Global Perspectives
Initiative

Health Innovation in Africa: The Way Forward

Breakfast Discussion hosted by Global Perspectives Initiative & Lindauer Nobelpreiträgertage

- CONSEQUENCES -

„The breakfast discussion was illuminating, a small seed that needs constant fostering and irrigation to grow. It is a daunting task, but we cannot afford giving up."

Aaron Ciechanover (Nobel Laureate 2004, Technion Integrated Cancer Center (TICC), Israel)

Central Arguments

Capacity building

- **Capacity building** in research structures
- Necessity for focussed action – e.g. leading to significant reduction of poverty related diseases
- More efficient to **create units and strategies for sustainable research structures** focussing on health in general, rather than particular diseases. Currently health is insufficiently analysed in a holistic way.
- New challenges lead to:
    - Secondary effects becoming chronical diseases – e.g. vascular diseases caused by HIV
    - Western style civilisation related diseases being on the rise – changing lifestyle
    - Cancer risk being on the rise

Solutions on site are key

- One-time vaccination donation from EU partners is insufficient
- African plans with African solutions need to be developed in a holistic approach
- Education, economic development, family planning, population development, social contracts and sustainable health eco-systems as conditions for improved health
- Technical use needs to be fostered:
    - Low tech – effective use of the existing structures
    - High tech – potential is given (drones etc.)

Pharma: Pricing and research focus are key

- Responsibility to create public-private funding for research
- Dual price system
- No institutional place for profit related research – market failure
- Solution approaches: Scaling / public funding / social responsibility (of public and private enterprises)
- Example: Otsuka is focussing on research and reasonable pricing of one specific poverty related disease without making profit beside their main business

Framing

- Strong health governance is needed
- Financial resources are still low – substantial increase is necessary
- Multilateral coordination needed – who are the players? (AU, WHO, UN, EU?)
- Dignity – Dialogue on eye-level is key. Other solutions will fail

- Using the international attention of epidemics facilitated by the media (e.g. strong media coverage on Ebola in Europe) to receive more funding for necessary research – using the potential of international help

Peter Agre (Nobel Laureate 2003)

- Research on poverty related diseases is making good progress
- Private institutions can make a difference
- Supporting local champions in academia, research and governance is key

Aaron Ciechanover (Nobel Laureate 2004)

- The only sustainable solution can be found with a holistic approach
- Eradicating one disease will not solve the issue of the absence of health eco-systems and the lack of capacity

STRUCTURE

PREFACE

The 68th Lindau Nobel Laureate Meetings of Medicine focused on Global Health and the medicine of tomorrow. On this occasion, the Global Perspectives Initiative invited to a breakfast discussion dedicated to the topic "Health Innovation in Africa".
The Global North has responsibilities and, in addition to monetary expenditures, must strive for a global structure that allows for access to health, independent of a person's origin. Necessary steps include: 1. Increased responsibility of the EU and Germany, 2. A larger amount of resources for research on poverty-related diseases, 3. Improved infrastructure for better access to local health facilities. These are some of the challenges we have discussed with young scientists Dr. Brenda Kwambana and Edith Phalane and Nobel Laureates Prof. Dr. Peter Agre and Prof. Dr. Aaron Ciechanover. It was concluded that research alone is insufficient. The experts also highly encouraged increased political commitment of the researchers themselves. In total, 39 Nobel laureates in Lindau discussed with 600 young scientists from 84 countries.

Demands

I. Germany's and Europe's responsibility for Global Health

Germany and the European Union have the financial and technological capabilities to diminish the dramatic divergence in health between the Global North and the Global South. The Global North has never been more capable and prepared to achieve Global Health for all, but ultimately has to actively take responsibility for it. Global Health is a term used to describe efforts to eradicate and control diseases on a global scale. It cross-links social, political, environmental, and commercial aspects of individual countries and the Global Health architecture. Life expectancy for those born in sub-Saharan Africa *today* is 20 years lower than that of Europeans. Poverty-related and neglected diseases account for more than half of all deaths in the world's poorest countries. This underlines the need to adapt a global perspective in research and development, and health care to foster partnerships, create synergies and avoid harmful competition. Germany and the European Union need to align their health-related objectives and interests with those of low- and middle-income countries. Not least because strong health care systems everywhere on earth are a fundamental premise of a system preparing against possible global epidemics.

Edith Phalane: Although Germany joined the Global Health debate later compared to other G7 countries, Germany has become an evident player in Global Health over the last 10 years. This is demonstrated by its expansion in the political and financial engagements in Global Health. The recent meeting of the G20 ministers of health held in Berlin further shows the country's dedication to Global Health. I believe **Germany and the EU have more to offer in terms of moving Global Health forward**. Germany's and the EU's responsibility for Global Health is starting to become evident, in particular with regards to the Global South, specifically Africa. The UNAIDS' and Germany's healthcare partnership on the importance of strengthening innovation and health systems in Africa is one example. The country's commitment to Global Health also became visible during the Ebola outbreak when Germany demonstrated strong governmental leadership and proven health security engagement. My research focuses on the long-term cardiovascular health of HIV-infected population. In this field I believe there is more that still needs to be done in terms of addressing new HIV infections and management thereof as well as the increasing rates of cardiovascular diseases (CVD). **HIV continues to be a global pandemic**. It is a burden not only in the Global South but also in the Global North, with its innovative and cutting-edge technologies and better health care systems. This indicates **vulnerability and gaps that needs to be addressed in Global Health policies**. CVD are one of the leading causes of mortality and morbidity globally, and this continues to place a challenge on health systems and policies. Germany and the EU can assume more responsibility by addressing causes and management of CVD globally by integrating a global approach."

Dr. Brenda Kwambana: I think Germany and the EU in general are now at the convergence of not just a socio-political but also a Global Health crisis. With nearly 200,000 migrants entering Europe via the Mediterranean alone in 2017, there will be a need to refocus attention on infectious diseases such as tuberculosis. Malaria still kills 445,000 people every year around the world. In 2008 there were 156 million cases of pneumonia and 1.6 million deaths mostly among children under five years of age in the Global South. The burden of non-communicable disease continues to increase in high income and low-middle income countries. Despite major advances in Global Health through vaccines and antimicrobial therapy, **there is great scope for Europe to play a central role in addressing Global Health challenges through strategic strengthening of partnerships with LMIC governments and research institutions**. The European & Developing Countries Clinical Trials Partnership (EDCTP) which funds clinical research to accelerate the development of new or improved drugs, vaccines, microbicides and diagnostics against HIV/AIDS, tuberculosis and malaria as well as other poverty-related infectious diseases in sub-Saharan Africa is an excellent model that should be extended.

Dr. Sambuddha Ghosh, MD: The first health ministers' meeting during Germany's G20 presidency in 2017, attracted a lot of investments and Global Health activities by many different stakeholders – which are still continuing. Germany could therefore play a strong political, conceptual, and financial role as Global Health leader. The new government must continue and further strengthen such Global Health commitments, which will see Germany make a significant contribution to the implementation of the Sustainable Development Goals. **Germany and the EU both play critical roles in Global Health**. This September is marked by the first high level meeting on tuberculosis (TB) during the United Nations General Assembly in New York. The broad engagement of member states such as Germany and generally the EU will encourage other countries to place a higher emphasis of TB on their agenda. UN member states will also be requested to step-up their commitments through increased funding as a percentage of GDP, committing to detection, treatment and elimination targets, and supporting a human-rights based approach to TB management. **The strong involvement of Germany and the EU at this high level meeting will be crucial to ensure its success**.

Prof. Dr. Peter Kremsner: Germany, driven by the German chancellor Angela Merkel, prioritised health during its German G7 and G20 presidency in 2015 and 2017. As a result, health assumed a prominent place on the political agenda. This momentum should be used by Germany within the international as well as the European community. Germany has strong research organisations such as the German Centers for Health Research (DZGs). Among those the German Center for Infection Research (DZIF) hosts thematic units for poverty-related and neglected tropical diseases and additional infrastructure units - the „African Partner Sites". Therefore, there is the capacity and chance – such as within the **German government's new strategy of cooperation with Africa "Marshall Plan with Africa"** - for strong health research partnerships between Germany and sub-Saharan Africa to strengthen Germany's long-standing commitment to health systems and to efficiently tackle poverty-related and neglected tropical diseases. As **Germany has become a visible actor in Global Health within the European Union**, Germany should be more active and visible in European initiatives such as the European and Developing Countries Clinical Trials Partnership (EDCTP).

II. Increasing investment in research on poverty-related and neglected diseases

The divergence between medical care in high-income and medical care in low- and middle-income countries must be counteracted by devoting an adequate proportion of investment toward the research and development of new drugs, diagnostics, and vaccines curing or controlling PRNDs. PRNDs comprise a diverse group of communicable diseases that disproportionally affect the Global South. The most prevalent diseases include malaria, HIV/AIDS, and tuberculosis. Insufficient access to adequate food, clean drinking water, education, and medical care promote the proliferation of infections that are cured or controlled in the Global North. So, the development of needed drugs is only part of the solution. However, the market failure created by the pharmaceutical industry that heavily relies on patents and market monopolies (or blockbuster drugs) must be addressed - in particular the lack of research and development in areas of real need.

Dr. Brenda Kwambana: I investigated the links between the microbiome, vaccination and carriage of the deadly pathogen Streptococcus pneumoniae (commonly called the pneumococcus) in the nasopharynx of babies in the Gambia. I started this work ten years ago as a doctoral student when there was very little interest in the microbiome let alone the upper airway microbiome. Back then, I had access to very crude molecular tools that had low sensitivity and were quite laborious to probe the microbiome. A year into my PhD I met an American collaborator from a large genomics center who offered to perform highly sensitive next-generation sequencing to better understand the microbiome. As you can imagine, I gladly agreed to this collaboration because there was no other way I could have accessed these high-tech tools.

Unfortunately, it took five years to get the sequencing data back and analyze it. By the time I published the paper, there were already other publications on the nasopharyngeal microbiome (mostly from Europe) – I had lost that race in a way. However, my study was still the first to describe the structure and organization of the nasopharyngeal microbiome from birth through the first year of life. I also showed that the pneumococcal vaccine did not significantly alter the nasopharyngeal microbiome among infants, as had been feared.

The MRC Unit The Gambia at LSHTM has established a Genomics Center equipped with next-generation sequencing platforms and a high performance-computing center. This means that I now have even greater control and ownership of my research. For instance, I now only need a few days to go from a sample in the field to raw sequencing data.

Dr. Michael Makanga: The EDCTP is a public–public partnership between institutions mandated by national governments in Europe and sub-Saharan Africa, and supported by the EU. It was created as a European response to the Global Health crisis related to poverty-related infectious diseases. This research funding partnership aims to accelerate the clinical development of new or improved medicinal products while also strengthening African clinical research capacity. **Poverty-related infectious diseases have an enormous negative impact on health, society and the economy**. They particularly affect the world's poorest and most marginalised communities. More than 1 billion people, including 400 million children, are suffering from the three major poverty-related diseases — HIV/AIDS, malaria and tuberculosis — and the neglected infectious diseases combined. Malaria and tuberculosis alone lead to the death of an estimated 2.1 million people annually. Poverty-related diseases increase infirmity and insecurity, undermine productivity, and thus perpetuate the cycle of poverty. Sub-Saharan Africa is disproportionately affected; approximately 90 % of all malaria-related deaths occur in this region which also accounts for 68 % of all people living with HIV and 72 % of AIDS-related deaths.

Dr. Sambuddha Ghosh, MD: As a leader and largest private sector funder of TB research and development, Otsuka has learned over the last 40 years of our TB development programme that we cannot do it alone. **Innovative public-private partnerships and novel funding mechanisms are required** if we are to continue

investing in neglected diseases that primarily affect low and middle-income countries and where there is limited sales potential in high-income markets to offset drug development costs. As a result, Otsuka supports a variety of incentives such as priority review vouchers, accelerated approval mechanisms, international regulatory harmonization programmes, national and international funding and cost-offsetting programmes, international bulk-procurement and purchasing mechanisms, regulatory fee waivers for orphan and neglected diseases, R&D prizes for neglected diseases, and multi-sectoral collaborations, among others. Unfortunately, many of these incentives remain theoretical or have been implemented in only a handful of countries. We strongly believe that these types of incentives, and others, are urgently required in order to ensure continued research, development and commercialization in priority neglected diseases such as tuberculosis.

Prof. Dr. Peter Kremsner: The strong and longstanding health research partnership between the Institut für Tropenmedizin der Universität Tübingen and the Centre de Recherches Medicales de Lambaréné (CERMEL) in Lambaréné, Gabon is a good example for an already existing strong health research partnership between Germany and Sub-Saharan Africa, an important element of creating research capacities within Africa. **Institutionalised funding by Germany would strengthen those who developed strong capacities that meet international standards in health research in the Global South** and support building lasting health research and education infrastructure.

III. Improvement of infrastructure in the Global South

For every state, building a policy implementation capacity is the condition for the instalment of an effective health care system. The transformation of knowledge into practice is a (if not *the*) core challenge in low- and middle-income countries. A variety of factors are responsible for the gap between the policy goal - healthcare for all, and the actual achievement - healthcare for few. Such factors include the availability of sufficient resources (to construct and run well-managed clinics), intergovernmental relations (to ensure the pursuit of a common goal), bureaucracy, and cooperation with international actors (to establish joint decision-making processes). In addition to the priority of ensuring access to basic medical care in all regions of countries of all incomes, scientific research has to be promoted in all parts of the world. Only by establishing local research institutions the rapid implementation of clinical and scientific findings in medical treatments is possible. Local research institutions will facilitate global surveillance structures that must be part of a global protection system in times of mass international transit.

Dr. Brenda Kwambana: Many African-based scientists are facing the same challenges I did a few years ago. They usually have access to excellent cohorts and patients coupled with an efficient production of field data and samples. However, beyond that, there is a high dependence on external collaborators typically in Europe and the USA for more sophisticated analyses. This invariably puts them at risk of having very slow turnaround times to publication, low prioritization of their work and loss of ownership of their research. **African-based researchers can easily become "sample collectors" as opposed to credible researchers.**

The lack of access to advanced technologies (capacity) and training in the tools to interact with "big data" (capability) are probably the most critical bottlenecks hindering African-based researchers from taking a lead role in addressing the continent's most pertinent public health challenges. To establish a stronger role for Africa-based researchers on the international stage, **there needs to be a concerted effort to equip African research institutions with well-managed world class research facilities** that can allow them to be at par with their counterparts abroad. Secondly, we need to ensure that the African researchers can access high-level training and collaborate as equals and not subordinates.

Organizations such as The Africa Research Excellence Fund (AREF), which invest in talented, emerging researchers in Africa, are helping to change the landscape of African-based science. AREF nurtures sub-Sahara African health research at its most vulnerable points by ensuring early-career researchers have the capabilities needed to advance their careers. We desperately need more of such efforts to effectively strengthen research in Africa and ensure that its scientist can compete for competitive funding globally.

Prof. Dr. Jürgen Kluge: I believe the starting positions are so different on the globe that we certainly need "horses for courses" and differentiated answers. **In very poor countries the solution could be public-private partnerships.**

Dr. Michael Makanga: The population in LMICs, especially in Africa is progressively increasing over time, particularly the young population (0-30 years). These countries bear the highest burden of disease, mainly infectious diseases but the investment in research and research capacity development by low-income countries is meagre. Furthermore, for diseases predominantly affecting resource-limited settings, there is little incentive for the industry to invest in innovations. **Alternative funding mechanisms are required to address this market failure.** The future of health in sub-Saharan Africa, better health and wellbeing will depend on the development of strengthened people-centred health systems delivering care to all those in need, in ways adapted to the specific circumstances of individual nations. Efficacy trials focus on the intervention, but to have public health impact there is also a need to get close to the patient – paying attention to key contextual issues, such as patient co-infections, co-morbidities and personal

circumstances; health service delivery mechanisms, including prevailing barriers to health service access; and socio-economic and political contexts.

These issues are set within the wider global context of the strive for **universal health coverage**, as countries increasingly consider how health systems can provide populations with comprehensive, integrated and sustainable access to healthcare. Patient-centred approaches recognise the fact that many patients are affected by more than one condition, including infectious and non-infectious diseases. This multi-morbidity has multiple consequences – one condition may increase the risk of another or exacerbate symptoms, and treatments for different diseases may interfere with one another. These factors have important implications for both the design and the implementation of interventions.

A further key global trend is the need to prepare for and manage infectious disease outbreaks and epidemics. As outlined in the 2018 report of the World Bank's International Vaccines Task Force, clinical research capacity needs to be built in advance of outbreaks, so that research on treatments and preventive measures can be rapidly initiated when outbreaks occur, and essential evidence on effective control strategies can be generated as swiftly as possible. To ensure this rapid response in times of emergency, countries need to commit to building their clinical research and regulatory capacities in advance, and promote regional cooperation and harmonisation, while Global Health initiatives need to support these efforts and establish mechanisms of effective global collaboration.

The following key points and strategies are important for developing strong research capacity in LMICs:

- Improved clinical research mentoring opportunities, both institutionally and individually
- Development of research networks that can offer learning and support opportunities
- Support for LMICs to define their own clinical research agendas
- Strengthened national and regional research networks – to be locally relevant and sustainable
- Increased health research funding from national governments as well as from international donors: in order to generate and sustain improvements in clinical research capacity, governments must commit the needed resources to finance the associated capital and recurrent costs
- Promote advocacy and research diplomacy to demonstrate the impact of clinical research
- Improved career pathways for clinical researchers in LMICs

➔ **BUILDING UP ECO-SYSTEMS OF RESILIENT HEALTH ENVIRONMENTS**
(education, economic development, resilience)

- Increasing investments
- Focus: poverty-related diseases
- Educate qualified medical personnel and researchers from Africa for Africa
- Solutions developed on site
- Coordination need: architecture of research structures
- Multilateral agreements can help

Please direct any comments or queries regarding the content of this paper to Daniel Greve:
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