jump from your gut into your genome and do some really funny things. And people say, "Oh, we can't let this happen." The one thing is something directly related to your health. The other thing is outside your reality. So this is easy to be against, right?

Recently, politicians have suggested that migrants and refugees were new vectors for disease and antibiotic-resistant bacteria.

Yonath — We need antibiotics for the whole world, it has nothing to do with refugees. There is resistance in the whole world, the refugees are not carrying resistance with them.

Dybul — We have to be very careful and that sounds like fear mongering to me: "Keep the refugees out because they are going to bring stuff in that we don't have." But there is always international travel, shipping—

Yonath — Mad cow disease and HIV were carried around the world by travelers, by business people that went first class on airplanes. You don't have to be a refugee for that.

Dybul — But migration does sometimes have an impact. If you look at migratory patterns, migration does lead to the transmission of communicable diseases. So in Southern Africa, for example, a third of all new tuberculosis cases are from migratory mine workers. They get treated when they are in the mine, then they leave, go home and stop taking their antibiotics. That's when TB spreads. Then they go to another mine, and perhaps even another community. If we are not careful about migration, you will see the impact of diseases in cases like this.

But the notion that people are vectors could lead to shutting down borders when the issue should be how

we provide healthcare and services across borders. Again, technology can help us with that. But we need to be very careful about the notion that migrants or refugees are vectors for disease.

Yonath — I have nothing to say against what you say.

On a constructive note, are our institutions communicating enough about the new disease challenges in different countries? Is enough data being communicated to scientists for them to develop targeted cures and approaches?

Dybul — Not yet. We need to develop better incentives for cooperation and research. It gets back to how we see ourselves as a global community, not in a frightening way but in an exciting way. How do you invest to promote health, education, and development?

That means investment in science and new partnerships where the companies work with philanthropic organizations and research centers to target drug-resistant tuberculosis strains, for example. It was actually that kind of partnership that created the only drug we have for drug-resistant tuberculosis, and we need more of those.

Yonath — In fewer words, there are now new organizations and new ways of organizing the creation of new data. There is a book called "Startup Nation: The Story of Israel." The number of startups in my country is incredible.

Dybul — Not just startups: Teva is one of the largest pharmaceutical companies in the world, and the largest generic pharmaceutical company by far, and it is Israel-based.

Yonath — But it doesn't do antibiotics.

Dybul — Not enough of them, no.

von Bohlen — There is one company we are invested in, CureVac, which develops mRNA as prophylactic vaccines against basically any kind of infectious disease. The Bill and Melinda Gates Foundation has recently co-invested in CureVac and wants to develop numerous anti-infection programs on the basis of mRNA. This is not only a cross-organizational, it's a cross-national approach to attack and cure infectious diseases worldwide. And it adds a novel molecular class outside the usual antibiotics.

The recently-announced Sustainable Development Goals seem terribly broad to be effective incentives. "Everyone in the world must have access to healthcare," for example. Are the Sustainable Development Goals something that will drive action, or just be a nice way for leaders to push responsibility 15 years down the road?

Dybul — I would say the advances in the Sustainable Development Goals (SDGs) are to shift from focusing on individual issues to a person. Basically we can't achieve any of the SDGs if we don't have gender equality. It really underlies all of them.

—
"If women want to be powerful, they can fight their way to the top just like men."
 —

PROF. ADA E. YONATH
 Weizmann Institute of Science |
 Director, Helen and Milton A.
 Kimmelman Center for
 Biomolecular Structure and
 Assembly | Israel

—

“Europe has a strong legacy of innovation, discovery, and revolution. Europe has been the front-runner, if you will, for centuries.”

—

DR. FRIEDRICH VON BOHLEN
dievini Hopp BioTech holding
GmbH & Co. KG | Managing
Director | Germany

That is easier to say than to do so we have to get concrete. Europe is actually leading on this push. The Prime Minister of Norway just convened a meeting linking education and health. We have to change the way we think.

Yonath — The striving for gender equality in terms of salary and/or work conditions is OK, it is fine. The emphasis that more women have to be more powerful is not OK, though. If women want to be powerful, they can fight their way to the top just like men.

In many countries there are differences in the salaries for the same job. This is wrong, I fully agree. But I am against saying like: In each board of directors the number of women should be the same as of the men, even if the women candidates are less suitable.

Would you agree that there are systematic challenges in some countries that are specific to women?

Yonath — In some countries, yes. But I am against quotas or laws enforcing equal numbers.

Dybul — It is more about opportunity. Every person should have an equal opportunity to achieve.

Yonath — Equal opportunity, yes. Also equal in basic education and basic means, but afterwards it depends. Not everyone wants to be a big shot. I was offered a directorship and I didn't take it. That doesn't mean I don't enjoy my life.

von Bohlen — And once more it is about education. It is about equal education of women and the respect to their same qualifications, wills and needs.

What about the refugee crisis in Europe right now? Could it have been avoided, and what's the key to preventing such mass migrations in the future?

von Bohlen — I think Europeans are in denial. We are sitting on a high level of wealth here, right? We are all scientists. If there is a gradient in chemistry, gradients always try to find equilibrium. Globally, there is a gradient in wealth and a gradient in money and a gradient in the number of people.

So what happens? The German population will shrink from 80 to 60 million, according to predictions, by 2100. The world population, at the same time, will grow another billion. The gradients are getting even bigger. Either the money goes down the gradient, or the people come up toward the money. It will happen, and it is completely silly and arrogant to sit and think this is something we can prevent.

Dybul — This is something Chancellor Merkel has been very strong on. She's said population growth and welcoming refugees is necessary for growth. But the flip side is that if we don't reduce the gradient, to use your analogy, by investing in health and development in other countries, there is zero chance of there not being more mass migration.

Scientists have always been better at connecting. There are politics and fights among scientists that most

people don't know about, but there is also a sense of working together for something that we just don't see in other parts of the world. I don't know how you in Germany think and talk about health, education, and development as a factor in your own economic growth, but in many places it is pretty scary and frightening how inward the thinking is on how we actually invest in our future.

von Bohlen — I am not negative. I just look into the mirror, and I don't like what I see.

So what do you tell the person in the mirror? How do you fix this?

von Bohlen — Remember your roots. Dr. Yonath said it: Europe has a strong legacy of innovation, discovery, and revolution. Europe has been the front-runner, if you will, for centuries.

So what do you see when you look at, say, the Arab Spring or other revolutions? Is Europe's legacy of innovation and revolution shifting elsewhere?

von Bohlen — Well, take Tunisia. Without the IT revolution, I don't think their revolution would have happened. Between Europe and America, we've created technologies that elevate people. Tunisians and others want to be similarly elevated. They want to live a life as self-determined as we do.

We enable them in some ways, and then encourage them to go away. That's a mistake. We might lose money in the short term investing in the developing world, but if we don't, we will have a global revolution. Europe has to come back and be more self-confident.

Yonath — Israel's a good example: Science in Israel was started with the work of refugees and continued by copying the United States. So this is the best of everything.

Dybul — It is, though. In Tunisia, technology was really important, but it was really about equality, which is not particularly different than what Europe or the US went through in their revolutionary periods. We need an investment portfolio. If you think of it from a purely self-interested perspective, who is going to buy stuff in the future? If they are not healthy and educated, they are not going to have the resources to be consumers. Investing in the rest of the world is an investment in our future.

We seem to be off balance. We went pretty heavily toward investment for 100 years going back to the turn of the century. And now we are going back toward a protectionist approach. When you go back to those isolationist approaches, you hurt not only yourself—you hurt everyone. ●

Photographer
HOLGER TALINSKI
Moderator
ANDREW CURRY



2

32-43

Climate Change & Health

The G7 Summit in Elmau, Germany, reinforced the United Nations Climate Change Conference target from 2009, limiting global warming to less than 2 degrees since the advent of industrialization. This was an important step and a good sign ahead of the December 2015 UN Climate Conference in Paris. Still, climate change's powerful impact on health is not yet reflected strongly enough in climate policy. Potential policy areas to address include access to safe drinking water, food security, air pollution, and secure housing/shelter. There are clear limits to society's capacity to adapt to the projected health impacts of climate change, and these boundaries must be addressed when considering policies and strategies at the national and international level.

"We won't reach a 4 degree increase in global temperatures. Our economic system and civilization will partially or completely collapse before we get there," said Hartmut Graßl, Max Planck Institute for Meteorology, in his speech at the WHS.

INTERVIEW

“We have to act now”

Sir Andrew Haines is professor at the London School of Hygiene and Tropical Medicine. He was dean and director of the school for nearly 10 years, and also served as a member of Working Group 2 of the UN Intergovernmental Panel on Climate Change (IPCC) for the second and third assessment reports, and review editor of the health chapter in the fifth assessment report. He spoke to the WHS Yearbook about the impact climate change could have on global health.

Is climate change something that the public health community is thinking about enough?

Sir Andrew Haines — Awareness of the health impacts of climate change has been growing for 20 years. Researchers have voiced concerns about how climate change could affect the distribution of disease vectors, for example. Or a warming globe's effects on malnutrition, or the effects of thermal stress.

But, of course, climate change could have many other effects as well. It might affect things like pollen production—as a result of the changing climate, but also higher carbon dioxide levels in the atmosphere. So it could affect the duration of the allergy season, for example.

The more difficult to quantify, but perhaps more important effects, are indirect: Increased droughts and other extreme events could have very large-scale effects on human health. For example, more recently there has been discussion about the possibility that the Syrian crisis could have been partly triggered by the drought that was experienced in that country. And there have been some estimates suggesting that climate change could increase the risk of such droughts. So climate change may interact in complex ways with other social or political changes to increase the risks to human health.

If we don't control emissions of greenhouse gases, of course, temperature increases could be far greater than they've been up to now. And with unconstrained emissions, we could have a global average temperature rise of 4 degrees by 2100, higher over land.

That would have very profound effects on human health. We don't fully understand all of those effects, but they are certainly likely to be very serious indeed for humanity unless we can have a very strong agreement in Paris to limit emissions.

Some of the effects you mentioned as indirect seem rather direct. An island going under water—that's a pretty direct effect of climate change.

That would be more direct. When I say indirect, I mean more large-scale population movements. If it's due to an island going under water, that's a direct effect, but if it's due to an increased risk of conflict, or other reasons for the displacement of populations, then that could be a much more complex relationship with climate change.

There are a lot of people who are talking about 2050 and estimating the disease burden of non-communicable diseases based on a continuation of the temperature we have today. Is that shortsighted?

Yes, and I think this is an oversight. The global health community is only just beginning to catch up with the idea that global environmental change might affect the trajectory of human progress. Many of the assumptions up to now have been that health will just continue to improve. But those of us who've looked more at global environmental trends would say that this might be a dangerous oversimplification.

“It's important that health professionals educate themselves about these global environmental changes.”



And of course we don't feed a lot of our food directly to people. It's fed to animals where you get conversion inefficiencies, and it's also been used for biofuels in some cases, which compete with human food. Of course, we need to grow more food and stop food waste. But we also need to recognize that today's average North American or even average European dietary patterns—extrapolated to 10 billion people—are unsustainable.

So on a constructive note, what should people in the global health community be doing to either internalize this message, or communicate it?

I think there are several things we need to be doing. One is that it's important that health professionals educate themselves about these global environmental changes. They're not generally part of the medical health professional curriculum, but people need to understand that there are these changes taking place and that they could potentially reverse the gains that we've seen over recent decades.

Secondly, they need to be aware that many policies to reduce environmental damage will also have near-term health benefits. If you take into account some of these health and other benefits, then they can help to offset the costs.

I think the third thing they need to do is to try to capitalize on the potential for developing more environmentally resilient and low-impact health systems. The health system itself is quite a substantial contributor to greenhouse gas emissions. In the case of the UK, it's a few percent of total emissions but it's quite a potentially influential few percent, because health professionals are influential people.

And very importantly, they need to influence the procurement policies of the health system. When our National Health Service did an audit of its greenhouse gas emissions, over 60 percent were related to embedded carbon, particularly pharmaceuticals. That has opened the doors to discussions with the pharma industry to get more sustainable procurement policies.

One of the things that's being done in the UK is to work on more sustainable procurement policies, working with companies to persuade them that they need to reduce their emissions. ●

When you start to put together all of these different trends, you can see that we have essentially built the health of our generation on the unsustainable exploitation of the environment. We are leaving as a legacy to the following generations a much-depleted and damaged world.

It's going to be a real challenge to continue these improvements of health against that backdrop. And if we wish to safeguard humanity, then we actually have to take into account these environmental changes and we have to act now. We can't leave that to future generations, because many of these changes will be irreversible by then. So we have to act now.

The argument we've been making is that many of the policies that we need to put into place now will benefit human health in the near term. So, for example, moving toward cleaner energy is a good thing anyway, because we know air pollution kills a lot of people. The benefits just from reduced air pollution run into billions of euros. In the EU for example, it's been estimated that emission reduction policies could save perhaps 38 billion euros in health costs by 2050.

Isn't a prediction of 10 billion people by the end of this century also dependent on the continuation of our current situation?

Yes, that's right. The projections that have been done have again largely, I think, been predicated on the status quo, and they haven't taken into account the potential for severe disruptions of food systems. It is a complex picture, because at the moment, the problem is not that we don't produce enough food; it's often that it is badly distributed.



SIR ANDREW HAINES
London School of Hygiene & Tropical Medicine | Professor, Public Health and Primary Care | United Kingdom

ESSAY

CLIMATE CHANGE AND HEALTH

Climate change threatens to undermine last century's enormous accomplishments in development cooperation and improved global public health standards.

Climate change poses one of the largest single threats to life and biodiversity on our planet as we know it today. The unrestrained progression of global warming will drastically change our environment and living conditions through droughts and water scarcity, and extreme weather events such as heat waves, floods and increases in ill health are expected to occur in many regions, especially in developing and low-income countries. Climate change affects health via three basic pathways. Firstly, through direct impacts primarily related to more frequent extreme weather events, including heat waves, drought and floods. These not only impact health directly by impairing human thermoregulation (heat exhaustion and stroke), but also indirectly by threatening livelihoods through weather-related crop failures leading to food shortages and migration, potentially resulting in flight and expulsion.

Secondly, climate change affects health through effects mediated through natural systems, e.g. the spread of vector-borne or other infectious diseases. Vector-borne diseases refer mostly to infections transmitted by the bite of blood-sucking insects such as mosquitos or ticks. Malaria and dengue fever are well-known vector-borne diseases that are highly sensitive in a non-linear way to climate factors such as increased temperature levels, precipitation and humidity. Also, food- and waterborne infections are very likely to be more frequent, as climate-sensitive pathogens (parasites, viruses, vibrios and other bacteria) are directly affected in growth, survival, persistence and transmission through climate change. Furthermore, climate

change diminishes air quality and increases health-damaging air pollution.

Thirdly, climate change impacts health through effects that are heavily mediated by human systems, for example undernutrition, occupational impacts and mental stress. Nutrition as a function of agricultural production is especially sensitive to climate change, mainly in areas that are already food-insecure.

A DETERMINED EFFORT AGAINST CLIMATE CHANGE MIGHT WELL BE THE GREATEST OPPORTUNITY FOR MANKIND IN THE 21ST CENTURY TO IMPROVE THE GENERAL HEALTH SITUATION

The sooner we act, the more chances we will have to shape our future for the better. If humanity is to have a fair chance of not exceeding a temperature increase of 1.5°C compared to pre-industrial levels by end of this century, it must not breach the IPCC's global carbon cumulative emissions budget of 655–815 Gt CO₂ between now and 2050. A determined effort against climate change essentially means a comprehensive shift away from the current heavy reliance on fossil fuels toward an electricity and transport system dominated by renewable energies—embedded in an emission-free economy. More than that, a determined effort against climate change might emerge as a major step for humankind in the 21st century to improve the general health situation across the globe. Shifting toward an emission-free economy implies a vast array of opportunities for an improved global health

situation, leading to a reduction in healthcare costs, the strengthening of communities' climate resilience, and the fight against poverty and unequal distribution of wealth, thus helping to improve and raise health standards across the globe.

These “no-regret” measures to mitigate climate change can directly yield significant health co-benefits. This is not mainly due to the much-needed significant reduction in greenhouse gases itself, but due to immediate cuts in short-lived climate pollutants (SLCPs) such as black carbon and tropospheric ozone. For example, promoting clean energy solutions (e.g. PV solar off-grid installations) enables households in poor and low-income regions to reduce exposure to residential air pollution and shift away from using solid fuels such as wood, charcoal and dung for cooking and heating, also co-benefiting the fight against deforestation and erosion.

PHASING OUT COAL—THE LARGEST SINGLE SOURCE OF ANTHROPOGENIC CLIMATE POLLUTION

The biggest climate polluter is the global power sector. Coal-fired power plants are the world's single largest source of climate pollution. Coal has the highest carbon intensity of any fossil fuel when combusted and is, therefore, arguably the single biggest threat to the global climate system. The resulting local air pollution caused by burning coal is a major public health menace contributing significantly to an estimated 4 million premature deaths annually, mostly in the developing world.

Coal-fired power plants are the single largest source of respiratory and cardiovascular disease. They release substantial amounts of highly-toxic particulate matter (containing heavy metals such as mercury, lead, cadmium or arsenic), sulphur dioxide, and nitrogen oxides—the latter contributing indirectly to the formation of ozone which, in addition to the health impacts, reduces plant biomass production and crop productivity. Therefore, governments need to urgently introduce legislation that ensures an immediate halt to the construction of new coal-fired power plants and a complete phase-out of coal in industrialized countries within the next 20 years, and globally by 2050.

THE HEALTH SECTOR IS BECOMING INCREASINGLY IMPORTANT IN THE FIGHT AGAINST CLIMATE CHANGE

To most effectively reduce vulnerability to climate change in the near term, it is important to implement programs that improve basic public health measures such as the pro-

vision of clean water and sanitation, and secure essential healthcare, including vaccination and child health services. Adapting to climate change and minimizing impact damage enables countries to free up investments for improved healthcare systems and water security. Climate adaptation therefore yields positive health effects, as it helps relieve pressure on public health budgets, reduces health costs, and enables investments in stable and climate-resilient health systems.

Simultaneously, several health measures may also yield positive effects to mitigate climate change. For instance, reducing the consumption of meat and high-fat dairy products would not only decrease the risk of heart disease and cancer, but also have an enormous positive impact on reduced land-use change, greenhouse gas reduction and improved water conservation.

EMPHASIZING THE IMPORTANCE OF POLICY INTERVENTIONS ADDRESSING CLIMATE CHANGE AND POVERTY AS KEY DRIVERS FOR ILL HEALTH

Recent cost reductions in renewables and technological advances demonstrated that a transition to a healthy renewables-based energy system and low-carbon economy is both economically and technically feasible. In the run-up to the COP21 in Paris, it is time to act responsibly, speed up global transformation and redirect economic development toward an ambitious decarbonization path and improved climate resilience. Emphasizing the health impacts of climate change would increasingly draw the necessary attention and emotion to what is often perceived to be of a rather abstract nature. A more human framing of climate change and its adverse impacts on health would help increase the understanding of the importance and urgency of fighting climate change and could serve as a strong policy driver. ●



Written by
PROF. DETLEV DRENCKHAHN
World Wide Fund for Nature (WWF
Deutschland) | President / Chairman |
Germany

ESSAY

HOW TO MINIMIZE THE NEGATIVE HEALTH EFFECTS OF CLIMATE CHANGE

Climate change directly and indirectly affects environmental determinants of health—clean air, safe drinking water, sufficient food and secure shelter. Although global warming may bring some localized benefits, such as fewer winter deaths in temperate climates and increased food production in certain areas, the overall health effects of a changing climate are likely to be overwhelmingly negative.

Climate change is expected to lead to increases in ill health in many regions, especially in developing countries with low income. Direct effects include temperature-related illness and death, and morbidity during extreme weather events. Indirect impacts include the influence of climate on microbial populations, distribution of vector-borne diseases, host resistance to infectious agents, food and water shortages, foodborne diseases and the consequences of non-communicable diseases, such as cardiovascular or respiratory diseases. Domesticated animals, including livestock, will also be affected, threatening human health.

Areas with weak health infrastructure—mostly in developing countries—will be the least able to cope with the negative health effects of a fossil fuel-based energy system or its indirect climate change effects on their communities without assistance to prepare for and respond to the impacts of climate change.

As a global healthcare leader focused on patients' needs, we at Sanofi are committed to acting with our partners to protect health, enhance life and respond to the potential healthcare needs of 7 billion people around the world. It is

acknowledged and well-established that climate change is exacerbating health issues and will present challenges to efforts by the global community to tackle health concerns and inequalities across the world. It will have severe consequences for both people living today—especially the poorest and most vulnerable among the world's population—as well as future generations. It may also pose a threat to achieving the objectives of the development agenda.

We believe our longstanding expertise in developing medicines and vaccines that address some of the world's most pressing health issues for both humans and animals—including diseases most likely to be affected by climate change—and our work in expanding access to medicines in underserved areas mean we are in a singular position to make a tremendous impact on people's lives, especially those directly and indirectly affected by climate change. We also have a major role to play in helping build or re-inforce public health capacity by increasing the resilience of healthcare systems in countries where infrastructures are weak. In the field of malaria, Sanofi has had a strategy of partnering with national malaria control programs in African countries to provide affordable medicines suited to patients' needs, and to support local players in

Robert Sebbag in the WHS workshop "Access to Essential Medicines and Health Commodities in Africa."



the prevention, diagnosis and treatment of malaria. With its partners, Sanofi has been developing training and informational tools, taking into account the specificities of each country, and making these available to public health authorities and NGOs. With regard to dengue, effective interventions are needed to minimize impacts on vulnerable populations in areas prone to climate change impacts to minimize morbidity and mortality. A broad range of intersectoral activities aiming to enhance disease prevention is required including: raising awareness, strengthened surveillance, enhanced diagnostic and treatment capacity, strengthened vector control, use of effective and safe preventive tools, such as the dengue vaccine. Sanofi Pasteur can play its part by providing its dengue vaccine in endemic countries once it is on the market.

We must lead by example and work to mitigate our own contribution to climate change. We believe that the pharmaceutical industry has a responsibility not only to reduce its own footprint, but to contribute to reducing a major component of the health sector's footprint. Sanofi is therefore committed to achieving a 20 percent reduction in CO₂ emissions stemming from our industrial and R&D sites and our sales force vehicles from 2010 to 2020. By the end of 2014, we achieved a 15 percent reduction compared

to 2010. Our mitigation strategy includes partnering with energy providers to develop renewable energy solutions that reduce our energy consumption and benefit the communities in which we operate, and constructing or retrofitting existing facilities in line with energy-efficient and resilient building regulations at our sites around the world. By actively working to develop innovative approaches to mitigating our emissions throughout our value chain, we can make a positive, measurable impact on our environment and contribute to the health of our planet and our communities. ●



Written by
DR. ROBERT SEBBAG
Sanofi | Vice President, Access to Medicines | France

ESSAY

ACADEMIES OF MEDICINE: INFLUENCING GLOBAL HEALTH POLICY

The goals of the InterAcademy Medical Panel (IAMP) and its 78 member academies are: to strengthen the capacity of academies to provide evidence-based advice to governments on health and science policy, to support the creation of new academies, to support projects by member academies designed to strengthen research and higher education in their countries, and to issue consensus statements on matters of importance to global health.

Issuing statements on critical global health issues is at the core of IAMP activities. Topics for statements are selected from among suggestions from member academies, especially those with a suitable target such as a major UN or WHO conference or the World Health Summit.

Among the statements released by IAMP is the 'Statement on the health co-benefits of policies to tackle climate change', released in 2010 to target the United Nations Climate Change Conference (COP16) in Cancun, Mexico. Moving toward the 21st session of the Conference of the Parties to the UN Framework Convention on Climate Change (COP21) in Paris in December 2015, it is worth not only re-affirming the significant health co-benefits that climate change mitigation can bring, but also looking again at the recommendations from the 2010 statement, which are still relevant and fall within the focus of the World Health Summit 2015 (see next page).

Other IAMP Statements, all of which still have relevance for the global health community, are:

- » the IAMP Statement on Infectious Diseases 'Controlling Infections in the 21st Century' (2002),
- » the IAMP Statement on the Launch of Disease Control Priorities Project (2006),
- » A Call for Action to Strengthen Health Research Capacity in Low and Middle Income Countries (2013),
- » the Joint IAP/IAMP Statement 'Antimicrobial Resistance: A Call for Action' (2013), and
- » A Call for Action to Strengthen Healthcare for Hearing Loss (released on International Ear Care Day, 3 March 2015).

Our membership in the M8 Alliance and active participation in the World Health Summit, as well as our joining the InterAcademy Partnership, an umbrella organization with more than 130 academy members in 2016, enables us to tackle even more issues, bringing the solid, unbiased and highly credible reputations of the world's academies of science and medicine to bear on those global development challenges that include significant health-related components, and helps set the global agenda on these important topics. ●



Written by
PROF. LAI-MENG LOOI
IAMP Co-chair | Academy of Sciences of Malaysia | University of Malaya | Senior Professor of Pathology | Malaysia



Written by
PROF. DETLEV GANTEN
IAMP Co-chair | World Health Summit President | Charité Foundation | Chairman of the Board | Germany

STATEMENT ON THE HEALTH CO-BENEFITS OF POLICIES TO TACKLE CLIMATE CHANGE

Excerpt

It is widely agreed that human activities are changing earth's climate beyond natural climatic fluctuations. The emission and accumulation of greenhouse gases associated with the burning of fossil fuels, along with other activities, such as land use change, are the principal causes of climate change. Depending on how fast greenhouse gas emissions increase, the Intergovernmental Panel on Climate Change (IPCC) estimates that the global average surface temperature at the end of this century is likely to be between 1.1°C and 6.4°C greater relative to 1980–1999. To avoid the worst impacts of climate change, considerable, though as yet inadequate, effort is being focused on limiting the global average temperature increase to 2°C above pre-industrial levels. Nevertheless, even a 2°C rise could have a significant impact.

Climate change poses a significant threat to human health in many direct and indirect ways. More frequent and extreme severe weather events, such as floods, storms and droughts, could cause an increase in deaths, injuries, common mental health disorders, some infectious diseases and large-scale displacement of people. Increased concentrations of ground-level ozone may exacerbate existing respiratory disease and increase cardiopulmonary mortality. There may be increased incidence of food poisoning and increased prevalence of malnutrition due to reductions in crop yields. Rising temperatures may increase heat-related deaths and heat stress, particularly in urban centers as a result of the urban heat island effect. There may be changes in the incidence and distribution of some vector-borne diseases, particularly at the edges of their distributions, and increasing incidence of emerging infections among livestock and humans.

Interactions between population growth and climate change will place further stress on supplies of food, shelter and fresh water. These may contribute to large-scale human migrations that would then put additional pressure on often weak public health infrastructure, generate unsanitary conditions for environmental refugees and pose a security risk by increasing

the potential for conflict. Based on the IPCC assessment, particularly in developing countries, the impact of the adverse health effects of climate change will outweigh any small positive effects, such as reduced deaths from cold as global temperature rises.

Recommendations

The growing body of evidence concerning the relationship between climate change and health shifts the lens through which climate change is perceived. It offers a new political space in which climate change negotiations and national policy formulation can take place. While the climatic effects of mitigation are long-term and dispersed throughout the world, the health co-benefits are more local and can be realised more directly and quickly, making them more tangible and attractive to policymakers and the public. In view of the strong health co-benefits arising from some measures to mitigate climate change, the signatory academies recommend that: The improvement of health, both globally and locally, and globally should be one of the main criteria motivating climate change mitigation measures. The potential health co-benefits and harms should be considered when making choices about mitigation policies.

The health co-benefits of climate change mitigation should be given greater prominence in international negotiations, for example through dedicated sessions on this topic. Health ministers and ministries should actively engage in promoting mitigation strategies that result in health co-benefits in their own country and should make the case for such strategies to their national climate change negotiators in advance of international meetings.

Health policymakers, scientists, health professionals and industry should reach beyond national and disciplinary boundaries to collaborate with each other to study, develop and implement climate change mitigation measures that also benefit health.

The health community must provide leadership by reducing emissions from health systems. ●

All statements are available at www.iamp-online.org/statements



The InterAcademy Medical Panel (IAMP), jointly with the InterAcademy Council (IAC) and the Interacademy Panel (IAP), are currently in the process of reorganization into an umbrella organization: the InterAcademy Partnership (IAP)—the global network of all science academies.

As an umbrella organization, the IAP will be able to harness the expertise of the world's scientific, medical and engineering leaders to advance sound policies, promote excellence in science education, and improve public and global health.

IAP's some 130 national members and regional networks will compile an extensive track record of delivering evidence-based advice and performing other services for national governments, international organizations and the global community. This new organization will enable IAP to enlarge the scale and scope of these contributions.

Through its global network, the InterAcademy Partnership (IAP) is able to harness the power and authority of these academies and access their combined scientific talent.

For more information, visit www.iamp-online.org and www.interacademies.org.

HEALTH IN NUMBERS

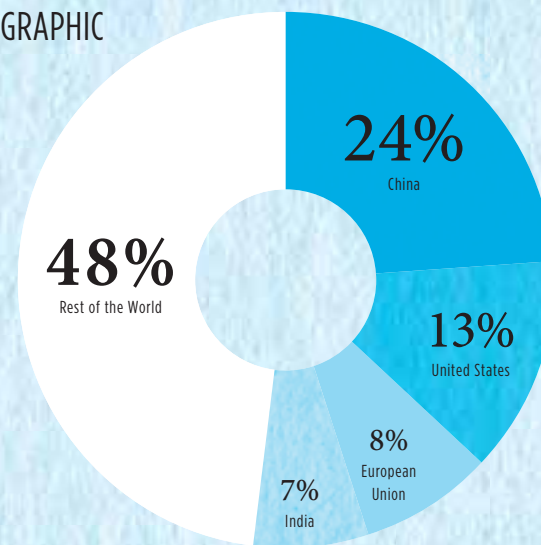
Climate Change & Health

Nothing threatens global health in as many different ways as climate change—from indirect effects like increased conflict and famine to direct impacts on productivity and health.

The global cost of adaptation to climate change could reach **US\$150 BILLION** per year by **2030** and **US\$500 BILLION** by **2050** if emissions continue to rise at the current rate.

United Nations Environment Programme
UNEP, 2015

INFOGRAPHIC



Based on current practices, it is projected that by 2020, China alone will produce 24% of global greenhouse gas emissions, the United States 13% and the European Union 8% and India 7%.

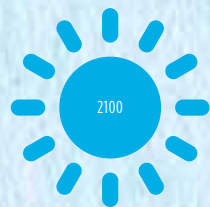
Kevin Rudd in *New York Times*, 2015

US\$10 BILLION was pledged to the Green Climate Fund for **2015–2018**, targeted at minimising temperature increase. The target is to raise **US\$100 BILLION** by **2020**.

G7 Research Group, "G7 Germany: The Schloss Elmau Summit 2015"

FACT

From 1880 to 2012, the global average temperature rose by 0.85°C according to multiple independently produced datasets. By the end of this century, the average global temperature is projected to rise between 1.5°C and 4°C.



+1.5–4°C



+0.85°C



IPCC, 2013;
United Nations,
2009

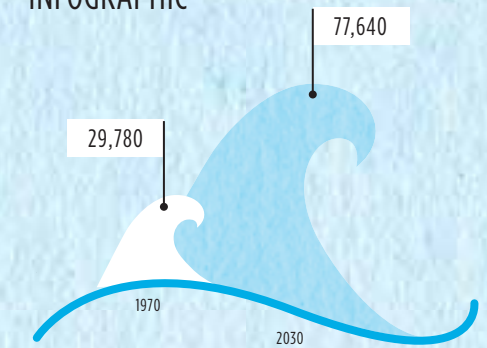
STATEMENT

“WORLDWIDE, THE POLITICAL SUPPORT FOR AN AMBITIOUS CLIMATE AGREEMENT IS STRONGER THAN EVER BEFORE. AMBITIOUS CLIMATE ACTION EQUALS EFFECTIVE HEALTH PROTECTION.”

JUTTA LITVINOVITCH

German Federal Ministry for the Environment,
Nature Conservation, Building and Nuclear
Safety Department Head

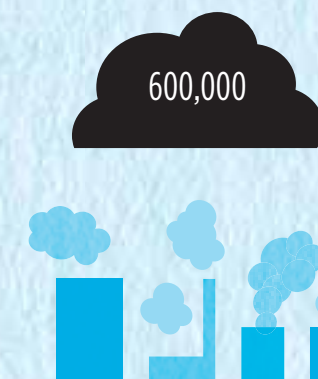
INFOGRAPHIC



In Asia, the number of people exposed to major flooding will grow from 29,780 in 1970 to 77,640 by 2030.

WHO Atlas of Health and Climate, 2012

FACT



US\$1.6 trillion is the economic cost of the approximately 600,000 premature deaths and diseases caused by air pollution in the WHO European Region in 2010, according to the first-ever study of these costs conducted for the region. That amount is nearly equivalent to one tenth of the gross domestic product (GDP) of the entire European Union in 2013.

World Health Organization, 2015

Estimates range from **1,000** to **4,300** additional premature deaths nationally per year by **2050** from combined ozone and particle health effects.

US Global Change Research Program, 2014

KEY NUMBER

Reducing global warming by about 0.5°C could simultaneously prevent up to 4.7 million premature deaths annually and improve crop yields from reduced ozone damage.

Annals of Global Health, 2014

0.5°C

FACT



In temperate countries, as summers become hotter and heat waves more severe, modelling indicates that from around mid-century (2050), additional heat-related deaths will progressively overwhelm the number of deaths averted as a result of milder winters.

New England Medical Journal, 2013



REPORT

World Health Summit—Berlin 2015 Call to Action

At the World Health Summit 2015, leading international experts and decision-makers worked on solutions for solving the central challenges facing health worldwide.

When you gather more than 260 of the world's top public and global health officials, researchers, politicians, and members of the public, remarkable discussions are sure to result. Over three days in October, that's just what happened at the World Health Summit, held at the German Federal Foreign Office in Berlin.

The summit included speeches by some of the biggest names in the political and global health world: German Federal Minister of Health Hermann Gröhe lauded the international character of the meeting, which drew 1,500 participants from more than 90 countries. "I'm convinced that only by acting globally can we secure our health locally," he told delegates in his welcoming address. "We need to think ahead and act together."

Taking the stage next, World Health Organization Director-General Margaret Chan urged participants to hold their political leaders accountable. "We need you to make sure leaders walk their talk by implementing what they've adopted," she said.

Beginning with workshops on topics like refugee health, the World Health Summit 2015 went on to tackle key themes such as climate change and health, antibiotic-resistant bacteria, digital health and refugee health in six keynotes, four panel discussions and 27 workshops.

The discussions that ensued touched on some of the hottest topics in global health, topics as diverse as big data, infant mortality, stem cell research and access to medicine in Africa. Tunisian Minister of Health Saïd Aïdi described his country's approach to improving healthcare using cutting-edge digital tools, Médecins Sans Frontières' Germany Managing Director Florian Westphal elaborated on the lessons of the ongoing Ebola crisis in Africa, and Nobel Prize winner Ada Yonath emphasized the need for new antibiotics. "We are

now trying to introduce personalized antibiotics," she said. "There is a light at the end of this tunnel."

At the session on Digital Health, EU Commissioner for Digital Economy and Society Günther Oettinger argued that advances in technology must not outpace privacy measures: "This means people must know which data is used, by whom and for what purpose, with exceptions provided for public health and specific research in well-defined situations."

"Both successes and disasters rightfully position global health at the center of the public and political agenda. The WHS will try to find solutions together with all stakeholders involved."

DETLEV GANTEN
World Health Summit President

For the world's future to be secure, the next generation has to have the support of today's leaders. From the first moments of the conference on Sunday morning, it was clear that the younger generation was eager and ready to take up the struggle for global health: Many workshops in the Federal Foreign Office's historic wing saw dozens of people eagerly exchanging knowledge and opinions.

The young crowd showed the WHS playing a different tune than most

scientific conferences. This year's summit introduced an entrepreneurial component, a competition on Monday afternoon to recognize promising startups tackling the most pressing global health issues of the day (see p. 50-51).

Later that night, World Health Summit Presidents Detlev Ganten and Shunichi Fukuhara welcomed delegates to the gala WHS Night in the Allianz Forum on Pariser Platz in the heart of Berlin. The WHS Startup Track award was presented by Cornelia Yzer, Berlin Senator for Economics, Technology and Research, among speeches, a festive atmosphere and dancing.

Things got serious once more the next morning, as the conference's final day included sessions on climate change, a timely topic ahead of climate negotiations in Paris. Fittingly, the penultimate keynote lecture addressed this issue in depth, whose impact can be felt in almost every part of the global health arena.

Experts emphasized that the same things that contribute to climate change—such as burning fossil fuels and polluting the air—also affect health. And a warmer planet may drive more people to flee wars over resources and land, intensifying already severe refugee crises.

London School of Hygiene and Tropical Medicine researcher Sir Andrew Haines offered an appealing solution, namely emphasizing that the immediate benefits of climate-protection measures like reducing pollution, could save billions in public health costs.

At the Closing Ceremony, WHS Presidents Detlev Ganten and Shunichi Fukuhara presented the M8 Alliance Statement calling on global leaders to take bold steps on global health (see p. 54-55). "The most important keyword is action," said Fukuhara. "There is no better place to demonstrate commitment to provide health access for all." ■



Moments from the WHS Berlin

DAY 1

October 11, 2015

OPENING CEREMONY

Europasaal, 17:00

"We see our presidency as both an opportunity and a responsibility to take an active part in shaping global health policy, together with our partners," said German Federal Minister of Health Hermann Gröhe on Germany's G7 Presidency.

WORKSHOP 07

Stresemann, 13:00

Big Data

"There is a massive amount of data that comes in every single minute of the day," said Ingo Ruczinski, Johns Hopkins Bloomberg School of Public Health, but "data is not the same as information and knowledge."

WORKSHOP 09

Willy-Brandt, 15:00

Social Entrepreneurs and Traditional Social Organizations

"Non-profits, even with significant assets, struggle with returns," explained Kerstin Maria Humbert, Karl Kübel Stiftung. "It is always a question of financial security. When it comes to market-based solutions, we as a non-profit organization can learn from industry."



01 At the press conference, central WHS speakers spoke with the press about topics like antibiotic resistance and refugee health.



02 The WHS program consisted of six keynotes, four panel discussions, 27 workshops and more than 260 international speakers.



03 Opening Ceremony of the WHS in the prestigious Welsaal.



04 German Federal Minister of Health Hermann Gröhe opened the World Health Summit 2015.



05 Allianz Krankenversicherungen CEO Birgit König and National Academy of Medicine President Victor J. Dzau spoke at the WHS Opening Ceremony.

06 Charité – Universitätsmedizin Berlin Dean Axel R. Pries (middle) prior to his welcome speech. Sitting next to him: Ernst Rietschel (former CEO of the Berlin Institute of Health, left) and Shunichi Fukuhara (WHS President, right).



08 The summit's 27 workshops were met by strong interest from the first day on.

09 Martin Ekeke Monono, Coordinator of the Organization of Service Delivery (WHO), spoke at the workshop on Civil Society Participation

07 Young professionals voiced their expectations at the WHS Opening Ceremony.



"The World Health Summit is truly a unique forum for international leaders to come together, exchange ideas and best practices."

MARGARET CHAN
Director-General of the World Health Organization (WHO)



in Health Policy Processes.

10 Opening speech of Margaret Chan, Director-General of the World Health Organization (WHO).

11 Representatives of all health-related sectors attended the WHS.





“Here you have industry, politicians, people from small pharma, big pharma and biotech all coming together. You can see how everything plays out. It’s also nice when people have a strong clash of ideas, putting forward what their point is.”

MALIHA SHAH
Postdoc, Piramal Imaging GmbH, Berlin, Germany



“I’d like to see more participation from policy-makers. We need to bring scientists and policymakers together so that discussions are not one-sided.”

MABVUTO KANGO
African Union Commission, Addis Ababa, Ethiopia

Faces and Voices in the Crowd



“Where else are you going to meet multiple Nobel Prize winners? People are really from all continents and all areas. There are so many things to learn.”

MARYLOU SELO
Mental Health Advocacy, New York, USA



“In the news you see a lot of negativity, but when you come to this summit you see smart people and they are really concerned about global problems.”

SMBAT RAFAYELIAN
Charité – Universitätsmedizin Berlin, Germany



“There are some really good issues from low-income countries, like linking poverty and health issues and the lack of resources and research in these countries. A discussion on how to improve those things would be very nice.”

FAZLE RABBI CHOWDHURY
Slyhet M.A.G. Osmani Medical College, Sylhet, Bangladesh



“It was interesting to see how field agents at the frontline felt about Ebola. The session touched the human side, and emphasized that it is about people, not just numbers.”

WARSDENBI KALPOE
Maastricht University, Netherlands

“To go from the genes, which are just a small part of what we need, to actually understand autism, we need interdisciplinary approaches to artisan biology.”

THOMAS SÜDHOF
Nobel Prize winner and professor at the Stanford University School of Medicine



Moments from the WHS Berlin

DAY 2

October 12, 2015

KEYNOTE 03

Weltsaal, 16:00
Digital Health
“Today’s technology turns big data into smart data—that is, into insight that can drive decisions, most notably the decisions of researchers and physicians,” said Luka Mucic, CFO & COO of SAP SE.

SYMPOSIUM 02

Weltsaal, 14:00
Value-Based Healthcare
“We are able now to create breakthroughs in medicine that the world has never seen. And this is also going to increase demand for additional medicines, additional therapies and overall health services,” said Joseph Jimenez, CEO of Novartis International AG. “Our health systems are not yet ready to meet this challenge.”

KEYNOTE 02

Weltsaal, 11:00
The Post-2015 Development Agenda
“The expectations of our citizens are very high after the revolution,” stated Saïd Aïdi, Minister of Health of Tunisia.



WHS
SPECIAL:
Startups

REPORT

WHS Startup Pitches Spotlight Digital Health's Promise

On the second day of the summit, participants in the WHS Startup Track lined up to present their health-focused business concepts to a jury and the audience in the Europasaal.

Each of the ten entrepreneurs had just three minutes to pitch their company and its potential impact on the healthcare sector. This competition gave voice to startup companies taking responsibility for the improvement of global health while recognizing the innovators behind them. The ten young companies competing in the WHS Startup Track 2015 were selected from more than 70 applicants from 17 countries. The feature of international



startups was linked to one of the summit's central themes, digital health, and the importance of innovation in the healthcare sector worldwide—according to one recent market study conducted by the consulting group Deloitte, the digital health sector is expected to double in size between 2012

and 2018, generating over \$21 billion annually by the end of the decade.

The startups covered a range of topics ranging from reminding patients to take their medicine to doctor's advice to chronic wound care. Nearly all of the startups developed software, or smartphone apps, to be used by patients, professionals or both.

The Ghanaian startup mPharma, winner of the WHS Startup Track 2015, created an e-prescription network that provides the location and availability of medications in real time. The software takes the place of a prescription pad, ensuring medications are available when patients and physicians need them most. "I realized if



you build a service that completely removes this paper-based prescription system, one of the by-products of this system is having the most powerful datasets for the drug industry, which is drug data," Gregory Rockson, co-founder of mPharma, said.

Another startup, VivoSensMedical, is marketing an in-body, wearable ovulation tracker called the OvulaRing. The device measures a woman's body temperature every five minutes, or 288 times a day. This allows women and physicians to predict with much higher accuracy when a woman is ovulating, according to Bettina

Brammer, a VivoSensMedical partner and the company's head of marketing.

The startup Viomedeo aims to connect patients with clinical research trials. Co-founders Alexander Puschilov and Tim Seithe built an online platform that lists 2,000 open clinical trials in Germany. "Patients can look for clinical trials and then contact the investigator," Seithe said. "Both parties, patients on the one hand, and investigators and pharmaceutical companies on the other, benefit."

Other startups include Mediteo, an app to help patients remember to take their medication; NGNeedle, a needle equipped with sensors capable of analyzing the surrounding tissue; HeartGenetics, a kit comprised of genetic diagnostic and medical devices; ReWalk Robotics, a wearable exoskeleton that provides wheelchair-bound patients with mobility; Tinnitracks, an app to filter a tinnitus patient's favorite music, making it suitable for clinical treatment; GiveVision, which develops smart glasses that act as eyes for blind people; and Tissue Analytics, an app that turns smartphones into an imaging platform for wounds.

Because 2015 marks the celebration of 50 years of German-Israeli diplomatic relations, additional attention was given to organizations with a connection to Israel and/or Germany. ♦



A Winning Idea

mPHARMA

The idea for mPharma, the company recognized as the winner of the WHS Startup Track 2015, came to co-founder Gregory Rockson after he heard the story of a Ghanaian patient rushed to a hospital for an emergency procedure. At the point of care, the necessary drugs were unavailable. By the time doctors acquired the drugs, it was too late. The patient had died.

"In developing countries, doctors rely on writing prescriptions on paper without even knowing whether the drug is available or not," 24-year-old Rockson said. "That was the first ah-ha moment." Rockson's realization ultimately led to mPharma, an e-prescription network that provides the location and availability of medications throughout Africa in real time by connecting doctors with pharmacies using smartphones and tablets.

The company, which operates in Ghana and Zambia, will launch in Cote D'Ivoire and Nigeria in coming months, co-founder Daniel Shoukimas said.

"It's great validation that we can build innovations in Africa for Africa, and be able to compete on the global stage," Rockson said. Concerning winning the WHS Startup Track he added: "Thanks to this prize, we made wonderful new contacts from which mPharma will definitely benefit."

www.worldhealthsummit.org/the-summit/startup-track

Moments from the WHS Berlin

DAY 3

October 13, 2015

SYMPOSIUM 03

Weltsaal, 09:00

Ebola: Assessment, Treatment and Prevention

"We have to remain vigilant until we have no confirmed new cases for 48 days and the epidemic can be declared over," said Florian Westphal, Managing Director of MSF Germany (Médecins Sans Frontières).

"The Ebola outbreak shows the limits of a system that incentivizes developing cures for lower and middle income countries. The private sector needs help to help us," claimed Wim Leereveld, Head of the Access to Medicine Foundation.

KEYNOTE 04

Weltsaal, 11:00

Global Health Policy in the G7/G20

"It's time to build a new public health system that meets the challenges of this century: Public Health 2.0," said Rockefeller Foundation Managing Director Michael Myers.

SYMPOSIUM 04

Weltsaal, 14:00

Non-Communicable Diseases: A Call for Common Action and Sustainable Change

"There needs to be advocacy to ensure NCDs do not fall off the screen after political declarations are made," said Srinath Reddy, President and CEO of the Public Health Foundation of India. "Accountability is a real driver behind political change."



01 Young Egyptian journalist Alyaa Abo Shahba (right) was one of the WHS Journalist Award winners.



02 Sanofi Executive Vice President, External Affairs, Hon. Suresh Kumar addressed the problem of non-communicable diseases.

03 Antoine Flahault, WHS President 2016, introduced the WHS Geneva Meeting, held in April 2016.

04 WHS 2015 President Shunichi Fukuhara issued a call for strong action.



"The most important keyword is action. There is no better place to demonstrate commitment to provide health access for all."

SHUNICHI FUKUHARA
WHS 2015 President



Get Old

We're getting older. And that's good news.

It's the little moments that mean so much to us. We want to be able to cherish those moments for many tomorrows to come. Pfizer is working around the world to this end. For more than 160 years, we have been researching and developing innovative drugs to help people improve their health and quality of life at all ages.

Every day, we make every effort to put our vision into action:
Working together for a healthier world.



www.pfizer.de

M8 Alliance Statement World Health Summit—Berlin

“We Must Act on Global Health”

October 2015

A DEFINING YEAR FOR GLOBAL HEALTH

The World Health Summit (WHS) 2015 took place in a defining year for global health: The world has set an ambitious agenda in relation to poverty, development, climate, and the health and well-being of all people—at the same time new challenges that require determined political action have emerged.

Our actions today will define the future of people and planet. The Ebola outbreak, the global migration and refugee movements, the experience of war and insecurity for many people, and the health impact of the financial crisis have put health firmly on the global political agenda. Many of the recent health crises are the result of a lack of commitment, weak governance, and insufficient investments in health systems and social determinants of health. Academia, politics, civil society and the private sector all have to assume more responsibility and act.

In the spirit of the Sustainable Development Goals (SDGs), the WHS 2015 calls on world leaders to take bold action for global health.

We, the members of the M8 Alliance, call for action in five key areas of global health following from the discussion at the World Health Summit 2015:

1. *The health of refugees and other forcibly displaced persons*
2. *Global health security, sustainability and solidarity*
3. *Universal health coverage*
4. *Climate change and health*
5. *Digital health*

THE RIGHT TO HEALTH OF REFUGEES AND OTHER FOR- CIBLY DISPLACED PEOPLE

We consider refugee health a neglected area of global health action and funding that must be addressed more forcefully in cooperation with refugee agencies and the humanitarian sector. Refugee and migrant health has entered public and political awareness in donor countries with the European “migrant crisis.” But we would do well to remember that by the end of 2014 there were 19.5 million refugees throughout the world, many of them living in dire conditions in camps and refugee shelters in developing countries. 59.5 million people are currently forcibly displaced worldwide. While refugees face immediate health problems, it is especially the long-term mental health and well-being of these millions of men, women, and children that requires determined action.

Call for action:

The M8 Alliance appeals to all parties involved that refugees should have access to health services equivalent to those of the host population. Everyone has the right under international law to the highest standards of physical

and mental health. Refugee policies must prioritize the most important determinant of long-term well-being: the integration of refugees into the new country’s health and social system.

THE RIGHT OF ALL PEOPLE TO HEALTH SECURITY, SUS- TAINABILITY AND SOLIDARITY

We are deeply concerned by the ongoing challenges the world faces in the area of global health security and we underline the need to better ensure global disease outbreak preparedness and response, cooperation in humanitarian crisis, and security for health institutions and staff in conflict zones.

In the context of the increased cross-border movement of people, products, and infectious microbes, countries must join forces to make the world a safer place and to ensure the health security of the poorest and of migrants and refugees. It is an unacceptable affront to the Geneva Conventions that hospitals in conflict zones can no longer be considered protected spaces. During this year, the G7 under the German presidency gave strong political support to the global health agenda—in particular the need to address neglected tropical diseases (NTDs) and antimicrobial resistance (AMR), as well as to ensure that the world is better prepared for outbreaks in the wake of the Ebola crisis.

Call for action:

The M8 Alliance calls on all countries and development partners to invest with determination in education, research, infrastructure, and specifically diagnostics and treatment of neglected tropical diseases and—following the Ebola crisis—to ensure the full implementation of the International Health Regulations by investing in country-based preparedness and response and the establishment of a reliable global response system. We further call for determined action on implementing the One Health approach to fight antimicrobial resistance AMR.

THE RIGHT OF ALL PEOPLE TO UNIVERSAL HEALTH COVERAGE

We emphasize that investment in health is key to sustainable development and fully commit to support goal 3, which aims to: “Ensure healthy lives and promote well-being for all at all ages.” We agree with Director General Margaret Chan of the WHO that “Universal health coverage (UHC) is the single most powerful concept that public health has to offer.”

Just two weeks before, the Sustainable Development Goals were adopted at the United Nations General Assembly and set a new vision for cooperation between nations. The world’s leading economists have argued that expanding investments in health will be key to achieving sustainable development. The WHS discussed many of the issues integral to this goal including the rise of non-communicable diseases and the need for a high-quality workforce.

Call for action:

The M8 Alliance calls on all development partners and countries to significantly accelerate their investment in UHC, including the access to medicines and the development of the global health workforce. The commitment to work jointly between public and private partners and with the full inclusion of communities and patients toward achieving high-quality universal health coverage is a priority.

THE RIGHT OF ALL PEOPLE TO A HEALTHY PLANET

We emphasize that the health of the planet and of people are inextricably linked and that it is critical to apply a human-rights-based approach to guide global policies and measures designed to address climate change. Tackling climate change could be the greatest global health opportunity of the 21st century.

In December 2015, countries will negotiate a new COP21 global climate agreement. We are concerned that the negative impacts of climate change are disproportionately borne by persons and communities already in disadvantageous situations that have historically contributed the least to greenhouse gas emissions. We reinforce that safeguarding health cannot be addressed separately from the natural systems on which it depends; strong intersectoral action is required.

Call for action:

The M8 Alliance urges a strong climate agreement and bold collective action at a global, national, and local level on the health impact of climate change. The WHS calls on all countries and development partners—global, national, and local—to address climate change and sustainable production and consumption. In particular, it calls on health organizations to take on a leadership role in the movement toward a low-carbon economy and healthy climate.

THE DIGITAL HEALTH RIGHTS OF CITIZENS

We call for an intensified dialogue on the potential of digital health—ranging from wearable sensors and portable diagnostic technologies to telemedicine tools and mobile health-care apps—for individuals and society. Concerns grow about the privacy and security of peoples’ data. We believe that clear policies and standards can help build public trust as the use of big data, electronic health records, the electronic sharing of health information, and health information technology increase.

A new world of health care is emerging—there are significant opportunities for the introduction of new technologies into clinical practice so as to enhance quality of care as well as personalize and measure outcomes and expanding points of care. Such technologies, including health apps and data sharing, can empower consumers and let them participate more in prevention and care, but this requires an investment in high levels of health literacy of patients and users.

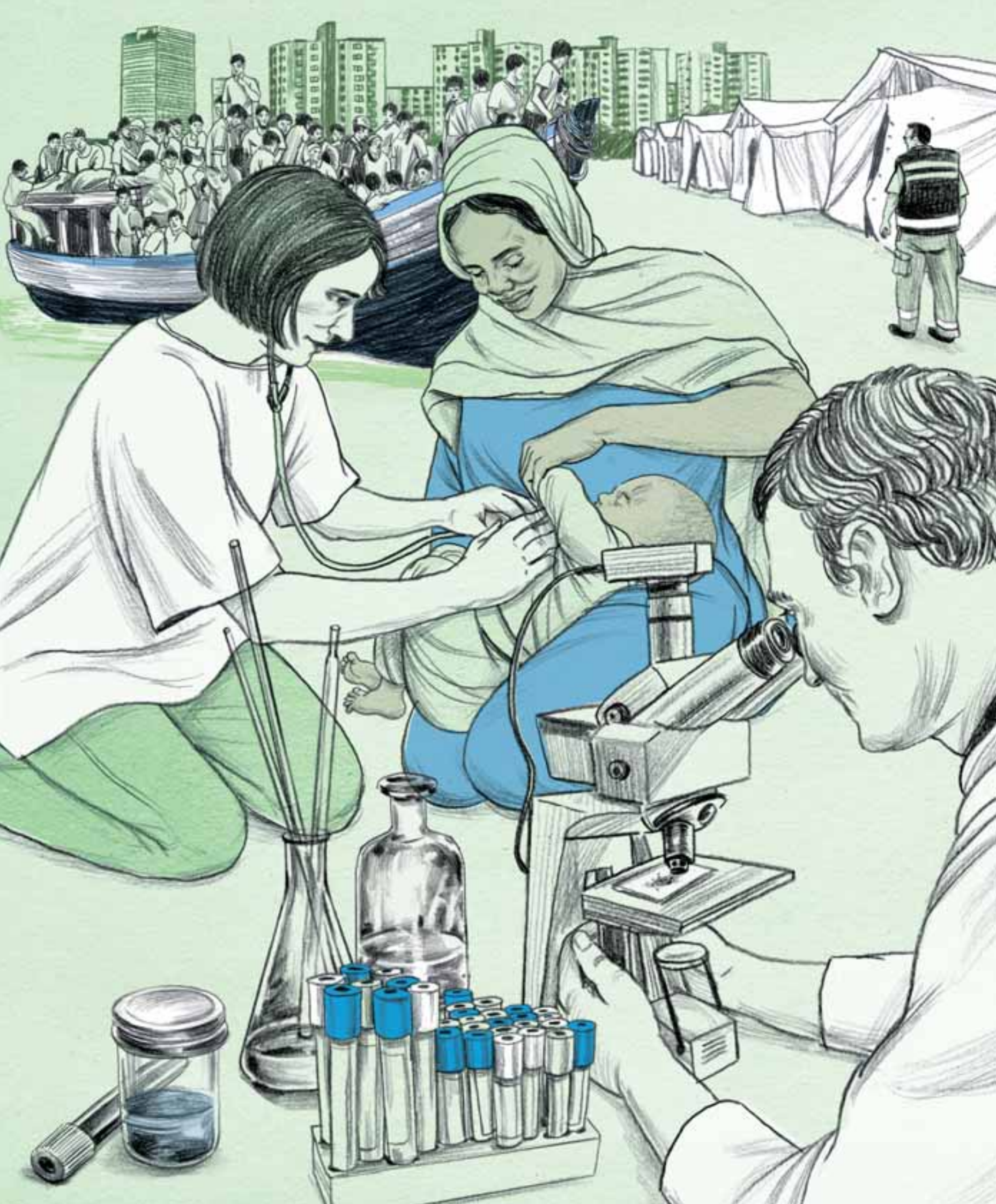
Call for action:

The M8 Alliance calls for an approach to digital health that works toward achieving the vision of the triple aim: improving population health, improving care experiences, and reducing per-capita costs of care. As digital health becomes a powerful driver in health, it is important that policymakers and legislators ensure the safety of the devices, the rights of consumers to the privacy of their data, and the equal access of patients to such innovation. ●

M8 Alliance
Academic Health Centers, Universities and National Academies

The M8 Alliance of Academic Health Centers, Universities and National Academies is a collaboration of academic institutions of educational and research excellence committed to improving global health, working with political and economic decision-makers to develop science-based solutions to health challenges worldwide.
www.worldhealthsummit.org/m8-alliance/members

The statement is available at:
www.worldhealthsummit.org/about-whs/impact



3

56-67

Refugee Health & Mega Disasters

Humanitarian disasters, relentless conflicts, and natural disasters such as earthquakes, tsunamis and hurricanes have resulted in millions of refugees and displaced persons over the past decade, all of whom are in need of help.

Furthermore, we face more and more health emergencies—as well as new “slow-motion disasters,” such as the rise of antimicrobial-resistant pathogen strains, which have the potential to throw medicine back to the pre-penicillin age. In order to respond rapidly, we need healthcare and emergency aid systems that are not confined by national borders and able to address barriers in cross-cultural communication and practices. And they must be backed up by research and capacity building measures. “We are ready to take our full responsibility for people in need,” said German Minister of Health Hermann Gröhe in his speech at the WHS. “The obligation isn’t limited to providing accommodation. We also need to provide healthcare and immunization.”



INTERVIEW

“Many sane people have paranoid fears”

Sir Robin Murray is Professor of Psychiatric Research at the King's College London Institute of Psychiatry. He specializes in the care and treatment of psychotic illnesses and schizophrenia, and has done extensive research into the links between urban life and mental illness. He spoke to the WHS Yearbook about the increased mental health risks faced by refugees, migrants and city dwellers.

Mental health isn't something that conferences like these usually focus on.

Sir Robin Murray — That's true. The great progress made with malaria and Ebola and AIDS has been made because resources have been devoted to the treatment and the prevention of these illnesses. Similar resources have not been devoted to mental health.

So why don't people take mental health as seriously as a public health concerns?

I think it's not such an obviously immediate problem. But in many respects it causes more long-term incapacity than many infectious diseases.

We know that cities by and large are not good for mental health, particularly inner cities. We know that the people raised in these areas have higher rates of minor psychiatric illnesses like anxiety and depression, they have higher rates of drug addiction, and we know that they have higher rates of serious mental illness like schizophrenia.

And what are we doing about it? Nothing! We are building more big cities. Yet the conditions in which people are bringing up their children in the inner city are almost designed to result in these children being distrustful of others and having fewer positive social bonds. All of these things, sadly, mean they have a greater chance of developing mental illness.

If there's a lot of evidence about the correlation, what can you say about the causation? What is it about cities that makes people crazy?



Well, we can't randomize people. But in Scandinavia, there are some beautiful studies of children, for example, brought up in rural areas of Denmark versus children brought up in moderate-sized towns versus people brought up in Copenhagen, which you would think is a relatively livable city. The children brought up in Copenhagen are about 3 times more likely to develop schizophrenia than the children brought up in the rural areas.

Part of the brain called the amygdala, which is involved in looking out for problems, is more active in people brought up in the city. We used to think that mentally ill people gravitated toward the center of cities, but in fact it's homegrown.

Are you saying that because the amygdala and other parts of the brain force you to be constantly on the alert in a city, there's a physiological change to your brain?

Well, I think there's growing evidence of physiological differences between people brought up in the city and in the country. If you're living in a high-rise block, and you think that if you go out, you may get offered drugs or you may get threatened or you may get your wallet stolen, then naturally these factors impact your mental health.

“We used to think that mentally ill people gravitated toward the center of cities, but in fact it's home-grown.”

OK. It's tempting to put some sort of evolutionary “human beings weren't designed to live in cities” spin on it.

It could be tempting, but we don't know that. In our cities, it's difficult to distinguish between density and poverty, and threat and crime. You would have to compare the mental health of those in the wonderful high-rise blocks that the wealthy live in with those people who are cleaning their flats. But we haven't done that.

What about the mental health of migrants and refugees?

We know that migrants and refugees have much higher rates of mental illness. It's not rocket science that if you're fleeing from a country, you've been exposed to some terrible things.

But then you also have to think about what happens to migrants and refugees after that. You may be resettled in a country that is pleased to see you. Or you might have to take a boat across the Mediterranean and watch people die and face hostility, and then eventually

get to a country where the population may or may not be supportive of you. Migrants in general have the problem of settling and fitting into a strange culture. Many studies have shown that migrants have increased rates of paranoia, and of schizophrenia. In Britain, if you are a migrant from Africa or the Caribbean, you're between 4 and 6 times more likely to suffer from serious mental illness than the host community, and also than the community you left. So, it's not being black; it's being black in a European country.

Knowing all that, are there best practices that you would recommend?

We know that refugees or migrants who end up far from any members of their own culture are more prone to becoming ill.

If you're black and you walk down a white street, and a group of people look at you strangely and wonder, “Is this person about to break into my house?” or “What is he doing here?”, then you recognize this hostility and this makes you more at risk.

That seems to fly in the face of the prevailing wisdom that you shouldn't put people in ethnic ghettos.

Maybe after the second generation people are sufficiently confident and stable and integrated to move out. That's what has happened to the Caribbean and Asian populations in Britain. But if they read in the newspapers all sorts of antagonistic things about migrants stealing our jobs, or causing crime, or bringing disease, then they could feel more stigmatized, and again this increases their chances of mental illness. You have to balance these things. You can't force people against their will to integrate, but it's obviously in their interests and their children's interests to become integrated.

We used to think that only a small proportion of the population is mad, and the rest are sane. But I think we now know that sane people have many paranoid fears. This is particularly the case in fear of the stranger. Many of the political conflicts we get into are due to mass delusions about strangers. We can think of Germany in the 1930s, with a collective madness and paranoia about Jews. You can think of the McCarthy era in the States with fears about “Reds under the beds.” These are paranoid thoughts about what these people of a different religion, different ethnicity, or different nationality are going to do to me unless I strike them first. Paranoia can become endemic, particularly if it is fostered by unscrupulous politicians. 🍋



SIR ROBIN MURRAY
King's College London | Professor,
Psychosis Studies | United Kingdom

ESSAY

ONE WORLD, ONE HEALTH

The MERS outbreak events in South Korea in 2015 demonstrate the consequences of gaps in infection protection, even in a highly developed country, but also the degree to which the spread of infectious diseases is conditioned by human behavior and cultural background.

In the same way, those in charge should continuously challenge the perception and the assessment of infection risks. After all, during the past decades a newly emerging, clinically relevant pathogen has been detected almost every year. Among these are many zoonotic pathogens, which means that they are transmissible from animals to humans and vice versa.

There will always be outbreaks with newly emerging or well-known pathogens. Humans will always be in close proximity to wild animals as well as to companion animals and livestock, which promotes the transmission of pathogens. Because of globalization accompanied by high mobility—business travelers, tourists or migrants—such pathogens are transported by plane to other continents within hours. Also, animals themselves can spread infectious agents, as for example, infected mosquitoes, ticks (vectors) or even exotic pets. But outbreaks can also be caused by contaminated food of animal or plant origin. Environmental conditions or land use also play a role because change in these areas also alters the conditions for survival and propagation of vectors, as well as of infectious agents.

Therefore, according to the “One Health” approach, humans, animals and ecosystems must be considered together when attempting to combat infectious diseases sustainably. Veterinary and human medicine, agriculture, ecology and climatology must work together interdisciplinarily and implement structures in order to be able to respond to challenges inherent in our common environment.

To focus the research strategy of the Robert Koch Institute in this area, we created the position of a coordinator regarding the impact of climate change on health. There are research associations in Germany already addressing the topic “One Health.” As an example, we cite InfectControl 2020 (www.infectcontrol.de), a research association funded by the Federal Ministry of Education and Research. A consortium of academic partners and business enterprises intends to develop fundamentally novel strategies for early recognition, containment and successful control of infectious agents, and to put them into practice. InfectControl 2020 places particular focus on the containment of infectious agents with antibiotic resistance.

Whether the pathogen is new or well-known, or whether a well-known pathogen presents new properties (like during the large EHEC outbreak in northern Germany), countries should be prepared worldwide for such events. The better the preparation, the faster the infection chain can be disrupted or the consequences alleviated. Basic prerequisites are good individual healthcare by physicians and hospitals, and a sufficiently equipped public health service focusing on the state of health of the general population. This involves, for example, tracing contact persons in the case of contagious diseases, informing them, if necessary isolating them, and referring them for medical treatment in order to prevent the spread of an infectious disease.

We have seen what happens if all of this is lacking on the occasion of the Ebola virus disease outbreak in West Africa that not only had grave consequences for the countries affected, but also had considerable repercussions for countries worldwide.

In previous years, Ebola virus disease outbreaks were small and confined to one area. The affected regions in Central Africa were remote and sparsely populated. Above all, people were familiar with the disease. However, in West Africa, mainly in the affected countries Guinea, Sierra Leone and Liberia, an important factor for the spread of the Ebola virus disease was not only the extremely weakly positioned healthcare system, but also the high population density and the comparatively mobile population. In addition, no cases of Ebola virus disease have ever been reported in this region, which is why there was no knowledge of the cause of the disease, modes of transmission and protection measures. Successful measures adopted in previous Ebola virus disease outbreaks, especially to isolate the patients and to quarantine contacts, were obviously not sufficiently adopted at first. Burial rites during which the body is touched have also contributed significantly to the spread.

A laboratory diagnosis is indispensable for a decision on isolation measures. Ebola virus diagnostics take several hours in the laboratory, but in the first place, the samples must be transported to one of the laboratories that were practically nonexistent in West Africa at the beginning of the outbreak. Even before the outbreak, physicians and healthcare workers were rare in the first place, and many of them were infected with the Ebola virus for lack of knowledge or lack of basic protection measures like gloves and face masks. Also, the tracing and isolation of contacts was hardly possible for months because the countries affected had neither expertise nor specialists in epidemiology.

Comparatively wealthy Nigeria managed through a strenuous effort to quickly contain the outbreak caused by a single imported case. Experts experienced in polio elimination played a key role here. In contrast, in Guinea, Sierra Leone and Liberia, extensive support from the community of states was necessary to stop the broad spread of the virus that is only transmitted by contact with body fluids.

The Ebola virus disease outbreak in West Africa was recognized in the spring of 2014 and has become a lesson in failure in global infection protection. Ebola virus disease is also a zoonosis. An international research team with the participation of the Robert Koch Institute has found that the outbreak in West Africa can most likely be traced back to bats (www.rki.de/ebola-en). This research trip was organized at the end of April within a few days after the outbreak was reported, and the researchers of the Robert Koch Institute benefited from long-term partnerships established in this region. In contrast, most of the previous Ebola virus disease outbreaks emerged after contact with hunted or deceased primates.

In the past, travelers had very rarely imported Ebola virus diseases, or similar diseases to industrialized countries. In the event of suspected cases and confirmed cases, the German network of competence and treatment centers has proved valuable due to its specialized handling of these infectious diseases. The secretariat of this so-called STAKOB network (www.rki.de/stakob-en) was established at the Robert Koch Institute, the national public health institute conducting research at the federal level advising the scientific community, and represents the contact for international stakeholders and for the German federal states that are primarily in charge of infection protection.

Taken together, many factors are important in infection protection, and not just in times of crisis: an educated and resilient population familiar with the most important basics of infection protection, efficient medical care, and foremost, a sufficiently-equipped public health service. This public health service conducts continuous surveillance of diseases, develops framework plans regarding particular infection events, detects disease outbreaks rapidly and takes effective countermeasures. Instead of rigid legal regulations, the ability to take action concerning infection protection requires more flexible structures, along with research activities in the form of networks and international cooperation taking into account the “One Health” aspect, communication skills to provide information regarding protective measures competently and credibly, and last but not least capable politicians! All of this actually concerns every country, because regions and states without efficient infection protection pose a threat to themselves and to others: Infectious diseases are not stopped by boundaries. 🍀



Written by
PROF. LOTHAR H. WIERLER
Robert Koch Institute (RKI) | President | Germany

ESSAY

GLOBAL FORCED DISPLACEMENT AND HEALTH: CHALLENGES FOR HUMANITARIAN ACTION

Denthoma 1 camp lies on the banks of the Nile in the city of Melut in South Sudan. It hosts 20,000 people seeking refuge from the conflict that has raged in the country since late 2013. In May 2015, Médecins Sans Frontières/Doctors Without Borders (MSF) was forced to leave its hospital in the camp due to heavy fighting. The hospital was vandalized and water tanks were riddled with bullet holes—leaving people to drink untreated water from the Nile at the same time they had lost access to medical care.

The violence, exposure to disease and lack of healthcare in Melut are terrible, yet typical examples of the health risks internally displaced people and refugees around the world face. At the end of 2014, over 59 million people were forcibly displaced in the world, according to the UN Refugee Agency. Two in three (38.2 million) fled within their own country, and one in three (19.5 million) sought safety abroad. The vast majority—86 percent—lived in developing countries.

Whether people cross borders or not, and whether they flee from violence, destitution, natural disaster or a combination of these factors—they share a pronounced vulnerability. They endure long and harsh journeys, often on foot and without adequate access to shelter or food. They have lost their homes and means of subsistence and are often dependent on aid to survive, especially in emergencies. Many are traumatized.

MSF ASSISTS PEOPLE FORCED TO FLEE

MSF is an international medical humanitarian organization which delivers emergency aid to people affected by armed conflicts, epidemics, natural disasters or exclusion from healthcare. Nearly 90 percent of our funding comes from private donors, ensuring the independence of our work from government interference. In 2014, we provided

humanitarian assistance in 63 countries, helping those whose needs are greatest and most acute.

People forced to flee are often in poor health, malnourished and vulnerable to disease. Many live in overcrowded camps for weeks, months or years. Apart from the direct consequences of being exposed to violence, they commonly suffer from respiratory infections, malnutrition, diarrhea related to poor sanitary conditions and malaria where it is endemic. Small children, older people and pregnant and breastfeeding women are particularly at risk.

MSF sets up hospitals in camps, supports health outposts in regions where large numbers of displaced people have settled, and dispatches mobile medical teams to assist those hiding in remote locations. We offer surgery for those who have been wounded, as well as prenatal and obstetric care. Our teams treat people for chronic diseases or illnesses contracted prior to their flight, including heart disease, HIV/AIDS or tuberculosis, and offer mental health support.

The precarious living conditions of many refugees and displaced people also give rise to the risk of epidemics. MSF organizes mass vaccinations to control diseases like measles, and provides access to clean water and proper sanitation to prevent the spread of cholera and other waterborne diseases.

CRITICAL NEEDS, LIMITED AID

The humanitarian aid system has grown massively over the past few years, with more resources at its disposal than ever. But on the ground, aid is very unevenly distributed. Among people forced to flee, needs are massive—yet MSF is concerned that emergency response is often inadequate and slow. The mass influx of people seeking safety tends to overwhelm local government and aid organizations who struggle to provide enough water, food and shelter. In regions that are affected by continuing fighting or are hard to reach because of limited infrastructure, aid organizations, including UN agencies and international NGOs, are largely absent.

Just one example of many: In May 2015, cholera broke out in overcrowded refugee camps in Tanzania where thousands of refugees had sought shelter from unrest and violence in nearby Burundi. According to the World Health Organization, 31 people died, and more than 3,000 acute diarrhea cases were reported. In response, with local health authorities, MSF opened up cholera treatment centers in two camps. We also vaccinated more than 130,000 people against the disease and set up a system for pumping and treating water. But other organizations must step up, especially with regard to sanitary conditions, so MSF can focus on medical needs.

Where humanitarian assistance exists, it is often concentrated on people living and registered in official camps. But increasingly, large numbers of people forced to flee are living in spontaneous sites or scattered in urban areas, such as for example in Lebanon, Jordan or the Central African Republic (CAR). These people often receive little or no international aid.

In the CAR, for example, around one fifth of the population of 4.6 million was displaced by the conflict that flared up in 2013. Many are forced to live in the bush, with inadequate access to food, water, shelter or healthcare. As a result, malaria and malnutrition are widespread. MSF dispatches mobile teams, but assistance remains inadequate, especially in areas affected by ongoing fighting.

Many people forced to flee also stay with host communities rather than in camps. This is common among Syrian refugees in Lebanon or people displaced internally in the Democratic Republic of Congo (DRC). These people often do not receive assistance of any kind—though their hosts may also be impoverished or affected by conflict.

Overall, MSF is concerned that aid agencies are failing to assist those in less accessible regions. But needs should determine where aid is prioritized—not accessibility.

In conflict-affected countries, security constraints generally slow down the delivery of aid or even make it impossible. In South Sudan, in the Denthoma 1 camp mentioned above, MSF was able to start providing water and healthcare again, but recurrent shelling continues to be a challenge. Syria is a tragic example of the failure of

humanitarian aid in insecure regions. Violence displaced more than 7.5 million people within the country—yet MSF and most other international actors are unable to assist the majority of them, primarily because it is too dangerous to do so.

Despite the obvious risks associated with working in conflict settings, MSF is concerned that many organizations are becoming too risk-averse, avoiding situations where aid would be possible. One example is the northern Iraqi city of Kirkuk: In December 2014, more than 180,000 people were internally displaced there. MSF was the only international medical organization in the area at the time. Most aid came from local organizations, but it was largely insufficient.

Humanitarian assistance to people forced to flee is also lacking because certain needs are prioritized over others, especially in emergency situations. Sexual violence, for instance, is a widespread yet neglected problem, and victims receive too little medical or psychosocial support. In the DRC, MSF treated more than 34,000 cases of sexual violence between 2007 and 2012; many patients had been displaced by fighting. The Syrian crisis is drawing attention to the problem of non-communicable chronic diseases (NCDs) among refugees. In the Lebanese Bekaa Valley, where many Syrians have settled, nine out of ten patients MSF sees are suffering from NCDs. In collaboration with specialists, MSF is developing treatment approaches for diseases like diabetes, high blood pressure or asthma that are adapted to humanitarian crises.

THE AID SYSTEM NEEDS REFLECTION AND CHANGE

Addressing the numerous challenges in refugee and displaced people's health means MSF needs to critically assess its own emergency response. At times, we have been too focused on hospital care in camp settings, neglecting people in harder-to-reach places. In other situations, we reacted too late to provide essential water and sanitation services, hoping that other organizations would step in.

As conflicts intensify and become more drawn out, and as the numbers of internally displaced people and refugees increase, humanitarian agencies need to reflect, learn and adapt when it comes to improving the health of people forced to flee. MSF is ready to contribute to this effort. ◆



Written by
FLORIAN WESTPHAL
Médecins Sans Frontières (MSF) |
Managing Director | Germany

ESSAY

SEXUAL VIOLENCE: A GLOBAL CHALLENGE FOR THE HEALTH SECTOR

Sexual violence is a matter of utmost international concern given high prevalence rates across all countries. An international exchange of ideas and strategies is essential for understanding current deficiencies and developing new perspectives for the health sector. Building national supply systems will be a crucial step toward better healthcare for victims.

THE EXTENT OF SEXUAL VIOLENCE AND CONTRIBUTING FACTORS

Over the past few years, international scientific exchange has revealed the breadth of areas affected by the problem of sexual violence. Sexual violence is not only an immense public health problem, but needs to be understood in its context-dependence and its complex interactions with risk factors on the side of victims as well as offenders.

It has become apparent that a broader perspective on the immediate and long-term causes and effects of sexual violence is necessary. Those include questions of respective manifestations of sexual violence, medical and psychological consequences for survivors of sexual violence, an adequate understanding of risk factors for becoming an offender, and in consequence the question of how to prevent sexual violence.

In this regard, the latest data from civilian societies have revealed that the prevalence of sexual violence against women and children is a global health issue. A review of 38 prevalence studies in 21 countries resulted in prevalence rates of recalled childhood sexual victimization of approximately 20 percent in women and 10 percent in men. Further, it was found that sexual violence often occurs in the context of other forms of violence and neglect.

Additionally, there is a high risk for women to become a victim of sexual violence during adolescence and adulthood. According to a recent EU survey including 42,000 participants from 28 European countries, one in 10 women has experienced some form of sexual abuse since the age of 15, and one in 20 has been raped. Yet, only 14 percent of women reported their most serious incident by an intimate partner to the police authorities, and 13 percent reported their most serious incident of non-partner violence.

A critical public health concern is the fact that sexual abuse, particularly when experienced in childhood, is a potent risk factor for the development of long-term health problems. It is well-established that childhood adversity, including sexual abuse, dramatically increases the risk for developing a wide range of psychiatric disorders as well as certain medical diseases later in life. Enduring effects of childhood abuse on the developing brain and its regulatory outflow systems, the autonomic, endocrine and immune systems, likely contribute to disease vulnerability. The consequences of childhood abuse are moderated by genetic factors and are mediated by epigenetic processes. The biological and behavioral consequences may also be transmitted into the next generation and may contribute to the so-called cycle of violence across generations.

RISK FACTORS FOR OFFENDING BEHAVIOR

In cases of sexual offending, to adequately understand risk factors for becoming an offender is an important task. Recent neurobiological findings regarding sexual preference disorders, such as pedophilia and hebephilia, have revealed that child sexual abuse (a behavior) on one hand and pedophilia (a preference disorder) on the other hand are two distinct phenomena investigated in forensic and sexological research. Etiological models of pedophilia and child sexual offending behaviors include neurodevelopmental perturbations and neuro-functional as well as structural alterations.

For example, the development of antisocial behavioral styles with a specific focus on juvenile sex offenders was found to be an equally important factor—particularly concerning the question of brain mechanisms involved in inappropriate behavioral control. Since most offenders are males, there is a need to reflect the transmitting impact of surviving sexual abuse, emotional abuse, neglect or physical abuse during childhood and sexual offending during adolescence or adulthood.

Subsequently, the question of what can be done to prevent such violence needs to be pushed into the center of attention.

A MORE ACTIVE ROLE FOR THE HEALTH SECTOR

In light of these research findings, the role of the health sector needs to be reconsidered. So far, its part in addressing interpersonal violence, including sexual violence, has been rewarding when it comes to appropriate help and treatment for traumatized victims. Nevertheless, a stronger engagement in the provision of services should be aimed at, not least because, so far, there have been few efforts for primary prevention approaches.

A cornerstone of current efforts to prevent sexual violence is to create data profiles to reveal the true extent of the problem and to fully extract the specific burden of sexual violence. In this regard, data collection on a national level has proven to be the most proficient. For example, the establishment of national action plans in different countries enable a better understanding of the variety of characteristics in sexual violence. Importantly, these action plans prove to be most efficient when applied on a national level, when addressing all forms of violence, and when informed by comprehensive nationally representative data. Importantly, risk factors need to include data on the use of child abusive images (so-called “child pornography”).

A rewarding strategy, particularly in high income countries, is the promotion of evidence-based research on the prevention of sexual violence and its consequences. A challenging but crucial task is to translate research findings into mechanism-based intervention strategies to prevent, reduce or reverse the long-term consequences of exposure to sexual violence.

New research findings described above enable a better definition of target groups for combatting and preventing sexual violence. For example, an increased focus on longitudinal studies in children exposed to sexual violence may enable a better understanding of developmental trajectories of risk and resilience factors, sensitive periods for the effects of sexual violence in order to derive mechanistic targets, as well as sensitive time windows for early intervention. Ameliorating the health consequences of childhood abuse may intermediately help reduce transmission across generations and enable prevention of maltreatment in the future. Of note, it is equally important to focus on adolescents (as offenders and as victims) and specific risk groups of victims (more females) as well as perpetrators (more males).

Overall, the question of strategies to prevent sexual violence is important in order to intervene at the earliest possible moment and to prevent sexual victimization of women and children altogether. Therefore, the transfer of knowledge to implement prevention and intervention strategies on the general level of society is a necessary task, particularly according to known risk groups (sexual preference disorders, antisocial attitudes).

To conclude, current efforts in the combatting and prevention of sexual violence show the importance of the health sector with all its resources assuming a major role. In terms of future goals and perspectives, mechanisms for the leadership and coordination of violence prevention activities should combine efforts of different stakeholders (e.g. government ministries, hospitals, health insurance schemes, the pharmaceutical industry). These efforts will not succeed if stakeholders of the health sector are not aware of and do not understand the connection between and the serious impact of sexual violence on health in general. ■



Written by
PROF. KLAUS BEIER
Charité – Universitätsmedizin Berlin |
Director, Institute of Sexology and
Sexual Medicine | Germany



Written by
PROF. CHRISTINE HEIM
Charité – Universitätsmedizin Berlin |
Director, Institute of Medical
Psychology | Germany

HEALTH IN NUMBERS

Refugee Health & Mega Disasters

In 2015, refugee issues dominated the headlines in Europe. Officials struggled to adapt and respond to the growing crisis as hundreds of thousands of migrants made their way across the Mediterranean in dangerous and sometimes deadly journeys. Public health policy developed to deal with other crises could be applied here to help both host countries and new arrivals cope.

By November **2015**, over **3,300** people had perished trying to cross the Mediterranean. Over **700,000** people were estimated to have arrived by sea.

UNHCR, 2015

FACT



Globally, the number of reported weather-related natural disasters has more than tripled since the 1960s. Every year, these disasters result in over 60,000 deaths, mainly in developing countries.

World Health Organization, 2015

FACT

According to Amnesty International, between 2007 and 2013 the European Commission spent more than €1.8 billion on border control and €700 million to support asylum procedures, reception services and refugee resettlement and integration.

Amnesty International, 2014



FACT

Top 10 source countries of refugees (in addition to Palestinian refugees)

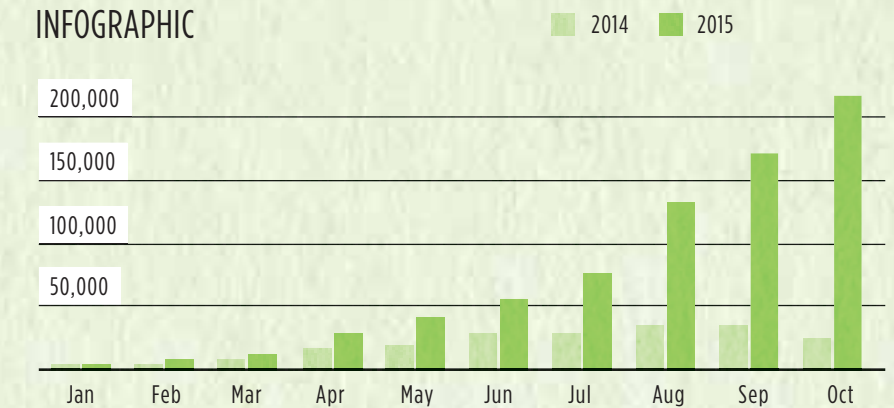
Amnesty International, 2015

01. Syria
02. Afghanistan
03. Somalia
04. Sudan
05. South Sudan
06. Democratic Republic of Congo
07. Myanmar
08. Central African Republic
09. Iraq
10. Eritrea

A recent study suggests that if all asylum seekers had the same access to the healthcare system as legal residents, total spending for medical care over the past **20 YEARS** could have been cut by **22%**.

Bozorgmehr K, Razum O, University of Bielefeld, 2015

INFOGRAPHIC



By late 2015, the number of refugees crossing the Mediterranean to Europe had reached a record high. According to the UNHCR, 220,000 refugees arrived in October 2015 alone—more than in all of 2014 put together.

UNHCR, 2015

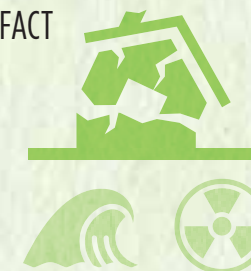
KEY NUMBER

According to UNHCR's latest statistics, there were approximately 59.5 million refugees in the world at the end of 2014.

UNHCR, 2015

59.5

FACT



By June 2011, 164,000 people were displaced in Fukushima. (Earthquake, tsunami and meltdown happened in March 2011)

United Nations University, 2015

STATEMENT

“OUR WORLD IS PROFOUNDLY INTER-CONNECTED AND THIS, TOO, HAS CONSEQUENCES. THE REFUGEE CRISIS IN EUROPE SHATTERED THE NOTION THAT WARS IN FARAWAY LANDS WILL STAY REMOTE.”

MARGARET CHAN

WHO Director-General, in her address to the World Health Summit 2015

PORTRAIT

M8 Alliance Special — A Unique International Network of Excellence

The M8 Alliance of Academic Health Centers, Universities and National Academies is a collaborative network of academic institutions known for its educational and research excellence. The network was founded in 2009 at the inaugural World Health Summit, and has provided an outstanding academic foundation for every WHS event since.

The M8 Alliance currently has 23 members based in 16 different countries, all of whom are committed to improving global health and working with political and economic decision-makers to develop science-based solutions to health challenges worldwide.

The M8 Alliance promotes the bench to bedside to population health translation of research, as well as the transformation of current medical care approaches to treating the ill by

creating healthcare systems aimed at the effective prevention of disease. The organization also works to adapt health-related solutions to rapidly changing living conditions through research in priority areas, especially shifting demographics, urbanization, and climate change.

For the WHS Yearbook, eight members and close friends elaborated on the opportunities and challenges of this unique international network. ●



**Shunichi
Fukuhara**

*Dean, School of Public Health,
Kyoto University, Japan*

“To me, the M8 Alliance is a dream team of global academic leaders addressing issues in global health. It can provide new visions and ideas to improve health worldwide.

The cooperation with the National Academies as members of the M8 Alliance offers precious mutual benefit, as the National Academies give the M8 Alliance visions and direction, while the M8 Alliance can contribute insights about societal needs regarding health. This is accompanied by the WHS Regional Meetings in which local issues and solutions serve as models. The world can learn from these models, and each region benefits by receiving feedback from the global perspective.”



**José Otávio
Costa Auler Jr.**

*Dean, University of São Paulo
Medical School, Brazil*

“One important thing that the M8 Alliance works on is to change the medical curriculum to improve medical education in order to prepare the new generation of medical doctors to really integrate the health system of each country, intensify primary care and promote preventive medicine. Medical education is a good example of how the network of the M8 Alliance can be implemented.

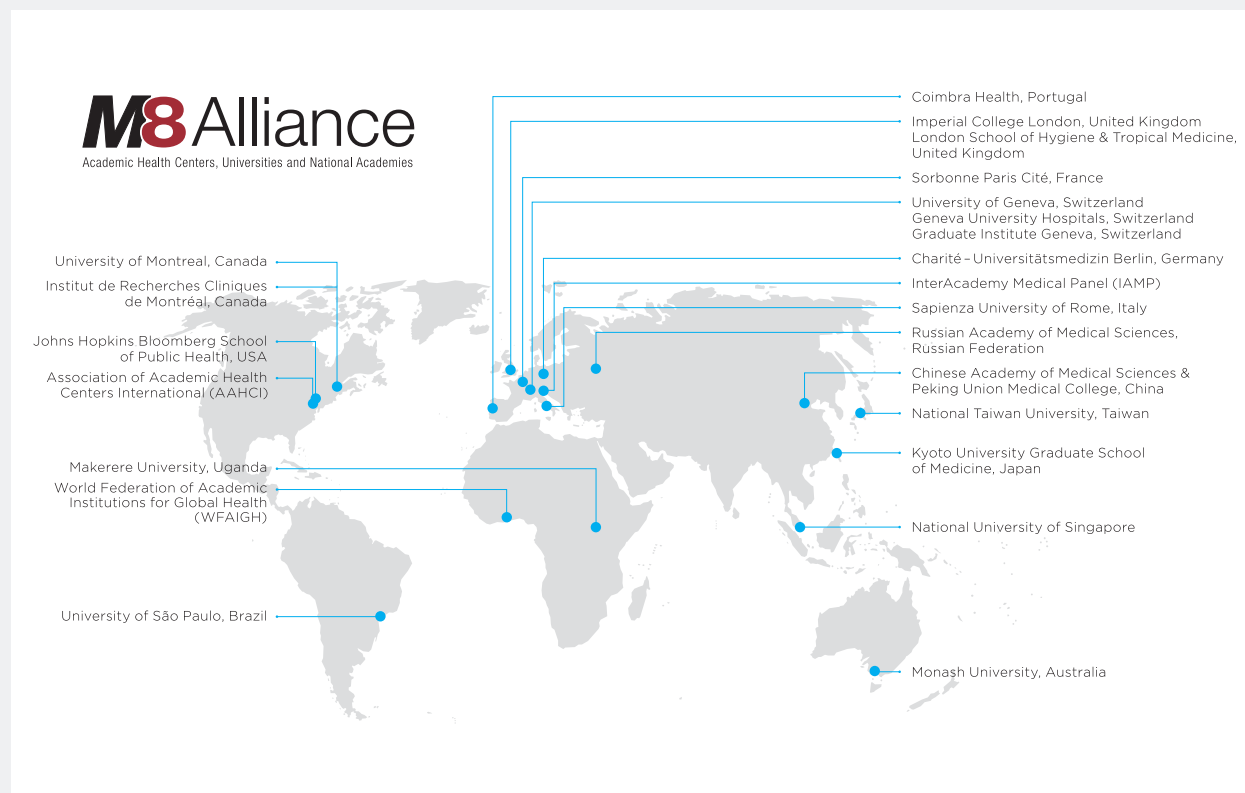
Additionally, the M8 Alliance benefits from organizing Regional Meetings next to the World Health Summit in Berlin. In the discussion of how to improve global health, we need to keep in mind that global health problems have regional particularities that need to be considered. Hence, it will be especially fruitful to closely link the programs of the Regional Meetings and the programs discussed in Berlin.”



**Hélène
Boisjoly**

*Dean, Faculty of Medicine,
Université de Montréal, Canada*

“The M8 Alliance is an outstanding forum in which global health leaders and faculties of medicine and public health can discuss modern health challenges. Through their discussions and knowledge sharing, the leaders can contribute to setting the global agenda for public health policies. What distinguishes the M8 Alliance from other international health organizations is its relatively small membership and the fact that all five continents are represented. This creates a very active dynamic in which the institutions are truly involved and have a genuine impact on its activities.”





Ben Canny

Associate Dean, Monash University Faculty of Medicine, Australia (until December 2015)

“The M8 Alliance is a group of like-minded institutions who seek to further the cause of health, global health and health professional education via forums and joint projects. It has a unique international perspective, seeking to bring together institutions from various parts of the world in collaboration with identified international associations. The various institutions have identified areas of expertise and interest. While there is a range of common activities, these will need to be increasingly met by the development of projects that individual institutions will lead or collaborate on. We have to identify significant unique projects before we celebrate the Alliance’s 10th anniversary in 2018.”



Khay Guan Yeoh

Dean, Yong Loo Lin School of Medicine, National University of Singapore

“Since its formation, the M8 Alliance has formed a strong group of like-minded, leading academic institutions of medical and public health schools, working together with governments and industry in order to solve the major health challenges of our time. It established a strong platform, the annual World Health Summit in Berlin, a powerful brand and an important forum that attracts international thought leaders, industry and governments. The M8 Alliance has identified the key global population health priorities that need to be addressed. In addition, a series of WHS Regional Meetings in Asia, South America and Europe has identified distinctive regional health issues. A critical element is that its members are leading medical and public health schools. Health education is a powerful tool to optimize the delivery of care and to engender the transformative change that is needed.”



Rifat Atun

Director, Global Health Systems Cluster, Harvard T.H. Chan School of Public Health, USA

“The unique strength of the M8 Alliance is that it brings together a diverse group of researchers with research excellence extending from the molecular level to global health systems across multiple health areas and spanning all regions of the world. The interface with the private sector is critically important in developing a shared agenda for research, innovation, policy and translation. It is this multi-disciplinarity and diversity that distinguishes the M8 Alliance from other networks that tend to be subject-, level- or geography-focused. The M8 Alliance can foster an innovation agenda for research across several distinct themes and strengthen the multi-disciplinary and multi-stakeholder research. It can help improve health on a global scale by encouraging knowledge exchange, capacity building, implementation of evidence and policy translation.”



Erwin Böttinger

Chief Executive Officer, Berlin Institute of Health (BIH), Germany

“The Berlin Institute of Health (BIH) was founded to combine excellent clinical research with state-of-the-art biomedical research. This translational approach from bench to bedside to population health is the key to improve health worldwide. The same vision drives the M8 Alliance: to combine the best of multiple research centers and medical clinics and bring it to patients. This alliance offers a globally unique opportunity to pursue our mutual goal as it syndicates the efforts and the expertise of strong partners—resting on the basis of trust and respect that has developed.”



Luciano Saso

Vice-Rector for European University Networks, Sapienza University of Rome

“The M8 Alliance is a strong organization with a very original structure consisting of Academic Health Centers, Universities and National Academies. We strongly believe in the aim of the M8 Alliance of promoting the bench-to-bedside translation of research and creating healthcare systems aimed at the effective prevention of disease. Sapienza University of Rome is one of the oldest and largest universities in Europe and it is very active in the global health field. The collaboration with other members of the M8 Alliance and the participation in the World Health Summit in Berlin is an excellent opportunity for Sapienza to further develop its research and education programs in global health with special attention to migrants’ health, antibiotic resistance, intercultural training of medical students, and residents and e-learning programs in the field. We are proud to be a new member of the M8 Alliance and are committed to use all our experience and expertise to contribute as much as possible to the activities of the network.”

REGIONAL MEETINGS

Three WHS Regional Meetings have been held so far: Singapore (2013), São Paulo (2014) and Kyoto (2015). In 2016, the WHS Geneva Meeting will continue this tradition, followed by Montreal in 2017.

www.worldhealthsummit.org/m8-alliance

M8 Alliance
Academic Health Centers, Universities and National Academies



REPORT

WHS Regional Meeting Asia — Kyoto 2015

Meeting Emerging Challenges

With the longest life expectancy in the world and a burgeoning elderly population, Japan has made the transition to an aging society well before most other countries. Soon enough, other industrialized as well as developing countries will face demographic changes and challenges similar to Japan's. Thus, the organizers of the WHS Regional Meeting 2015 saw it as their responsibility to understand Japan's geriatric care efforts and explore how healthcare systems can be further restructured to prepare for rapidly aging societies.

This defined the first of three central topics:

1. Challenges in a Rapidly Aging Society
2. Preparedness for & Resilience after Disasters
3. Fostering New Leadership

On April 13 and 14, over 600 participants from more than 25 countries gathered at the Kyoto International Conference Center. 64 globally prominent experts addressed the gathering in sessions ranging from high-rank-

ing keynote lectures to interactive workshops.

The meeting began with a lecture by Michael J. Klag, the Dean of Johns Hopkins Bloomberg School of Public Health, addressing the issues of aging societies.

NEW LEADERSHIP

To tackle tomorrow's problems, the next generation of experts was included as well. They were able to meet renowned experts Hiroo Imura

(Professor Emeritus, and former President of Kyoto University), Barry R. Bloom (Professor, Harvard School of Public Health), Peter Piot (Director, London School of Hygiene and Tropical Medicine), Thomas S. Inui (Director of Research, Center for Global Health, Indiana University), or Masayo Takahashi (Project Leader, RIKEN Center for Developmental Biology).

A poster presentation showcased the 15 most promising projects submitted by young applicants from around the world. Teeranee Techasrivichien (Kyoto University) was recognized for her study of "Changes in Sexual Behavior

"It's a great platform, especially because it gives young researchers like us an opportunity: I was able to present some of my work and get feedback from senior researchers."

TEERANEE TECHASRIVICHIE
Kyoto University



The Kyoto International Conference Center hosted intense workshops.

and Attitudes across Generations and Gender among a Population-Based Probability Sample from an Urbanizing Province in Thailand."

HEALTH SYSTEMS AND MEGA DISASTERS

Just four years ago, Japan was hit by the so-called "triple disaster": an earthquake, a tsunami, and the meltdown at the Fukushima Daiichi nuclear power plant that followed. The "lessons learned" were not only discussed during the two day conference in Kyoto but followed by a roundtable discussion on April 16 at Iwase General Hospital in Fukushima and a special symposium at Fukushima Medical University—the co-host of the WHS Regional Meeting—on April 17.

How can health systems be prepared for mega disasters? What is their responsibility to society afterwards? And what can we learn from Japan's "triple disaster" experience? A "Japanese model" was introduced to shed some light on what we might learn from these dire experiences. The M8 Alliance of Academic Health Centers, Universities and National Academies also composed the joint statement "Meeting Emerging Challenges: Toward Responsive and Resilient Health Systems" (see the following two pages). The statement was the highlight of an extraordinary WHS Regional Meeting.

After 540 days of preparation and two two-day events, participants left with food for thought and new friendships—knowing that the discussion would continue at the World Health Summit 2015, held from October 11-13 in Berlin. ♦



Eduardo Krieger, Shunichi Fukuhara and Detlev Ganten presented the "Best Poster Award" to Teeranee Techasrivichien.



About the Meeting

THE HOST— KYOTO UNIVERSITY

The Graduate School of Medicine at Kyoto University was set up in 1899, just two years after the University was founded, and has made many contributions with its advanced education and top-notch research. The School of Public Health was established in 2000, and was the first institution of its kind in Japan. It explores the integrated socio-ecological approach for health, referred to as the "New Public Health."

THE CO-HOST— FUKUSHIMA MEDICAL UNIVERSITY

Fukushima Medical University was founded to nurture young medical professionals who will contribute to the future promotion of health, medical care and welfare of the citizens of Fukushima Prefecture. It is also a research institute that seeks to advance the fields of medicine, nursing and related areas.

Since the 2011 earthquake off the Pacific coast of Tohoku and the subsequent Fukushima power plant disaster, Fukushima Medical University has maintained a close relationship with Kyoto University, and is now also a significant participant in the WHS.

M8 Alliance Statement WHS Regional Meeting Asia — Kyoto and Fukushima 2015

Meeting Emerging Challenges: Toward Responsive and Resilient Health Systems

April 2015

In 2011, the massive earthquake, tsunami, and subsequent nuclear reactor meltdowns produced one of the most severe disasters in the history of Japan. Fukushima Prefecture was the most severely affected by this 'triple disaster'. The impact of the triple disaster on health and the health system was extreme, with adverse effects continuing to be felt.

Hit by this severe natural disaster, the health system in Fukushima also faces a second challenge: a hyper-aging society. A transformed health system is an imperative if Fukushima is to be able to respond to future disasters and demonstrate resilience to the rapidly emerging needs of the Japanese society. Lessons learned from Fukushima provide an opportunity for the rest of Japan and other countries of the world to build more responsive and resilient health systems that are key to sustainable development.

In this statement, we, the members of the M8 Alliance, consider 'Responsiveness' and 'Resilience' as two critically important attributes of a sustainable health system. We define responsiveness as the capacity of providers to respond to health needs of the population in the event of a catastrophe (such

as a natural disaster), rapid change (such as emerging new infections) or cumulative effects of contextual changes (such as the aging of its population). We define resilience as the capacity of a system to sustain its activities and adapt to major changes it faces over time (population aging, epidemiological transition leading to chronic illness and disability, economic crises, and migration, for example). Sustainable health systems are a critical ingredient for sustainable development.

The aftermath of the triple disaster revealed societal cohesion, as well as the strengths in the responsiveness and resilience of Fukushima's health system. The societal response and resilience to the disaster was exemplary: Not only did the social fabric remain intact, the society was able to weave a stronger fabric to protect its members, especially the vulnerable. Social violence, witnessed elsewhere with natural disasters, did not emerge. Most health professionals remained in Fukushima after the disaster and they struggled to protect the lives and health of people in Fukushima. Voluntarism was evident—providing much needed additional human resources. Yet, the responsiveness of the health system was challenged, and its resilience is under pressure as the health system tries to meet the ongoing

needs of vulnerable populations, in particular the elderly. Responsiveness challenges included integration of community and hospital responses, speed of communication, managing varied messages emerging from official sources and the media, transportation—with consequent adverse effect on supply chain management for critical supplies—and the shortage of health human resources. There was strong public demand for transparency, timely communication and information dissemination.

Fukushima embodies the challenges faced by the health system in Japan and in other countries globally. These health systems are subject to rapidly changing contexts, with external shocks such as natural disasters and economic crises, as well shocks from within the populations they serve, such as aging, rapid rise of chronic illness, growing disability and emerging infections. Nothing less than a transformation is needed to create health systems in Japan and globally that are responsive and resilient to future shocks and emerging contextual challenges, including the rapid aging of society. Such a transformative change will require a set of actions we recommend below, not as a prescription but as a set of considerations to inform health system transformation.

ADDRESSING EMERGING INFECTIONS AND DISASTERS

Responsiveness

- » Establish a framework for rapid decision-making and action in health systems.
- » Ensure timely information dissemination to the public and intelligence gathering for rapid strategic responses.
- » Create sufficient reserves to rapidly mobilize and fill health system "gaps" that emerge due to the limited supply of critical resources and increased demand for these resources immediately after a disaster.
- » Provide immediate access to transportation, communication, temporary shelter, clothing, and food to assure individual and population health security needs.
- » Create just-in-time management systems to deploy mobile health teams units and health workers in health systems.
- » Integrate medical and societal actions for a more comprehensive response.

Resilience

- » Monitor the long-term effects of disasters, including mortality, disability, destitution, and social welfare in different population groups, especially the vulnerable, to inform current and future policies.
- » Establish multi-sector action plans involving public agencies and the private sector.
- » Enable community mobilization through social networks and build social capital.
- » Allocate resources not according to historical burden, but to meet current and future needs.

RESPONDING TO THE NEEDS OF A HYPER-AGING SOCIETY

Responsiveness

- » Emphasize healthy aging.
- » Transform the response paradigm from "find it and fix it" to "predict risk and prevent."

- » Focus on proactive management of outcomes to enable reactive diagnosis and treatment.
- » Focus on targeted services and support to maintain the health and functionality of frail elderly, who often have multi-morbidities and would otherwise use a disproportionate share of medical resources.

Resilience

- » Transform the health system from a hospital-centric to a community- and primary care-centered model, where primary care physicians work within multidisciplinary teams and play an important role in personal, public, and environmental health.
- » Establish more robust and comprehensive health information systems as a foundation for resilient healthcare systems.
- » Foster development of "hybrid doctors" who provide personal healthcare and simultaneously manage population health.

LEADERSHIP AND GOVERNANCE

Strong leadership and governance is critical for transforming health systems to be more responsive and resilient. We recommend:

- » Developing and strengthening leadership at all levels of the health system to improve communication and decision-making in the event of a disaster.
- » Establishing a multi-sectoral and inter-sectoral response that involves all parts of the government and non-health institutions in health systems planning and implementation of strategic action plans.
- » Involving the private sector in the building of partnerships to design and apply new technologies, information systems, and innovation.
- » Engaging medical academia and academic health science centers to foster collaborative research,

- monitoring, and evaluation across disciplines to inform and support health system reform.
- » Introducing formal education programs healthcare care systems and health professional training courses to address the acquisition of responsiveness and resilience knowledge and skills.

LOOKING FORWARD

We must learn from responses to external shocks and rapidly changing contexts. Building an evidence base through rigorous scientific research is critical for managing emerging challenges and future crises that provide opportunities for transformative change in health systems. Policymakers, academics, and practitioners must collaborate to maximize the societal benefit of fostering the health workforce, generating new evidence for policy-making, and designing health systems that bridge gaps between primary care and specialized services delivered in hospitals. This call to action is directed not only to policymakers and academics, but to the whole of society. ●

M8Alliance
Academic Health Centers, Universities and National Academies

The M8 Alliance of Academic Health Centers, Universities and National Academies is a collaboration of academic institutions of educational and research excellence committed to improving global health, working with political and economic decision-makers to develop science-based solutions to health challenges worldwide.
www.worldhealthsummit.org/m8-alliance/members

The statement is available at:
www.worldhealthsummit.org/about-whs/impact



Changing the practice of medicine

At Novartis, we harness the innovation power of science to address some of society's most challenging healthcare issues.

Our researchers work to push the boundaries of science, broaden our understanding of diseases and develop novel products in areas of great unmet medical need.

We are passionate about discovering new ways to extend and improve patients' lives.



4

78-93

Health in the Post-2015 Development Agenda

Social, economic and environmental factors are fundamental determinants of human health. The well-being of the planet and the people living on it will only be secured by approaching the complex interaction between these factors using a systems approach.

2015 is the year we reached the target deadline for the UN's Millennium Development Goals. Which global development goals have been met and where do we need to focus our future health and development efforts? How do we need to move forward to achieve long-term progress?

“The world cannot afford a slow start—delivery was slow with the Millennium Development Goals. We need to cut the time lag in the process between adoption and implementation of the Sustainable Development Goals,” said Debra Jones, Director, Save the Children, in her speech at the WHS.

INTERVIEW

“We must change our paradigm”

Dorcas Makgato-Malesu is Botswana’s Minister of Health. Before taking over the ministry in October 2014, she served as Minister of Trade and Industry and the Chief Executive of the Botswana Export Development and Investment Authority (BEDIA). She has held leadership positions at Air Botswana, Debswana and Barloworld. She spoke to the WHS Yearbook about Botswana’s implementation of the Sustainable Development Goals (SDGs).

How effective do you think the new Sustainable Development Goals will be?

Dorcas Makgato-Malesu — It’s going to take a lot of countries to be able to infuse those sustainable goals into their national development plans and make them a reality. I don’t necessarily believe in cut and paste. I believe in making sense out of what is being given to me. Coming from an economics background, what is most important for me is for health to start talking the language of business.

The health sector must start saying, “What is the return on the investment that governments or private sector or stakeholders are putting in?” Whether that return is achieving epidemic control, whether that return is being able to do more with less, at the end of the day there has to be sustainability in everything that we do.

In the case of Botswana, what we’ve done so far has been good, but we want to move it from good to great. Great would be sustainability. Now, for instance, having competing agendas, I need to be able to persuade the country that you need to spend more on health than on water. You need to spend more on health than on electricity. That’s difficult. The other burden that we have in Botswana is the fact that the human resource market is so global. We’re competing with the global community for the employment of those people that you are spending the little money that you have training.

What kind of practical measures are there to reverse this brain drain trend?

It’s a discussion that we must have at the regional level, at the continental level, and on the global platform; also with

our funding partners, because it is something that must be addressed. If I take Botswana, for instance, we have a shortage of doctors. Recently, we founded a medical school, and I know that we educate enough doctors. If they didn’t leave, we probably would not have to bring in any doctors, but I can tell you now that they will leave. They will go to Australia, they will go to the UK, they will go to bigger economies that can afford to pay them the wages or offer them the lifestyle that I perhaps can’t.

Perhaps at the national level we must treat it differently. Separate those job cadres that are global by nature, and try to pay them separately from your normal public sector pay. It’s going to take a lot of creativity to solve this problem.

Education is free in Botswana. But because we are part of a global community, we train, they go. At some point something is going to give.

What other reforms is Botswana implementing?

The exciting development in Botswana right now is moving away from trying to treat HIV/AIDS as just a disease where you will start your treatment at a certain level, but looking at epidemic control.

“I think what Botswana can teach other countries is that investing in healthcare pays.”



A frequent topic at this meeting has always been how to encourage more research and development in drugs that target diseases that impact the developing world more than the European and the American markets. What do you say to pharma companies?

It cannot just be about them looking at patents that will be profitable to them and ignoring the rest. If anything, they also have a social responsibility to be part of what we’re all trying to achieve. You can’t take a selfish view and only concentrate on what’s going to work for you. I think that would be suicidal.

The disease of your neighbor is your disease in the future. Pharmaceutical companies are part of a global community. They ought to be looking at total health.

Speaking in the language of business, what’s the return on investment for them?

It cannot be a sustainable business if you’re just looking at profits and not looking at the social impact that you’re having within the community. We need to be alive for them to be able to make money out of us.

Are you happy with the state of the dialogue between partners?

I think certainly the conversations must change. I think the conversations should be about what is it that I need as a recipient in relation to what the partner has to offer. It can’t just be about what the partner has to offer.

Is there anything you think Botswana can teach other countries in the region in terms of approaches that you have succeeded with?

I think what Botswana can teach other countries is that investing in healthcare pays, because if you recall, we were the first country that was bold enough in Africa to start the treatment of HIV/AIDS. It was not because Botswana was rich, it was because it was the most practical thing to do at the time, and is still the most practical thing to do. And I think we are where we are because we were able to arrest the problem before it could be detrimental to our well-being as a nation.

So, what they can learn is being able to make bold decisions, because that was a bold decision at the time. ▲

How does that work in practice?

In our scenario, if a pregnant woman comes in and is tested, we immediately treat without necessarily waiting for the CD cell count. Now we are saying, “What are we doing to men? Shouldn’t we do the same?” If we were to say that we want to test and treat, which is what research is suggesting, what would that do? If it suppresses the disease to undetectable levels where then you do not spread it, surely that’s maybe what you ought to be looking at.

The capital investment is so huge. But if you can then show the relevance of epidemic control, the argument of the future, you would not be able to sell it. Our arguments must be businesslike to be able to persuade.

When you say health has to speak the language of business, are you talking literal dollars?

It doesn’t have to be dollars. If it’s a matter of controlling an epidemic, it will naturally translate into dollars at the end of the day. Just saying, “We’ll cure this, we’ll cure that” is not sustainable over the long-term.

We must change our paradigm and move away from curative to preventive medicine, with the focus on primary healthcare.

Is the business of business very different from the business of global health?

Well, I was Minister of Trade for the last 5 years, and business is business. I don’t care where. If I’m going to be spending X amount on a particular issue, what am I going to get in return? In business you say return on investment.



H.E. DORCAS MAKGATO-MALESU
Minister of Health | Botswana

ESSAY

G7—WORKING TOWARDS GLOBAL HEALTH

Global health was a central priority of the G7 Summit at Elmau. Given the tremendous challenges before us, three public health topics had been placed on the G7 agenda: Antimicrobial Resistance, Ebola and Neglected Tropical Diseases.

The fight against antimicrobial resistance, Ebola and neglected tropical diseases calls for a global and cross-sectoral approach. “Think ahead. Act together” was the motto of Germany’s G7 Presidency in 2015. We saw our presidency as both an opportunity and a responsibility to take an active part in shaping global health policy together with our partners.

The three topics mentioned above have one thing in common: It takes a systematic approach to address them. Indeed, none of these three global health challenges can be solved with measures from the classic public health toolbox alone. Cross-cutting measures are essential and will have to include, in addition to health, sectors such as research, development policy as well as food and agriculture. At the same time, these three challenges can only be overcome if the recommended measures lead to the comprehensive strengthening of health systems.

At Elmau, the G7 Leaders had adopted a Summit Declaration that does address all of these three topics, laying the foundations for further G7 activities. In order to advance the combat against Antimicrobial Resistance (AMR) and Ebola, and thereby implement the Summit Declaration, I had invited my G7 counterparts to a G7 Health Ministers’ Meeting that took place on October 8-9, 2015 in Berlin. At the same time, the G7 Research Ministers were meeting to discuss ways of strengthening the fight against Neglected Tropical Diseases (NTD) internationally.

At the G7 Health Ministers’ Meeting, we signed the “Berlin Declaration on Antimicrobial Resistance—Global Union for Antibiotics Research and Development (GUARD).” The fact that a growing number of bacterial pathogens are be-

coming resistant to antibiotics and that the past few years have seen a massive rise in AMR requires decisive action. This issue affects us all—both industrialised and developing countries alike. Conservative estimates suggest that well over 700,000 people already die each year from infections caused by resistant bacteria, and the death toll will keep increasing. Apart from human suffering, we are also faced with far-reaching economic consequences. According to OECD estimates, the cumulative losses suffered by all of the OECD countries as a result of antimicrobial resistance will amount to almost three trillion US dollars by the year 2050 if we do not begin to take counter-measures today.

No country is capable of winning the combat against AMR alone. It is only through joint, globally coordinated action that we can achieve real progress. However, we will only make progress if we get human and veterinary medicine and agriculture to work together globally in the spirit of the One Health approach. To this end, we have teamed up with our G7 partners to collect best practice examples for the implementation of the One Health approach and have made them available in a brochure. You can find it at the following link: www.bmg.bund.de/en/ministry/international-co-operation/g7-presidency/best-practice-broschuere-kopie-1. With these efforts, we, the G7 countries, support the development of national action plans for controlling AMR worldwide, and in doing so, contribute to containing AMR resistance.

The recently adopted Berlin Declaration on AMR, with the German GUARD Initiative, clearly states that the G7 countries strive to preserve the use of antibiotics, notably by making antibiotics both in human healthcare systems and in veterinary medicine subject to prescription or the veterinary equivalent. This is the route that I personally

advocate. I am convinced that this is the most effective way to ensure that what we consider to be a priceless commodity for the world at large—effective antibiotics—will remain accessible to everyone in the long-term.

“Consequently, the WHO must be properly resourced and re-formed if it wants to re-establish its role as the guardian of global public health. We must strengthen the WHO’s emergency response capacity, in particular.”

The German GUARD Initiative also includes a greater engagement in research, the development of new antimicrobials, treatment alternatives and rapid diagnostic tools, as well as the establishment of a global network of experts on antibiotics. Germany will get the ball rolling by organising the first expert meeting in 2016/2017. In addition, we agreed to explore further how we can create effective incentives along the value chain to stimulate innovation and the development of new-class antibiotics and alternative treatment options.

The G7 Health Ministers’ Declaration also reflects the lessons we have learned from Ebola. We all agreed that we must do our homework. Together, we need to ensure that the international community will be better prepared for similar emergencies in the future.

Specifically, the lessons learned from West Africa reaffirm one insight: Efficient and robust health systems are the key prerequisite for the rapid detection of and response to health crises. The international community and the G7 can provide valuable input and assistance in building resilient national health systems.

By 2019, therefore, as announced by Chancellor Merkel in New York in September 2015, Germany will be making an additional 600 million euros available for strengthening health systems in developing countries. However, alongside this outside support, it is the countries themselves that must make the decisive moves to implement the right to health and the establishment of a strong national health system. National governments have to assume a strong political leadership role, and the coordination of the assisting partners has to be improved. Civil society, including the local population and the private sector, must also be involved in the process.

Another key lesson from Ebola is the following: Affected countries need to provide full transparency on their domestic public health situation as early as possible. The transparent sharing of information is a prerequisite for the international partners to be able to mount a quick and well-informed response to a global health crisis such as Ebola.

The International Health Regulations (IHR) are the international regulatory framework for addressing cross-border health threats. Indeed, the poor implementation of the IHR was a factor that allowed the Ebola outbreak to escalate to its notorious scale. Therefore, national capacities for implementing the IHR must be urgently established and expanded. Here, the WHO must play the critical role of a coordinator. The G7 are sending the strong message that countries must be supported in implementing the IHR: 60 countries will be receiving assistance from the G7. With this commitment, we are taking on a profound responsibility and leadership role for global health.

The WHO has the central role to play in the fight against cross-border health threats. Consequently, the WHO must be properly resourced and reformed if it wants to re-establish its role as the guardian of global public health. We must strengthen the WHO’s emergency response capacity, in particular. Considering the multitude of major global health institutions, I am convinced that we need a strong coordinator in this area. The WHO—with its global membership—is the only international institution with universal political legitimacy in public health. Accordingly, Germany’s membership in the WHO has been and continues to be the central and universal frame of reference that defines our contribution to global health.

Germany is committed to assuming its international responsibility regarding public health. We are convinced that only by acting globally will we be able to ensure comprehensive health protection locally. This year’s G7 Summit Declaration reaffirms that the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being. Germany’s G7 Presidency has shown that we are addressing the emerging global challenges. Also, we are shouldering responsibility globally in concert with our partners. ▲



Written by
HERMANN GRÖHE
Federal Minister of Health | Germany

ESSAY

TOWARD INDIVIDUALIZED CANCER MEDICINE

Cancer researchers today are increasingly analyzing the genetic and epigenetic changes underlying individual tumors. Their data are leading the way to individualized therapies that specifically target identified cancer-promoting cellular changes. These exciting developments have opened a new era in the field of oncology.

Hardly any other biomedical research field has seen such marked progress in recent years as cancer research and cancer medicine have. Fundamental findings obtained in cellular and molecular biology have enabled scientists to unravel the molecular mechanisms underlying malignant transformation in most tumor diseases. As a result, an increasing number of agents that specifically target individual molecular changes in the tumor cell have been developed; some of these have already been approved as drugs.

At the same time, advances in high-throughput genome sequencing and bioinformatics have made it possible to perform complete analyses of individual patients' whole cancer genomes. In the framework of the International Cancer Genome Consortium (ICGC), a worldwide network of researchers is currently analyzing the complete genomes of tumor cells from 500 patients for each of the 50 most common cancer types.

This research, on the one hand, has turned out to be a gold mine for the detection of complex new patterns of genetic and epigenetic alterations; on the other hand, it has shown that there are substantial individual variations at the molecular level among patients with tumor types of identical histopathology. These variations also appear to be responsible for the large variability in clinical disease courses and patients' response to available treatment protocols. At present, it takes no more than two to three

weeks to perform an analysis of the whole genome of human tumor samples.

Last year, the National Center for Tumor Diseases (NCT) in Heidelberg, which builds on the close cooperation between the German Cancer Research Center (DKFZ) and Heidelberg University Medical Center, sequenced the tumor genomes of approximately 2,000 cancer patients. In many patients with advanced tumors as well as in cases of therapy resistance, scientists identified altered genes, groups of genes, or signaling pathways for which appropriate treatment approaches already exist. The knowledge about the individual pattern of genetic changes in tumor tissue facilitates learning more about the fundamentals of cancer. These comprehensive investigations are paving the way for stratified and personalized oncology.

To address the challenge of constantly increasing amounts of data obtained in personalized oncology, it is essential that appropriate medical informatics systems are developed in a continuous process. All clinical processes can benefit considerably from real-time provision, analysis and visualization of clinical data. One of the biggest challenges in this context is to consolidate clinical patient data that are provided in various individual systems and formats. In collaboration with SAP, the NCT is currently establishing a storage-resident central NCT Data Warehouse for the aggregation, combination and evaluation of molecular and medical data to support clinical decision-making. It exploits the powerful SAP-HANA processor technology.



Otmar D. Wiestler at the WHS keynote on Digital Health.

Based on the experience gained so far and the continuously increasing numbers of customized therapies, truly individualized cancer medicine is emerging now. By the end of 2015, the NCT will offer tumor genome sequencing that will be used to make individual treatment recommendations to all cancer patients with advanced disease. After initial clinical trials, the procedure will become a standard part of the care covered by a person's health insurance.

In recent years, research results have increasingly confirmed that in addition to the genetic characteristics of a tumor cell, the epigenetic coding of the tumor genome also has an impact on the course of the disease and should therefore be used for patient stratification. Colleagues from the DKFZ have shown this in specific types of childhood brain cancer. These epigenetic alterations can be approached with novel treatment strategies.

Every cancer therapy produces strong selective pressure on cancer cells. This leads to the development of resistance mechanisms. Treatment arsenals should always comprise alternatives that can be used to launch a new targeted attack against resistant cells. Single tailor-made treatment tools do not necessarily promise long-term and resounding success. Currently, careful consideration is being devoted to the question of how to combine novel and conventional treatment protocols for individual patients. Intelligent therapy combinations will not only increase treatment efficiency, but also help avoid resistance development for a longer time.

New developments in the field of immunotherapy offer great promise. Some checkpoint inhibitors have already been approved as drugs and have achieved astounding remission in cases of melanoma and lung cancer. Another fascinating approach involves therapeutic vaccination against tumor-specific antigens.

An intelligent combination of all of these methods with genome-based targeted therapies opens up the prospect that even highly malignant cancers and those that have been diagnosed at a late stage can be controlled efficiently over a prolonged period of time and be converted into chronic, manageable diseases. This is the biggest challenge for our field in the immediate future. ▲



Written by
PROF. OTMAR D. WIESTLER
Helmholtz Association of German
Research Centres e. V. | President |
Germany

ESSAY

PAVING THE ROAD TO SUSTAINABILITY

Two of the biggest shifts in global health are about to take place, both of which will make it possible for more children to get access to life-saving vaccines for years to come, and at their heart is sustainability and country ownership.

A necessary part of sustainable human and economic development is country ownership. To this end, within the next decade we are going to witness two of the biggest transformations the global health community has ever seen. The first is the widespread and much-needed modernization and extension of the aging supply chain infrastructure used to deliver vaccines to children in the world's poorest countries. The second is to see 20 of these countries transition away from support and begin to fully self-finance their national childhood immunization programs.

Both of these are built on principles of sustainability by helping countries become stronger through investment in their own health systems and immunization programs. Together, these huge developments will help enable us to reach more of the one-in-five children that are still not receiving a full course of the most basic vaccines, saving more lives for years to come. Making these transformations possible is the unique and innovative public-private business model of my organization Gavi, the Vaccine Alliance. Since 2000, it has been helping to improve access to new and underused vaccines for children living in the world's poorest countries, immunizing more than half a billion children and preventing 7 million deaths.

Gavi has managed to achieve this by forecasting and pooling demand from 73 countries, using its purchasing power to help shape vaccine markets, working with manufacturers to simultaneously build capacity and bring down prices, stimulate competition and create stable and sustainable

vaccine markets. This has helped reduce the price of some vaccines by more than 90 percent and brought down the total cost of immunizing a child with pentavalent, pneumococcal and rotavirus vaccines from US\$35 to US\$22 over the last five years.

SUPPLY CHAIN REVOLUTION

As part of a broad new supply chain strategy, Gavi now aims to apply the same kind of successful business model to help revamp up to 135,000 vaccine supply chain points across Gavi-supported countries. This supply chain architecture and cold chain system is outdated in many places, and was set up more than 40 years ago as part of the Expanded Programme on Immunization (EPI) as a means of transporting vaccines safely and effectively from the manufacturer to health clinics. It has been hugely successful, helping to significantly increase immunization coverage in poor countries. However, today's cold chain system is often in disrepair and in need of significant strengthening.

Indeed, of the facilities that need cold chain equipment (CCE), 20 percent do not have any, and of those that do, 20 percent of the installed devices do not function. At facilities where equipment does work, in many cases it works very poorly, with an estimated 60 percent running the risk of damaging vaccines through exposure to excessive freezing or unacceptably high temperatures. We also see poorly designed supply chains with limited means of tracking data, which together make it difficult to manage and optimize vaccine stock levels, track progress and monitor outcomes.

A big part of the problem is that the relatively high upfront cost of high-performing, sustainable equipment can put it out of reach for many developing countries, those with the lowest gross national incomes and per capita spending on health in the world. So when faced with the choice of investing in seemingly expensive new equipment, often there are higher priorities, or it can appear to make more economic sense to keep existing equipment running until it eventually breaks down.

Gavi is now hoping to address this issue through the creation of an innovative mechanism—the CCE optimization platform. By employing well-established market-shaping strategies, consolidating procurement, coordinating funding and improving market visibility through strategic demand forecasts, the aim is to encourage manufacturers to scale up production, stimulate innovation and reduce the cost of procuring equipment. This is all with a view to accelerating the upgrade of cold chain equipment in countries where it is needed the most.

TRANSITION

In launching this platform, Gavi is committing up to US\$50 million a year to co-invest with eligible countries. That means country ownership lies at the heart of this model, with supported countries contributing at least 20 percent toward the cost of equipment. This is particularly important given Gavi's ultimate mission to assist countries in moving toward entirely self-financed national immunization programs. As their economies grow, so too do their contributions toward vaccines, until they reach a point where they take on the full cost of their vaccines.

Over the next five years, 20 countries are expected to make this transition, with more to follow. This represents a hugely positive and wholesale shift in global health, and a big help in ensuring its lasting success will be the modernization of the supply chains. Not just because they need it, but because they make up a core part of a country's health systems. Through immunization services, communities gain access to other vital health interventions from nutritional supplements to maternal care. And anything a nation can do to strengthen its health systems will go a long way toward protecting its people from emerging infectious diseases, as we saw recently with the devastating Ebola epidemic in West Africa.

In addition to this, there are also economic gains to be had from investing in supply chains. Over the course of its lifespan, a typical gas fridge can cost around US\$3,600 to run, compared to just US\$400 for a modern solar-powered unit. Similarly, by using more reliable modern equipment, it is possible to better protect vaccines, reducing waste through temperature damage by more than 1 percent. Across Gavi-supported countries, this alone could save up to US\$13 million a year.

But it is not just about saving money, it is about reaching more children and saving more lives. Global leaders appear to agree. Last January, they converged in Berlin at Gavi's pledging conference, hosted by the German Chancellor, Dr. Angela Merkel. There, leaders committed a record-breaking US\$7.5 billion toward childhood immunization over the next five years, with €600 million from the German hosts. With this, Gavi now aims to improve coverage and equity to reach an additional 300 million children from 2016-2020 with life-saving vaccines, saving up to six million more lives and generating between US\$80 and US\$100 billion in economic benefits. It is an astonishing ramp up, but with improved supply chains and increased country ownership, it can be achieved and sustainably so, ensuring that hundreds of millions more children continue to receive vaccines for years to come. ▲



Written by
NGOZI OKONJO-IWEALA
Chair of the Gavi Board | Former
Finance Minister | Nigeria

ESSAY

PARTNERSHIP AND INNOVATION TO ADVANCE GLOBAL HEALTH AND ACCELERATE THE END OF AIDS

New models of collaboration can unleash the innovation needed to improve the prevention and treatment of HIV/AIDS while enhancing preparation for future epidemics.

It has been just over a year since unprecedented statistics and tragic images of profound individual and societal suffering inflicted by the 2014 Ebola outbreak in West Africa spread fear across the world, turned the global community to crisis mode, and topped the agenda of world leaders. We must now consider lessons learned while acting in positive, proactive and decisive ways to build on those response components that worked, and remediate those that did not. The Ebola response reminded us of the importance of proactive public health preparedness and how complicated responding effectively to global health challenges can be in an interconnected world. It also highlighted how important effective multi-sector collaborative efforts are in accelerating the development of global health innovations. Experience gleaned from efforts to treat and prevent one infectious disease can expedite innovations targeting other emerging infections while strengthening healthcare more broadly.

Since 1981, HIV has infected 80 million people worldwide and killed almost half of them. Despite remarkable advances in antiretroviral treatment (ART), 1.2 million died of AIDS-related causes in 2014, and 2 million became newly infected with HIV, two thirds of them in Sub-Saharan Africa. Sadly, the horrible overall human and societal toll caused by the 2014 Ebola outbreak over the past year

is exceeded in Africa by the number of weekly new HIV infections and deaths due to AIDS.

The challenges of providing combination ART to all HIV-infected people is a formidable one that will require enormous financial resources and an enduring commitment to achieve and sustain—especially as ART initiation is recommended earlier in the course of infection. We have reason to be optimistic about innovative approaches to preventing HIV infection that are now being developed, including pre-exposure prophylaxis using ART, the development of long-lasting ART, and microbicides. However, if shown to be effective in practice in high-incidence populations, these approaches also face significant practical and economic implementation challenges at scale. The world will need an effective AIDS vaccine as an essential complement to all other treatment and prevention innovations if we are to end the AIDS pandemic.

HIV is by far the most challenging virus we have ever tried to prevent by vaccination. More than 30 years into the epidemic, we still lack breakthrough tools like vaccines to stop HIV from spreading and end AIDS' devastating impact on individuals, families, communities and countries. The recent UNAIDS and Lancet Commission report called for the world to urgently expand access to HIV/AIDS treatment and to “get serious” about prevention,

including supporting development of an HIV vaccine. Modeling work by the International AIDS Vaccine Initiative (IAVI) and partners suggests that an effective AIDS vaccine could avert millions of new HIV infections per year. But a vaccine will require the best science, innovation, perseverance and cross-sector collaborative models.

PRODUCT DEVELOPMENT PARTNERSHIPS ACCELERATE DISCOVERY AND DEVELOPMENT

There is now significant positive momentum in HIV vaccine research, and important scientific advances are being made to inform the design and development of novel approaches. Promising new vaccine candidates are progressing toward clinical evaluation, and some may enter late-stage clinical efficacy trials within the next few years. AIDS vaccine research is also providing new information on therapeutic interventions that use the immune system to modify the course of AIDS and transmission of HIV. Such discoveries will inform novel treatment approaches that combine immunotherapy with ARV treatment in ways that may improve HIV infection host control, and contribute to explorations of modalities to pursue HIV cures.

The response to Ebola, HIV/AIDS and other infectious diseases has helped inform the new global agenda for sustainable development. These ambitious efforts, including ending major epidemics like HIV/AIDS, are solidly aimed at achieving greater equity in health. The Sustainable Development Goals (SDGs) offer a unique opportunity to embark on new models for collaboration that will enable innovation in vaccines, medicines and diagnostics, and prerequisites for real health equity. To spur such innovation requires significantly increased investment in global health research and development (R&D), and commitment to new collaborative, mutually beneficial partnerships among governments, academia and the private sector. Strengthening R&D capacity in low-income countries most impacted by AIDS and other known and emerging infectious disease threats must be an integral part of global health investment. Increased leadership and participation by scientists and communities in countries where the disease burden is high remains critical to this effort.

Unprecedented international, multi-sector public-private collaboration expedited our response to the worst Ebola outbreak in history. The rapid, recent Ebola vaccine advancement to late-stage clinical trials would not have been possible without the close relationship between government and academic public sector partners, international organizations, NGOs and industry. New tools like vaccines can be accelerated by better institutionalizing these collaborations and making them quicker and more effective through mechanisms such as Product Development Partnerships (PDPs) such as IAVI. This vision gave rise to IAVI, the first PDP, almost twenty years ago. IAVI

continues to work in close collaboration with partners in academia, industry, government, philanthropies and other NGOs to facilitate R&D efforts among diverse partners and play unique roles in forming multi-sector collaborations. PDPs can gather international, cross-sector consortia to address fundamental scientific issues impeding progress in a disease area, or even across several disease areas while advancing new technologies and enhancing knowledge and technology transfer. PDPs have the potential to play an important role in expediting the translation of promising scientific advances into innovative products that can unleash the innovation needed to rid the world of HIV/AIDS. While PDPs have made significant contributions to advancing innovations that address important global health challenges, the PDP model continues to evolve to improve effectiveness and impact in accelerating progress in R&D, strengthening research and response capacity in at-risk countries, and maximizing global health impacts while pioneering new and more effective strategic collaborative models among committed public and private partners.

AIDS vaccine R&D engages communities involved in health promotion by enhancing access to health services in general, strengthening health systems more broadly, and enabling governments to better address other domestic health research priorities like non-communicable diseases such as diabetes, cardiovascular diseases and cancer. AIDS vaccine research facilitates new technologies and vaccine approaches that directly benefit broader vaccine efforts targeting a wide spectrum of infectious diseases including tuberculosis, malaria, and yes, Ebola.

To achieve the United Nations' agreed upon highly ambitious SDGs, the global community must now demonstrate equally ambitious leadership in supporting an innovation agenda. This agenda must encourage and enable partnerships that catalyze and accelerate the R&D of new tools to better prepare the world for current and emerging global health challenges. These new collaborations can, if agreed upon, be adopted and implemented by the global community, significantly advancing global health equity. ▲



Written by
DR. MARK FEINBERG
International AIDS Vaccine Initiative |
President and CEO | USA

ESSAY

STEM CELLS IN DISEASE MODELING AND REGENERATIVE MEDICINE—PERSPECTIVES, CHALLENGES AND REALITIES

When human pluripotent and other stem cells became available in the late 1990s, there was hope that novel therapies might arise quickly. The last two decades have yielded novel concepts, and stem cells are now moving into application.

DISEASE MODELING WITH STEM CELLS AND DRUG TESTING

Two major discoveries opened the door to establishing human cell cultures for uncovering disease mechanisms: the identification of human embryonic stem cells (hESCs) and the Nobel prizewinning discovery of induced pluripotent stem cells (iPS cells). The latter allows somatic cells to simply be taken from patients and “rewound,” producing pluripotent cells that can be pushed toward diverse fates. Pluripotent hESCs and iPS cells, alongside other somatic stem cells and their derivatives, can be used to test drugs and identify potentially toxic side effects.

Reliable animal models are lacking for a number of devastating human diseases, including cystic fibrosis, fragile X and Long QT syndrome, and neurological diseases such as Parkinson’s (PD) or Huntington’s. This heightens the importance of studies on human cells obtained through genetic modifications of human pluripotent stem cells and, more recently, deriving iPS cells from patients. Stem cells harboring disease-causing mutations can be differentiated in vitro, producing cell types that are directly involved in the disease. Identifying and modeling the mechanisms that contribute to disease are crucial first steps toward new forms of treatment and prevention. New genetic engineering technologies based on the CRISPR/Cas9 system and

TALEN nucleases are precise, powerful tools to introduce or repair genetic mutations in stem cells. They can be used to produce two cell lines whose genomes differ by only a single, disease-causing gene. This huge step eliminates genetic background effects in studies of cell lines derived from different people whose genomes differ in many other ways.

Modeling a disease in cell cultures permits studying how drugs affect cells with a disease phenotype, as well as identifying other targets that do not exhibit mutations but might be modulated to improve health. Such cells will help avoid past problems: After approval, some drugs turned out to have toxic side effects on organs that were not the intended targets. Deriving specialized human cells from stem cells offers a method of testing drugs before their release that is safer and more cost-efficient, as well as reducing the amount of animal testing.

THE PATH TO CLINICAL STEM CELL APPLICATIONS

In regenerative medicine, stem cells offer the potential to replace a patient’s degenerated cells or tissues, using his own cells that have been manipulated and grown in the lab. This strategy demands that new cells or tissues integrate themselves correctly in the body. It is also essential that methods of preparation are developed that

do not harm the recipient. Importantly, stem cell-based products have to be well-defined; control of their genetic integrity is crucial, and contamination with other cell types that may, for instance, lead to tumor formation or arrhythmias in the heart, have to be excluded. HSCs have been used for almost half a century to treat leukemias and lymphomas, and now successful treatments based on stem cells are reality for the replacement of skin grafts to treat high-degree burns, and limbal stem cells are used to repair corneal damage. Clinical trials with pluripotent stem cells have been initiated (or soon will be) for major diseases including PD, where dopaminergic neurons must be replenished; to replace disrupted nerves in spinal cord injuries, which may be successful if performed quickly; to generate pancreatic cells in diabetes, cardiomyocytes after heart attacks, and retinal pigment epithelial (RPE) cells to treat macular degeneration.

Stem cell transplantations have produced some unexpected side effects: In many cases, transplanted cells do not integrate into an organ to participate directly in its regeneration. Even so, there may be benefits, since the transplanted stem cells may support self-regeneration through cells already present in the body—a so-called bystander effect. This has been observed in mesenchymal stem/stroma cell (MSCs) treatments after cardiac infarctions and in bone and cartilage regeneration. Compared to other sources of stem cells, MSCs are currently the subject of most clinical trials worldwide. Intensive efforts are underway to identify the factors that cells secrete to trigger the bystander effect and exploit them in other types of therapies. As well as unleashing the self-healing powers of specific organs, MSCs (and possibly other stem cell-derived cell types) may modulate the immune system after degenerative events. This may powerfully influence inflammatory reactions in the aftermath of tissue damage, and thus allow organ regeneration.

MAJOR CHALLENGES FOR APPLIED STEM CELL TREATMENTS

Applications of stem cells in regenerative therapies, disease modeling and drug development raise a number of questions that need to be discussed:

- » When can patients expect to see the first treatments for more diseases, and can developments be accelerated without compromising patient safety?
- » Will healthcare systems be ready to reimburse the cost of treatments?
- » How can the expertise of diverse players, including clinicians, scientists, and the private sector with biotech, larger pharma companies and suppliers, be best combined to promote innovation?

Basic stem cell researchers have to bridge a gap to translate their findings; regulations governing clinical and basic research are very different. Many European countries lack the “clinician scientists” who have experience in both research environments and could help bridge the gap. Patients with serious diseases are naturally anxious to see

cures arrive before it is too late, prompting untrustworthy clinics to promote “miracle cures” based on unproven therapies. An important task is to provide education and carry on realistic discussions with patients concerning the opportunities and difficulties still faced by treatments based on stem cells.

Stem cell research is costly, and innovation requires business strategies from the private sector. Novel technologies have to be made available to the whole research community, a process in which suppliers play pivotal roles. Moreover, to be accessible to researchers worldwide, stem cells need to be stored in specialized biobanks in a standardized manner, a major investment that cannot be carried by public funding alone. Regulatory requirements are established for stem cell-based products for transplantations, so-called advanced therapy medicinal products (ATMPs), to ensure patients’ safety while speeding up clinical applications. Finally, national healthcare systems need to evaluate the matter of reimbursement for future treatments. It may be difficult to cover such treatments for all patients, since production of ATMPs is expensive.

DRIVING TRANSLATION FORWARD

Public-private partnerships worldwide are instrumental in deriving commercial applications from stem cell-based approaches. The Innovative Medicines Initiative (IMI) is Europe’s largest public-private initiative aiming to speed up the development of better, safer medicines. IMI is a joint undertaking of the European Union and the pharmaceutical industry association EFPIA. Two projects in IMI directly involve stem cell research: StemBANCC will generate and characterize stem cells to carry out biological assays for novel drugs; the European Bank for induced pluripotent Stem Cells (EBiSC) aims to establish an iPS cell bank that will be the “go-to” resource for the characterization, storage and distribution of iPS cells.

Interaction and communication between scientists, clinicians and other stakeholders require reliable networks. The German Stem Cell Network (GSCN) and other networks embedded in international structures are playing a key role here. The GSCN aims to create new synergies within all areas relevant to stem cell research in Germany, and on a global level with international partners. It provides an interface between science, education, politics and society as a whole. ▲



Written by
DR. DANIEL BESSER
German Stem Cell Network (GSCN) |
Managing Director | Germany

Health in the Post-2015 Development Agenda

The last two decades have seen tremendous strides in global health, with life expectancy climbing all over the world. Yet challenges remain, including realizing the full potential of women and combatting climate change.

KEY NUMBER

169

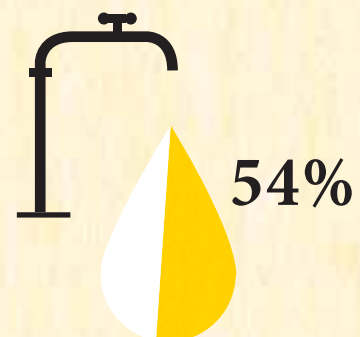
17 Sustainable Development Goals (SDGs) were set by the UN for the Post-2015 Development Agenda with 169 embedded targets.

UNDP, 2015

In the decade between **2000** and **2010**, an estimated **3.3 MILLION** deaths from malaria were averted and **22 MILLION** lives were saved in the fight against tuberculosis. Access to antiretroviral therapy for HIV-infected people has saved **6.6 MILLION** lives since **1995**.

United Nations, 2014

INFOGRAPHIC



Between 1990 and 2012, there was a 54% reduction in the proportion of people without access to improved drinking-water sources.

World Health Statistics 2015, WHO

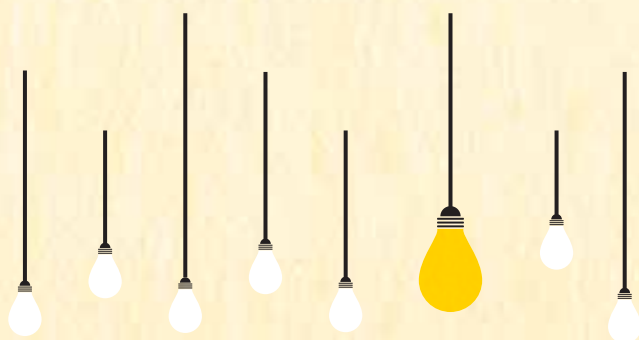
FACT



New HIV infections in 2013 were estimated at 2.1 million, which was 38% lower than in 2001.

United Nations, 2015

FACT



1.3 billion people worldwide have no access to electricity.

G20 Research Group, "G20: The Australia Summit: Brisbane", 2014

Between **2011** and **2015**, the USA spent **17.1%** of GDP on healthcare, Germany **11.3%** and the UK **9.1%**.

The World Bank, 2015

FACT



More than 1 billion people have been lifted out of extreme poverty since 1990.

United Nations, 2015

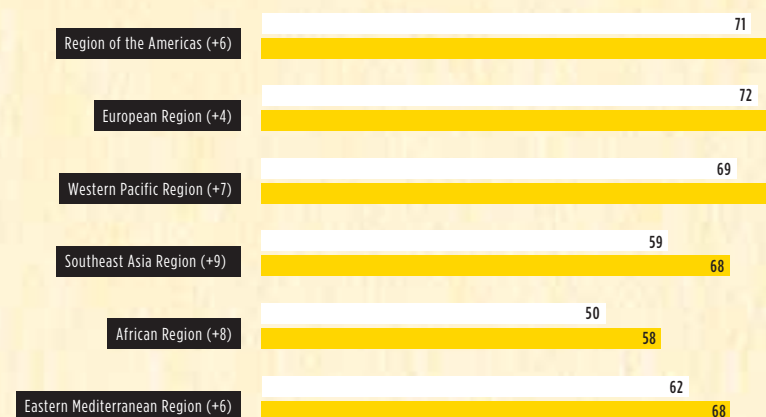
STATEMENT

"2015 IS NOT JUST ANY OTHER YEAR. 2015 REPRESENTS AN OPPORTUNITY FOR TRANSFORMATION. IT IS MEANT TO BE A YEAR OF GLOBAL ACTION, THE YEAR WE MAKE HISTORY, THE YEAR WE MOVE THE WORLD TOWARD A MORE SUSTAINABLE AND EQUI-TABLE FUTURE."

BAN KI-MOON
UN Secretary-General

INFOGRAPHIC

1990 2013



Average life expectancy at birth in WHO regions: 1990 & 2013 World Health Statistics 2015, WHO

FACT



In 2014 alone, several tens of thousands of academics authored at least 165,000 academic papers that refer to sustainable development, according to Google Scholar.

United Nations, 2015

FACT

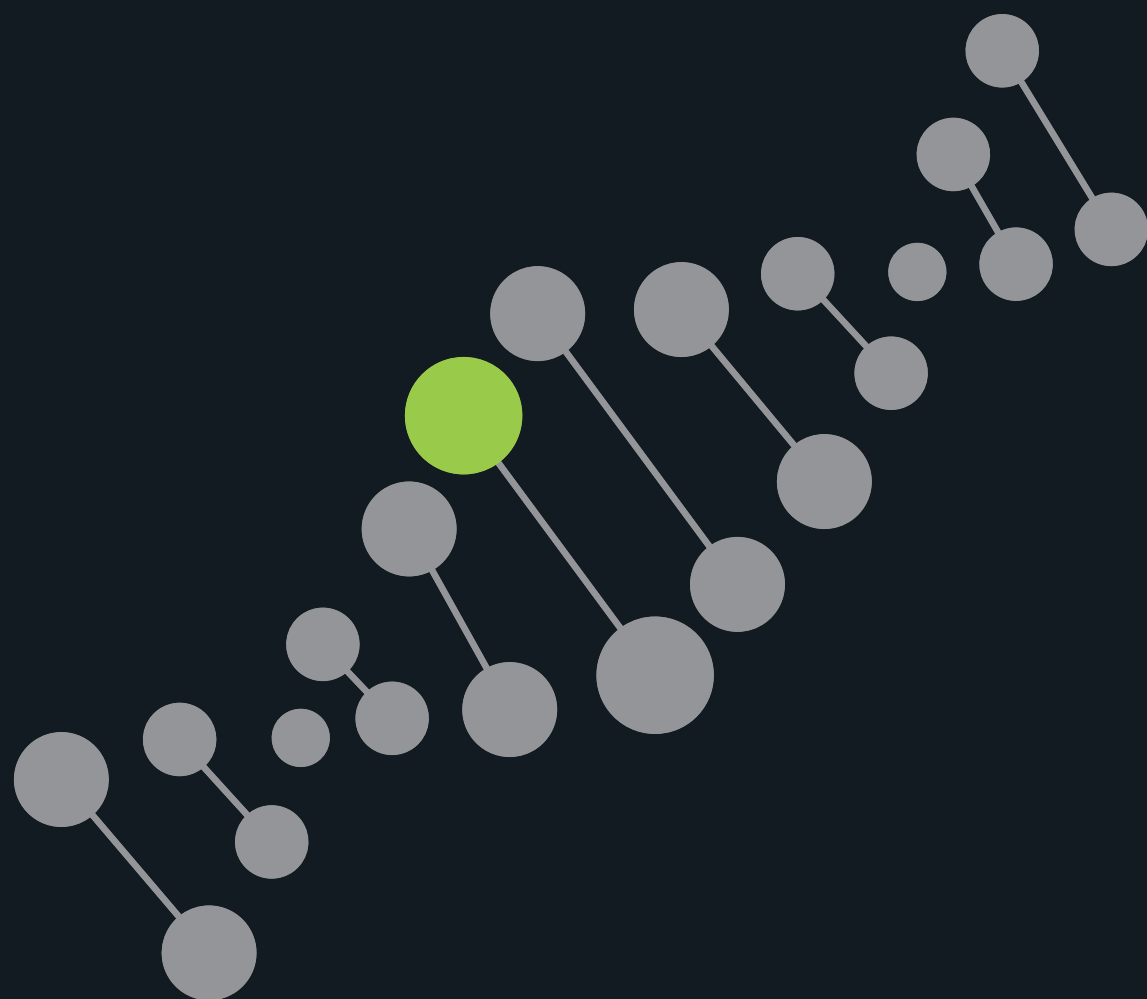


Approximately half of Sub-Saharan Africa and a third of East Asian populations live on less than US\$1.25 per day.

G7 Research Group, "G7 Germany: The Schloss Elmau Summit 2015"

In some countries, less than **5%** of total government expenditure is on health.

World Health Statistics 2015, WHO



**Often a little innovation
makes the difference**



www.deloitte.com/de/lifesciences-healthcare

Deloitte.

Is research part
of your DNA?
**If so, we look forward to
bonding with you?**



We're in search of bright sparks to light up new knowledge with us.

Why do governments, companies and institutions rely on the Helmholtz Association when they need to resolve matters concerning society, science and the economy? Because we crack the hardest nuts between basic research and application proximity. How do we do this? With (junior) scientists like you who are in search of flexibility and development opportunities and whose research spirit is longing to finally be able to use the craziest high-tech tools.

For everyone who was born to research: www.helmholtz.de/career

 **HELMHOLTZ**
| ASSOCIATION

ABOUT

M8Alliance

Academic Health Centers, Universities and National Academies

The M8 Alliance of Academic Health Centers, Universities and National Academies is a collaborative network of academic institutions known for its educational and research excellence. The network was founded in 2009 at the inaugural World Health Summit, and has provided an outstanding academic foundation to every WHS event since.

The M8 Alliance currently has 23 members based in 16 different countries, all of whom are committed to improving global health and working with political and economic decision-makers to develop science-based solutions to health challenges worldwide.

The M8 Alliance promotes the bench to bedside to population health translation of research, as well as the transformation of current medical care approaches to treating the ill by creating healthcare systems aimed at the effective prevention of disease. The organization also works to adapt

health-related solutions to rapidly changing living conditions through research in priority areas, especially shifting demographics, urbanization, and climate change.

MEMBERS

- » Charité - Universitätsmedizin Berlin, Germany
- » Coimbra Health, Portugal
- » Imperial College London, United Kingdom
- » London School of Hygiene & Tropical Medicine, United Kingdom
- » Johns Hopkins Bloomberg School of Public Health, USA
- » Kyoto University Graduate School of Medicine, Japan
- » Makerere University, Uganda
- » Monash University, Australia
- » National University of Singapore
- » National Taiwan University, Taiwan
- » Sapienza University of Rome, Italy
- » Sorbonne Paris Cité, France
- » University of Geneva, Switzerland
- » Geneva University Hospitals, Switzerland
- » Graduate Institute Geneva, Switzerland
- » University of Montreal, Canada
- » Institut de Recherches Cliniques de Montréal, Canada
- » University of São Paulo, Brazil
- » InterAcademy Medical Panel (IAMP)
- » World Federation of Academic Institutions for Global Health (WFAIGH)
- » Association of Academic Health Centers International (AAHCI)
- » Chinese Academy of Medical Sciences & Peking Union Medical College, China
- » Russian Academy of Medical Sciences, Russian Federation

www.worldhealthsummit.org/m8-alliance/members



Congratulations to a remarkable Event.
(Sixt – proud partner of the WHS 2015, Berlin)

ABOUT



WORLD
HEALTH
SUMMIT

The World Health Summit (WHS) is one of the world's most prominent forums for issues involving healthcare. The interdisciplinary, international event takes place in an atmosphere of academic freedom.

Every October, internationally renowned leaders and representatives from the sciences, politics, business, and civil society travel to Berlin for the WHS to discuss the latest challenges facing medical research and healthcare. Under the high patronage of German Chancellor Angela Merkel, French President François Hollande and European Commission President Jean-Claude Juncker, the summit is the premiere international platform for exploring strategic developments and decisions in the area of healthcare.

The World Health Summit's academic think tank is provided by the M8 Alliance, a unique collaborative network made up of leading international medical universities, research institutions, and the Interacademy Medical Panel (IAMP)—representing National Academies from 67 countries. The World Health Summit also organizes the Regional Meeting that takes place each April in the country of the acting president.

www.worldhealthsummit.org

SAVE THE DATE

WORLD HEALTH
SUMMIT
GENEVA MEETING

GENEVA,
April 19–21, 2016

SAVE THE DATE

WORLD HEALTH
SUMMIT 2016

BERLIN,
October 09–11, 2016

IMPRINT

PUBLISHER WHS Foundation GmbH,
c/o Charité – Universitätsmedizin Berlin,
Charitéplatz 1, 10117 Berlin, Germany
EDITOR-IN-CHIEF Tobias Gerber,
Tel: +49 (0) 30 450 572 114,
communications@worldhealthsummit.org

EDITORIAL BOARD Prof. Detlev Ganten,
Dr. Jörg Heldmann, Julian Kickbusch, Daniela Levy
PUBLISHING HOUSE G+J Corporate Editors GmbH,
Stubbenhuk 10, 20459 Hamburg, Germany

MANAGING DIRECTORS Soheil Dastyari,
Sandra Harzer-Kux

PUBLISHING DIRECTOR BERLIN Joerg Strauss

MANAGING EDITOR Eva Kanthack (V.i.S.d.P.,
responsible for the editorial content),
G+J Corporate Editors GmbH,
Friedrichstraße 82, 10117 Berlin, Germany,
Tel: +49 (0) 30 2757 2409 6822.

Responsibility for the content of scientific
presentations and essays is solely that of the
individual authors.

EDITORS Andrew Curry, Christine G. Coester

PROJECT ASSISTANT Pia Büchsenmann

ART DIRECTOR Diana Müller

PHOTOGRAPHY Steffen Kugler (p. 5, 12–13, 35, 39,
46–52, 58–59, 81, 85) | Holger Talinski (p. 4, 25–26,
29–30, 44, 46–47) | Florian Büttner (p. 69, 70) |
World Health Summit (p. 3, 17, 19, 21, 37, 39, 40, 61,
63, 65, 69–71, 87, 89, 91) | German Chancellor Office,
French Presidential Office, European
Commission (p. 6, 7) | European Union (p. 15) |
Getty Images (p. 5, 72) | Kyoto University (p.73) |
Bundesregierung/Steffen Kugler (p. 83)

ILLUSTRATIONS Anja Stiehler/Jutta Fricke
Illustrators

INFOGRAPHICS Diana Müller | flaticon
(p. 22–23, 42–43, 66–67, 92–93)

FACT CHECKING Dr. Egbert Scheunemann

PROOFREADING Steen Gilbertson

TYPESETTING S&T Digitale Medien GmbH,
Berlin, Germany

PRINTING LASERLINE Digitales
Druckzentrum Bucec & Co. Berlin KG

RIGHTS Reprints in part or as a whole are only
permitted with explicit approval of WHS
Foundation GmbH. The editors are not responsible
for unsolicited manuscripts and pictures.

EDITORIAL DEADLINE November 17, 2015



INNOVATION FOR LIFE

HOPE IS WHAT ENERGIZES OUR RESEARCHERS TO PUSH THE FRONTIERS OF MEDICAL INNOVATION EVERY DAY.

To fight against dengue fever, hypercholesterolemia, diabetes and atopic dermatitis, our researchers help turn discoveries into solutions – even faster. With major treatment launches planned by 2018, Sanofi shares the hopes of millions of patients and public health partners.

www.sanofi.com

