HEALTH DIPLOMACY MEETS SCIENCE DIPLOMACY

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INTRODUCTION

The field of health diplomacy has grown to prominence very rapidly in the last few years. Recognizing the importance of the relationship between health diplomacy and the broader field of science diplomacy, the Global Health Programme (GHP) at the Graduate Institute of International and Development Studies organized its 6th High-Level Symposium on Global Health Diplomacy, in cooperation with the Swiss Academy of Medical Sciences, on the theme 'Health Diplomacy Meets Science Diplomacy' in Geneva on Tuesday, 12 November 2013, attended by over 100 participants.[1]

The Symposium was opened by Ilona Kickbusch, Director of the Global Health Programme at the Graduate Institute of International and Development Studies, who thanked the many actors who supported the work of the GHP and in particular the Swiss Foreign Office and Federal Office of Public Health; and the Swiss Academy of Medical Sciences, which had supported the Symposium financially and intellectually. Welcoming remarks were also contributed by Ambassador Alexandre Fasel. Permanent Representative of Switzerland to the UN Office and other international organizations in Geneva, and Professor Ann-Françoise Allaz, Member of the Executive Board of the Swiss Academy of Sciences and the Board of the Swiss Academy of Medical Sciences.

The Symposium's Moderator, Professor Michel Kazatchkine, UN Secretary General's Special Envoy for HIV/AIDS for Eastern Europe and Central Asia and Senior Fellow at the Global Health Programme, welcomed participants and drew their attention to the working definitions of 'science diplomacy' and 'health diplomacy' at the back of the Programme. The Rapporteur, Professor Stephen Matlin from the Institute of Global Health Innovation at the Imperial College London and Senior Fellow at the Global Health Programme, gave an introductory presentation to place the Symposium in context. The opening session concluded with questions directed to Ilona Kickbusch and Stephen Matlin by the Moderator and members of the audience.

HEALTH DIPLOMACY AND THE GLOBAL HEALTH PROGRAMME

The Global Health Programme has become one of the world's leading centres in the field of global health diplomacy (GHD)[3]. It serves as a case study and training centre, providing a unique approach to knowledge transfer involving leading academics and experienced practitioners; conducts executive courses for diplomats, health attachés and staff of international organisations, as well as offering Masters' training; and serves as a platform, a think tank and as the node of an expanding global network that includes over a thousand alumni of its GHD courses.

The GHD programme is conducting a series of linked activities to illuminate the evolving and dynamic relationships and exchanges within the health diplomacy-science diplomacy domain. Elements included a paper in preparation on 'science diplomacy meets health diplomacy'; a dialogue held during the 2013 World Health Summit in Berlin[2]; and the extended dialogue in this annual High-Level Symposium in Geneva. The series of linked activities is exploring how diplomacy can contribute to health sciences, but also how health sciences will allow the advance of a diplomatic agenda and how this can forge new relations across countries. One aim is to build partnerships with Academies of Science to take this agenda forward.

SCOPE OF SCIENCE DIPLOMACY AND HEALTH DIPLOMACY

Science diplomacy and health diplomacy can be viewed as fields that are distinct but overlapping in a number of ways. The two fields had several things in common, both being integral parts of foreign policy that aim to address global challenges; helping to build bi-, multi- and poly-centric relations between sectors; needing to balance national and global interests and provide an interface between values and principles and political and economic powers.

WORKING DEFINITIONS

Science Diplomacy is the use of science, its methods, and its philosophies in diplomacy as an avenue for establishing new connections and strengthening existing ones. Science is yet another field that can broaden horizons and diversify the international dialogue, handily lending itself to problem solving, logical discourse, and the ongoing pursuit of understanding that diplomacy currently espouses. According to the Royal Society, London and the American Association for the Advancement of Science, science diplomacy involves science in diplomacy, science for diplomacy, and diplomacy for science.[4] Each of these interactions host their own unique set of challenges and rewards, and in order to fully pursue science diplomacy, each one must be addressed in full:

- Diplomacy for science
  Diplomacy is a mechanism for advancing a scientific goal, particularly extensive and expensive research programmes that need to leverage the participation of multiple countries.
- Science in diplomacy
  Science is necessary for the conduct of diplomacy or to inform issues of diplomatic concern. This includes the capacity of diplomats and diplomacy institutions to understand scientific and technical knowledge as related to bilateral and multilateral issues such as cross-border public health and food safety.
- Science for diplomacy (or 'science diplomacy')
  Science is a mechanism for enhancing or building bridges between countries (i.e. diplomatic purposes). Science diplomacy is especially relevant in helping develop positive engagement between countries that have strained, limited, or non-existent relationships.

Global Health Diplomacy refers to the multi-level and multi-actor negotiation processes that shape and manage the global policy environment for health, in health and non-health fora. It relates in particular to health issues and determinants that cross national boundaries, are global in nature and require global agreements to address them. It brings together the disciplines of public health, international affairs, management, law and economics. If well conducted global health diplomacy results in better health security and population health outcomes for all countries involved; improved relations between states and a wider commitment of a wide range of actors to work together to improve health, and outcomes that are deemed fair and support the goals of reducing poverty and increasing equity.

The Geneva Symposium and earlier Berlin Seminar offered the opportunity to discuss issues related to GHD and explore the influences of GHD on other areas. It was emphasised in both meetings that science diplomacy is not just about 'international cooperation' but that it has a clear purpose to affect relationships; and concomitantly that health diplomacy goes beyond health cooperation, with the aim of increasing health, decreasing health inequities and improving relations between countries throughout the world.

'Science' includes not only the physical sciences such as physics, chemistry and biology, but also the political, social, behavioural and economic sciences, which many Academies of Science are now embracing. The political, social and economic sciences depend not just on 'knowledge' but also 'understanding', an approach that is critical to their application to global health – an area defined by complexity and uncertainty and increasing understanding of the need for integrated approaches. It is vital to understand how social processes allow for impact – reflected in, for example, the World Bank's attention to the 'science of delivery'.[5]

THE RAPID RISE OF HEALTH DIPLOMACY

While science diplomacy is now a mature field, health diplomacy is much younger and has risen to prominence only within the last decade, but the extent to which it has 'arrived' – not only as a theoretical subject but as a practical tool – was summed up by Director-General Dr Margaret Chan's assertion at the 132nd session of WHO Executive Board, January 2013, that "health diplomacy works". Two papersi, [6,7] by Ilona Kickbusch and colleagues in 2007 noted that the rising field of GHD required new perspectives, strategic approaches and skills in global health and that training across disciplines was essential. Revisiting the subject five years later, Kickbusch and Kökény [8] provided a number of reasons for the rapid ascent of global health diplomacy:

- Foreign affairs ministries were becoming more involved in health because of its relevance for soft power, security policy, trade agreements and environmental and development policy.
- Venues of health diplomacy were expanding: many new actors outside WHO have become (health) diplomats. Health is part of summit diplomacy in the UN, G8, G20, BRICS, EU, Organisation of Islamic Cooperation, etc.
- Globalization, new donor–recipient relationships, new types of health alliances and the rise of cooperation between low- and middle-income countries (LMICs) have heightened the need for health diplomacy.
- Competent health diplomats are needed more than ever. Fly-in, fly-out negotiations for health no longer suffice. The many health negotiations taking place in different venues involve interactions at many levels of governance and a new interface between domestic and foreign policy. Representatives of countries and other interested actors are continuously engaged in negotiations in hubs such as Geneva, New York, Brussels and Addis Ababa.

ELEMENTS OF HEALTH DIPLOMACY

The role of evidence

Since the role of evidence in decision-making was first expounded in the 18th century, circumstances have become much more complicated. New scientific knowledge was fundamental to the international discourses in the Sanitary Conferences of the 19th century to prevent the spread of epidemics. 'Evidence' itself is now much more complex and decision-makers are often faced with an overload of data of varying robustness from which they have to select what was most reliable. The key role of evidence for GHD needs to be discussed, including:

- To what extent can evidence inform the discussion of diplomats driven by a range of diplomatic concerns?
- Are the fundamental canons of science – the processes of experimental observation, formulation and testing of hypotheses and the key concept of falsifiability of scientific theories – relevant for diplomatic training?
- What roles can/should qualitative evidence play?
- How can scientists learn to better prepare, interpret and classify evidence to meet the needs and circumstances of diplomats?
- What are the issues that science is not able to address?
- When is evidence necessary but not sufficient and how does it happen that interests trump evidence?
- How do evidence and diplomacy feature within the workings of international agencies in their engagements with member states and how does this impact on the functioning of programmes?

Access to knowledge and technologies

GHD is contributing to delivery of better health and global public goods[9] (GPGs) for health. While knowledge is often discussed in the context of GPGs, in reality there is not currently free access to knowledge for all. Basic research results are published in journals requiring either access fees or authors' payments to compensate for 'open access', which limits opportunities for researchers in resource-poor settings. In the case of applied research with commercial potential, the protection of intellectual property through patenting opens a degree of access to the knowledge created but constrains its use for a number of years. Tensions between these constraints and the concept of health as a human right have been evident in recent years and health diplomacy has played – and is continuing to play – an important role in resolving matters, e.g. in relation to access to medicines[10] and the question of an R&D Convention[11]. It is important to note that new players, including from LMICs, are important new actors in this area and are challenging traditional sources of power.

NATIONAL EXPERIENCES OF SCIENCE DIPLOMACY AND HEALTH DIPLOMACY

There are numerous historic examples where science has helped keep doors open during periods of diplomatic tension, including between the Soviet Union and USA in the Cold War. More recently, the critical role of diplomacy in advancing global health has become clearer and has increasingly engaged Heads of State (e.g. in UN meetings[12]) and Ministers of Foreign Affairs (e.g. the Oslo Ministerial Declaration[13] by Ministers of Foreign Affairs of Brazil, France, Indonesia, Norway, Senegal, South Africa, and Thailand).

A point of confusion is that sometimes large companies become engaged in disputes with countries – e.g. over access to medicines, as discussed below – and are mistakenly seen as 'national' (e.g. Nestle, which has had disputes over encouraging infant feeding formulas as an alternative to breast feeding; and Roche, which has been involved in disputes over pricing of anti-retrovirals in LMICs, are seen as 'Swiss') while there do not, in fact, represent a government.

Switzerland

While small in size, Switzerland is very efficient in its science output and sits high in international innovation rankings. It is notable that about 70% of research in Switzerland is conducted by the private sector, with about half of this in the pharmaceutical and chemical industries.

Like a number of other countries, Switzerland had developed an official national policy on international research and education.[14] Switzerland is resource-poor but rich in traditions of knowledge, innovation and science diplomacy. The policy highlights a range of priorities, including European, multilateral and large infrastructure programmes, where diplomatic negotiations are required. While the EU is Switzerland's most important partner, there are also major ties with Canada, Japan, South Korea and the USA and stronger engagements are desired with BRICS countries and the rest of the world.

The role of the state was stressed in supporting good science and effective collaborations through public financing of basic science; and an open border policy that encouraged the circulation of talent between countries, and a willingness to be flexible and balance government intervention with bottom-up principles. Switzerland's bilateral research agreement with South Africa, which had led to a joint call for research projects and the operation of a single, joint review panel, was an example of the application of this approach.[15]

Another example, which was now being emulated by other countries, was the development of an international network of Swiss science attachés. Switzerland's first science attaché abroad had been appointed as long ago as 1958; there were now 25 science counsellors around the world and six offices of scientific cooperation and outreach.

Geneva itself is home to a multitude of important actors and the 'capital of health'. The city is headquarters for many international organizations and the region has one of the highest densities of life sciences anywhere. Geneva can also claim to be the 'capital of science',

e.g. co-hosting CERN with neighbouring France. CERN's recent success in the confirmation of the Higg's Boson demonstrated that Europe could play a leading role globally, in a spirit not of competition but of international collaboration in science. Diplomacy can help science through 'connecting and creating'.

For the Swiss Academy of Medical Sciences (SAMS), the concept of science diplomacy is considered new and interesting. SAMS sees science as an important area for diplomacy, which could improve global health and, it is hoped, access to health. SAMS has had a long-standing interest in the ethical dimension of medical science [16], a topic permeating the themes in the programme of the Symposium.

The Swiss Tropical and Public Health Institute [17] is a leading Swiss and European institution combining research, services, teaching and training in global health, with experience in science for diplomacy (e.g. health sector support as a bridge for peace in the Northern Caucasus), science in diplomacy (e.g. advising the Swiss government in areas such as the bilateral cooperation with South Africa) and diplomacy for science (e.g. facilitating exchanges between businesses and international partners, such as engagement between leading Vietnam politicians and Basel medical and pharmaceutical centres).

South Africa

South Africa has taken up global health issues in both the international and national arenas. At the global level, it has engaged in diplomacy to raise awareness of issues such as universal health coverage and press these at the UN General Assembly. Nationally, the concern about access to affordable anti-retroviral agents for HIV/AIDS initially led to confrontation with multinational pharmaceutical companies, who had taken a legal route that gave little opportunity for dialogue. Eventually, however, the companies withdrew from this and agreed to lower prices. As a result of the experience, later rounds of diplomacy were able to solve further pricing issues by negotiation, avoiding confrontation and saving billions of rands for South Africa. There could be future opportunities for the BRICS countries to work together – e.g. to make medical devices more affordable. The models of health diplomacy are still evolving, but it is clear that synergy between diplomacy and science can advance global health causes.

EXAMPLES OF GLOBAL HEALTH DIPLOMACY AND SCIENCE DIPLOMACY

Access to health technologies

The traditional paradigm of innovation in technologies for health (involved a stepwise approach of pre-competitive basic science, largely funded from public sources, followed by commercial development of pharmaceuticals and other technologies) has delivered many important new methods for prevention and treatment, but access to these by poorer populations has been very restricted and there has been insufficient incentive for the development of health technologies that would be predominantly or exclusively used by these populations. Areas where the traditional paradigm has failed include orphan diseases, the evaluation of non-commercial products, preparations for pandemics, neglected diseases ('diseases of poverty'), and antibiotics. Some progress has been made in a number of these areas, but for others – the last two in particular – what is still lacking is a platform for science diplomacy that would support and facilitate the necessary processes. Such a platform could be based on the 'five C's':

1. Common norms and norms for investments
2. Communication mechanisms for information sharing and collaboration
3. Coordination mechanisms so that science and R&D investors have better information
4. Collaborating more efficiently
5. Collective decisions for big issues

Difficulties in establishing such an approach include the challenge of dealing with 'free riders' who do not contribute but share the benefits of GPGs created; the linkage of science and technology to the 'hard power' of national interests; heavily contested areas such as the role of patents and intellectual property protection; and accommodating the realities of a rapidly changing world in which the traditional labels of 'developed' and 'developing' are increasingly less relevant and countries need to contribute together even as the world moves through the present transition phase. What is most needed now is the creation of a process through which agreements can be reached.

To the extent that knowledge and health technologies are GPGs, it is interesting to note that different countries invest in these to extremely variable extents [18]. Even among the relatively wealthy countries of Europe, there is variability by a factor of up to five in the percentage of Gross Domestic Product that different counties invest in R&D, demonstrating that contributions to GPGs reflect political choices. Investments are needed by both the public and private sectors. The balance between these varies greatly between countries – on the whole, with richer ones making proportionately larger public investments.

The success of CERN illustrates how countries could collaborate on very large and important scientific projects; new global challenges such as climate change, energy, water, food and health required a similar combining of national forces.

Diplomacy facilitating international science cooperation and vice versa

As science grows more complicated, the practice of science is becoming increasingly international, facilitated by the ever-greater ease of travel, communications and access to knowledge and the political improvements that have opened borders and reduced tensions in the last few decades. These changes have created the need for greater expertise in science diplomacy and skill in balancing political factors in formal relations with the liberal, spontaneous and bottom-up processes that characterise science.

Tobacco control

The Framework Convention on Tobacco Control (FCTC)[19] was the first global health treaty and a historic milestone as a new instrument in public health. Since its adoption in 2007 it has made substantial contributions to improving health globally. It has also given birth to the Protocol to Eliminate Illicit Trade in Tobacco Products[20] – which is, in effect, the second global health treaty. The Symposium coincided with the first anniversary of the agreement on the Protocol, which is already progressing well (at least 37 governments have signed to date) and will come into force when 40 governments have ratified.

HIV/AIDS

The HIV/AIDS pandemic provides a massive case study of response to a global health challenge that has not only required scientific research and health/science diplomacy[21], but in many ways has reshaped and redefined the field of global health[22]. From the earliest days of the recognition of the epidemic and questions about the geographical origin of the infection and about restricting international travel; to issues relating to intellectual property, access to drugs and treatment for all; and to battles over which international agencies and mechanisms are best suited to responding to the pandemic, there has been a continuing interplay between the scientific and diplomatic arenas. This field has constantly challenged the multiple stakeholders and has exemplified the ways that different actors – including individual champions, civil society groups, NGOs, the private sector, governments and international and inter-governmental organizations – can all influence global health outcomes through diplomatic engagement.

Building bridges

Collaboration in science or global health can precede work by diplomats, build bridges between countries that have poor formal relations and change diplomatic approaches where there are negative impacts on health. Foreign policy and health can interact positively in a number of ways: foreign policy can enhance health and be used to promote health globally; health can be used as an instrument of foreign policy, or be an integral part of foreign policy.

A case in point is that of Iran-USA relations, which illustrates the potential of health diplomacy. Iran has a well-developed system that integrates health, relevant sciences and medical education, with a close interface between the Ministry of Health and academia. The country has engaged extensively in science and health diplomacy, including participation in activities with WHO and a number of countries; contributing to disease elimination or eradication programmes; exchanging health experts; promoting and facilitating meetings and visits by professionals; and managing disasters. As a result of recognition by US scientists of Iran's experience in rural development, poverty reduction and rural health improvement, Iranian scientists were invited to assist in a regeneration initiative in the Mississippi delta region in the USA, where there had been a long history of failed efforts[23]. It was necessary for scientists to engage with their governments to ensure support for the collaboration and avoid misunderstandings about its purpose. A series of visits between the USA and Iran led to the signing of an institutional Memorandum of Understanding and a period of several years of effective cooperation that has significantly improved health in the delta region. The relationship continues to develop, expanding the collaboration and developing new health care models. Such people-to-people collaboration can serve to build trust between countries.

The role of non-state actors

A range of national and international non-governmental organizations are important in the field of contact and exchange between scientists and scientific communities in different countries and these can play a significant role both in mediating the use of science as a diplomatic tool and in providing evidence and expert opinions to support the work of diplomats. Examples include national Academies of Science, regional Academies such as the European Academies Science Advisory Council[24] (EASAC) which provides advice to European policy-makers; the International Council for Science[25] (ICSU) whose members are national scientific bodies and international scientific unions and which has developed a Committee on Science and Technology in Developing Countries[26] (COSTED) and a series of interdisciplinary bodies working on science for policy[27]; the Inter-Academy Medical Panel[28] which focuses on strengthening the role of academies to alleviate the health burdens of the world's poorest people, build scientific capacity for health and provide independent scientific advice to national governments and global organizations; and the World Academy of Sciences[29] (TWAS) which has an International Programme on Science and Diplomacy[30] and is especially active in promoting South-South cooperation. One challenge is that while health/medicine and science have tended to develop separate academies to pursue their professional interests, there is a need both for mutual learning and for a more integrated approach in the way that they engage with the world of diplomacy.

ISSUES AND TENSIONS

Is there a conflict of interest between diplomacy and science/ global health?

One theme that recurred during the discussions centred on differing perceptions of the purposes and characteristics of diplomacy on one hand and the aims and practices of science and global health on the other. Two dimensions of this apparent tension were highlighted repeatedly:

- Diplomacy in areas such as foreign policy and trade evolved as a means for States to engage in negotiations that primarily or exclusively serve national interests – which may include sustaining a competitive edge in areas such as science, technology and innovation. Global health takes the achievement of worldwide benefits and a 'global public good' perspective as its starting point, which may require subordinating national interests in favour of collective international ones.
- States tend to try to control and regulate affairs, while science and global health emphasize liberal, bottom-up and non-interventionist approaches.

A number of speakers provided views and examples to suggest that these apparent tensions may not be as extensive or serious as presented; that diplomacy is not necessarily trapped in the logic of national interests, promoting economic and political interest rather than values and principles and fostering competition rather than cooperation; and that there may be a convergent position where each can effectively support and contribute to the other without conflicts of interest.

- Rather than emphasising apparent tensions, the focus should be more on addressing the common gaps, where countries need to stand together in a common cause. The challenge is then how diplomacy can help to fill these gaps rather than defending the rights and advantages of sovereign States. The concept of 'shared responsibility' seems to be crucial to this.
- Diplomacy has created space and bridges enabling the international science community to have dialogue. If used effectively, foreign policy can open space for science and innovation to be creative in addressing common challenges in a connected, globalized world.
- Effective science and innovation cannot be achieved by decree, but rather by the creation of enabling frameworks that establish favourable conditions.
- An important role being played by a number of academies of science and medical science was the establishment of 'international panels' and 'global panels' (e.g. USA's Institute of Medicine[31]) looking at areas such as global challenges and medical and ethical norms. Is this a smart way to proceed – or should norms and standards be left to WHO and other global institutions? There were precedents for norms and standards being effectively generated through other channels – e.g. the Scandinavian initiative that had produced the Helsinki Declaration[32] on Ethical Principles for Medical Research Involving Human Subjects; and new norms on differential pricing of medicines arising through South Africa's efforts, with a 'soft' understanding that high-income countries (HICs) pay the bulk of innovation costs and low-income countries (LICs) pay the lowest possible price for the product. Governments were now being challenged to recognize that if they did not accommodate global health perspectives in their approach, others – including civil society – would step in to fill the gap.
- Problems with 'soft' norms were exemplified by difficulties with the differential pricing of medicines. This requires that countries do not engage in parallel imports. Some HICs now pushed for lowering of their own prices which could result in even greater costs for others. LICs do not always see the expected benefit from differential pricing, as a result of agents adding large commission charges (e.g. this has happened in Egypt); and settlements negotiated in one area (e.g. anti-retroviral drugs in South Africa) did not necessarily solve the problem for other classes of drugs needed by the country (e.g. for non-communicable diseases). These examples highlight the potential advantages of developing more formal and comprehensive agreements through global negotiations.
- There are challenges in determining when mutuality of interests exist – and of identifying exactly what these interests are; and when there are conflicts of interest and how to resolve them. WHO has substantial experience in wrestling with these problems – e.g. in relation to working with the private sector.

Is there a lack of consistency in the way countries and international organizations approach science/global health issues?

A further difficulty that sometimes compounds the challenges of reaching agreements that support global health can be a lack of consistency. This is sometimes manifest at the national level, with different government departments (e.g. foreign affairs, trade, health)

taking divergent approaches on matters such as intellectual property; and sometimes this is reflected in contradictory approaches taken by negotiators within international bodies (e.g. World Trade Organization; World Health Organization) which often had a poor history of talking to one another.

Is collaboration on science/global health issues achieved at the expense of innovation?

It is widely acknowledged that competition is a valuable factor that helps to drive innovation – so do international science diplomacy efforts to foster collaboration weaken this competitive environment and reduce innovation? Several speakers did not think this was the case. It was pointed out that areas attracting diplomacy and encourage collaboration in science/global health accounted for only a small part of the overall efforts in these fields and mainly addressed either the need for 'big' science projects beyond the scope of individual players, or areas where market incentives were weak and there was an intrinsic lack of competition. It was also suggested that diplomacy to promote greater regulatory harmonization was a positive force, as it increased the certainty of targets and expanded the potential markets for conforming products.

What is 'real' evidence for decision-makers?

The challenge of providing useful evidence for decision-makers provoked lively discussions. For example, many countries have introduced agencies or processes for health technology assessment that help policy-makers decide which health interventions are cost-effective and which should be publically funded. But evidence does not always reach or convince policy-makers – one tragic example was the failure to bridge the gaps of conflict and generate sufficient action when the HIV/AIDS epidemic began to emerge in South Africa in the 1980s, with the result that many additional lives were lost.

'Real' evidence was said to be evidence that helps create communities of collective endeavour, purpose and interest that are relevant to each stakeholder. Health diplomacy has a number of examples to offer:

- Creation of a global framework for pandemic preparedness had aimed to ensure that all countries can decrease the impact of pandemics and derive benefits from vaccine sharing; and this has required diplomacy to bring together science, industry and governments and to address the legitimate concerns of all stakeholders. Traditionally trained diplomats are not necessarily geared for this kind of approach and the requirement to develop mutual understanding to find a common position. The work to reach international agreement was driven by the H1N1 virus threat and required effort by diplomats to develop mutual understanding, learning and trust and to learn about scientific research and industrial production. The development of the Pandemic Influenza Preparedness Framework, adopted after four years of effort, has been an innovative model and a real achievement. [33]
- The four-year process of intensive negotiations which led to the FCTC involved the transfer into legally binding text of evidence on the harmful effects of tobacco. Key points were the strength of the scientific evidence (including that derived from long-term cohort studies); the development of a strong, shared process for reaching consensus in the negotiations at WHO; building alliances; the progressive education of those engaged in the process, building trust.
- The evidence for the health-damaging effects of consumption of trans-fats led to Denmark's efforts to limit trans-fats in food in 2003, followed by a number of other countries. Resistance by the food industry and the difficulty of regulating a problem with cross-border dimensions highlights the need for stronger global diplomacy on this issue. [34]
- The dearth of 'local' epidemiological evidence in some regions, especially Africa, can be a barrier to gaining the attention and support of key national politicians and diplomats. For example, involvement in longitudinal cohort studies runs at a level of about 10,000 per million population in the USA, at about 1,000 per million in Mexico and in Europe, but at only about 15 per million in Africa. One initiative being undertaken to try to redress this imbalance is the Africa/Harvard School of Public Health Partnership for Cohort Research and Training [35] (PaCT) which has country collaborators in Nigeria, South Africa, Tanzania and Uganda and plans to enrol 500,000 people across Africa using a harmonized survey instrument. While building capacity for cohort studies within Africa, the project aims to provide evidence on health care for African policy-makers. The data gathering in Africa takes advantage of the high degree of access to mobile phones and the development of social networks-innovations which it if felt could also revolutionise how research is done in HICs. Important lessons from the pilot phase of the project included that it had been extremely valuable to engage facilitators to explore differences and build strong teams; the Ministries of Health had been included from an early stage to gain their support and learn what they wanted from the project; the populations that had been expected to be the most difficult to reach, in rural areas, turned out to be relatively easy, with a high proportion of the participants proving willing to undertake hospital visits for blood tests.

CONTEMPORARY CHALLENGES IN SCIENCE/GLOBAL HEALTH DIPLOMACY

As well as population increase, energy, food and water shortages and climate change, reference was made to several contemporary challenges in science diplomacy and global health diplomacy:

Non-communicable diseases (NCDs): The global 'epidemic' of NCDs, which now greatly affect health in LMICs as well as in HICs, is an area that many feel requires collective international effort on multiple fronts and engaging multiple stakeholders, including addressing the challenges of regulating foods and controlling products such as tobacco and alcohol.

Anti-microbial resistance (AMR): The emergence of microbes resistant to many, if not all, known antibiotics poses serious challenges to health everywhere and the failure of traditional market forces to result in development of new antibiotics has led to calls for an urgent global programme, supported at least in part by public finances, to fill the gap. Challenges requiring the contributions of diplomacy include not only how to finance and organize the required R&D, but how to ensure the rational use of antibiotics for human health and how to limit the over-use of the products in animals.

Big data on health: The development of new techniques for manipulating and mining big data is opening up major new areas with important implications across science and global health. This is beginning to attract the interest of organizations in Geneva and elsewhere.

Beyond aid: The borders between 'developed' and 'developing' grow increasingly blurred and it is important to consider where the world will go beyond the era of aid. Health research, science and innovation are increasingly being pursued through international collaborations (e.g. between the EU and Africa, EU-Caribbean and USA-Africa) and are keys to development. But few LMICs have government science advisers and science and technology are often at the back of the agenda in developing South-South cooperation.

Including civil society actors in diplomacy: COHRED, which promotes research and innovation for better health, health equity and sustainable development, is working to map the role of NGOs in research for health in LMICs – they can potentially be key players in the equity domain. Geneva offers great opportunities as a place to bring NGOs into international debates and diplomatic efforts, but this requires conscious effort and some changes of attitude. The role of universities also needs to be stressed, as they can be core facilitators of research and entrepreneurship and a component of the triangular relationship between global health/science, diplomacy and research. This is not always the case in LMICs, where some universities are "steeped in tradition rather than innovation".

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2 Science Diplomacy Meets Health Diplomacy. Seminar at the World Health Summit, Berlin, 20 October 2013, organized by the Graduate Institute of International and Development Studies (GIIDS), Geneva; Imperial College, London; and Global Health Europe. Co-chaired by Eduardo Krieger (Past President, Brazilian Academy of Sciences) and Stephen Matlin (Senior Fellow, GIIDS; Adjunct Professor, Imperial College London; Vice Chair, Global Health Europe); panel speakers included Volker ter Meulen (Co-Chair, IAP-Global Network of Science Academies; Former President, German Academy of Sciences), Peter Piot (Director, London School of Hygiene & Tropical Medicine; Former Executive Director, UNAIDS), Andreas Stamm (Programme Manager, National Quality Infrastructure Programme, GIZ, Ethiopia); Gary Nabel (Chief Scientific Officer; Deputy Head of Research and Development; Sanofi, USA) and Jie Chen (Director, School of Public Health, Fudan University, China).

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