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# Treatment Guaranteed?

Unfortunately not. Today's world is facing a situation where the spread of diseases across borders may affect countries' economies and stability. It can also change the customs of the local inhabitants. Treatment can only be guaranteed if states cooperate more in the prevention and alleviation of disease. The World Health Organization is the forum for such cooperation, and Estonia is increasingly contributing to its work.

This double issue of *Diplomaatia* is about health, disease and the cooperation between states. Tiina Intelmann, Head of the European Union Delegation in Liberia, describes how Ebola has affected the security and economy of Liberia.

"When I arrived in Liberia in 2014 as the head of the European Union delegation, the situation was sad," says Intelmann. "A curfew had been imposed; schools, universities and most public offices were closed. In order to buy a loaf of bread, you first had to wash your hands with chlorine solution and prove that you did not have a fever; only then were you allowed to enter the shop."

Ilona Kickbush, an internationally renowned global health expert, gives an overview of the fight against Ebola across the world. Zsuzsanna Jakab, the WHO Regional Director for Europe, writes about healthcare policy in Europe.

Kristel Lõuk, a diplomat at the Permanent Mission of Estonia to the UN, explores the Millennium Development Goals, while her colleague Taavo Lumiste at the Estonian mission in Geneva outlines the active role of Estonia in the WHO. In a joint article, Jarno Habicht, the WHO representative in Moldova, and Marge Reinap, his colleague in Estonia, write about why it is important to get acquainted with the network of WHO representations around the world.

Ain Aaviksoo, Deputy Secretary General at the Estonian Ministry of Social Affairs, thinks that implementing e-health in Estonia means a revolution in healthcare since patients can get more involved in

deciding their treatment. Professor Andres Metspalu introduces the Estonian Genome Center, and Doctor Kuulo Kutsar writes about the international battle against infectious diseases.

Srikanth Reddy, an internationally renowned medical researcher, provides a historical overview of the Spanish flu that raged around the world after World War I. Reddy writes: “The 20th century witnessed three influenza pandemics: in 1918 (Spanish flu), 1951 (“Asian flu”) and 1968 (“Hong Kong flu”). Of these, the 1918 Spanish flu pandemic was considered the most devastating in modern human history.”

# Battling Ebola: The View from Liberia

## People in Liberia can shake hands again



**Tiina Intelmann,  
Ambassador. Head of the European Union Delegation in Liberia**

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*Tiina Intelmann has held various posts in the Estonian Ministry of Foreign Affairs since 1991. She has been Permanent Representative of Estonia both to the OSCE in Vienna and to the United Nations, and President of the Assembly of States Parties of the International Criminal Court. She has been Head of the European Union Delegation in Liberia since last year.*

On 9 May, the European Union's delegations all around the world celebrate Europe Day. This year, there were several reasons to celebrate this in Liberia. It was the day the World Health Organization declared the country free of the Ebola virus. For the first time in months, people were allowed to shake hands. Many other things that are an elementary part of people's everyday lives had also been forbidden during the Ebola outbreak.



When I arrived in Liberia in 2014 as the head of the European Union delegation, the situation was sad. A curfew had been imposed; schools, universities and most public offices were closed. In order to buy a loaf of bread, you first had to wash your hands with chlorine solution and prove that you did not have a fever; only then were you allowed to enter the shop. People did not know whether the disease could be spread by banknotes. Counties had set strict requirements for Ebola examination on their borders; in order to cross the border you had to get out of the car and go through the examination procedures. Mainland borders were closed, and most airlines had cancelled flights to Liberia. Foreign entrepreneurs left the country in a hurry. Mines and businesses were closed. Hairdressers, sport, restaurants, entertainment—suddenly, all of this was part of a different and very distant world.



*A Liberian man in Monrovia celebrates the country becoming Ebola-free*

AP/SCANPIX

The Ebola epidemic had begun in West Africa in December 2013 but did not receive wider international coverage until the summer of 2014. Liberia was the hardest hit because the virus quickly reached the capital, Monrovia, where the majority of Liberia's four million people live close together in quite serious poverty.

At first, the dismayed authorities tried to close some districts of the city, but the trapped citizens were unhappy with this and the situation became explosive; neither the local police nor the United Nations military contingent were able to calm things down. One such poor district, West Point, is close to the EU delegation. The people in the slums do not have any food or money, and each morning they set out to find food and other necessities for the day or do some temporary work. More than half the population of Liberia are illiterate and even those who are officially classed as literate often have an inadequate knowledge of world affairs. Trust in the state, government and other official structures is very low. Information is usually spread by word of mouth; people also listen to the radio, but the more important messages need to be put into song and repeated several times in order for them to get through. Taking this background into consideration, it was extremely difficult to convince people that the disease was spread by physical contact and that religious burials and wake ceremonies needed to end. The lack of knowledge and low level of education gave rise to various conspiracy theories and even outright denial of the virus.

By the end of last summer, Liberia had reached a stage where the whole country was basically shut down. Even before the Ebola outbreak, Liberia was considered one of the least-developed countries in the world, dependent on the direct aid of donors and the sale of natural resources. The income from trade in natural resources was now lost. Many development cooperation projects had to be cancelled. The EU also decided to stop many aid programmes, and evacuated the majority of its staff from the country. Only the head of the

delegation and some key employees stayed on, in order to ensure the continuance of the most important activities, political relations with the country's government, and the EU's humanitarian aid. Brussels switched to humanitarian crisis mode, in which ECHO (the European Commission's department responsible for humanitarian aid) had the leading role.

To date, the EU and its member states have mobilised about €1.3 billion to defeat Ebola. Some of this money has been spent on direct humanitarian aid for the three countries that have suffered the most—Liberia, Sierra Leone and Guinea—while some covered the costs of research, laboratories, supplies, and the international medical personnel who rushed to help (and their possible evacuation). Like the United States, some EU member states used their military capability to deliver aid. For example, HNLMS *Karel Doorman*, a Dutch support ship, entered Monrovia harbour twice and delivered shipments from various member states to Liberia, as well as to Sierra Leone and Guinea.

However, the EU's approach to the crisis was much more extensive. It quickly became apparent that Liberia had run out of money. In order to avoid an even more severe disaster, the EU donated €20 million to the Liberian state budget at the end of 2014 to provide wages for those healthcare workers and civil servants who had not left the country. In March this year, a high-level conference took place in Brussels at which those providing and receiving aid devised further actions to end Ebola and for the subsequent recovery work.

We celebrated Europe Day and the end of Ebola in Monrovia with the festiveness and thoroughness characteristic of Africa. Meanwhile, busy months lie ahead to help Liberia deal with the consequences of the crisis and achieve again the moderate economic growth the country experienced prior to the outbreak.

The healthcare system needs to be fixed quickly. Many healthcare workers have either died or left the country. At the same time, an exceptionally large amount of medical supplies, sophisticated laboratories and medications has been brought to Liberia. The ad hoc

healthcare facilities built by USAID, the Chinese military and others will be handed over to the Liberian government. The question is whether Liberia is able to accommodate these facilities and use them effectively. The Ebola outbreak halted the vaccination of children; there is now an outbreak of measles in Liberia. Ebola has not yet been researched thoroughly and as a result people are still cautioned to be very careful because it is not entirely clear how long the virus stays in some bodily fluids. It is not known whether these warnings will be taken seriously.

In any case, it remains crucial to follow sanitary requirements. There are about 5,000 schools in Liberia, many of them without water supply and toilets that can be used safely. Using soap and other cleansing products is unfamiliar for many people. The EU has helped create the conditions to provide water to 500 schools, which means that children can attend these schools again.

The Ebola outbreak once again demonstrated the risks of over-centralisation in a country. Sometimes it seems as if everything takes place in the capital, but coping with the disaster also requires local action and initiative, operational structures and measures in the villages and towns. The same could be said about the general functioning of the country. As a result of the lessons learned from the Ebola outbreak, there is now a political readiness to decentralise some of the state functions and the EU is supporting these initiatives.

UN agencies and programmes help orphaned children, women who have lost their spouse and relatives, and families who are unable to educate their children. An estimated 5,000 people died of Ebola in Liberia, and 3,000 children were orphaned.

In the years to come, the EU's aid programmes are aimed at developing strategic infrastructure (roads, electricity systems), education and, partly at the request of the Liberian government, agriculture, to provide the people with basic food products. However, the main priority was and remains the improvement of the governance and leadership of the state, the introduction of good practice in government, and fighting corruption. The Liberian



government stresses the importance of the private sector in economic development, but in reality the state has failed to include foreign investors and Liberians living in the US because there is not much faith in the functioning of the country, which came out of a civil war only ten years ago. Middle-aged men who participated in the war are unable to find work and are uneducated; the situation is no better with the next generation of young people. The country has no industry or significant agriculture which could help lower the price of food products and decrease the country's dependence on food imports. At the beginning of 2014, predicted economic growth was 5.9%, but due to Ebola it fell to 2.2%. There were one or two healthcare workers for every 100,000 people before the outbreak, and the number is even smaller now.

The Ebola outbreak once again demonstrated the importance of cooperation between neighbouring countries. Liberia has been declared free of Ebola, but the fight continues in Sierra Leone and Guinea. Without mutual help and information exchange, it might be impossible to restrict the spread of the virus, and the three countries are well aware of this.

The EU is one of the main donors in Liberia, as well as in other developing countries. Our goal is to ensure the economic stability and security of the country and we prioritise the promotion of democratic, fair and inclusive ruling principles.

# Ebola: Back to the Future of Health Diplomacy

## People in Liberia can shake hands again



**Ilona Kickbusch,  
professor**

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*Ilona Kickbusch is Director of the Global Health Programme at the Graduate Institute of International and Development Studies, Geneva. As an internationally recognised global health expert, she serves on many panels and advisory boards, most recently the Ebola Interim Assessment Panel of the WHO. She has also been deeply involved in the development of the Health 2020 European health policy framework of the WHO Regional Office for Europe. Her key areas of work relate to global health governance, Health in All policies, public health, health promotion and health literacy. Details and updates can be found on her website ([www.ilonakickbusch.com](http://www.ilonakickbusch.com)) and on Wikipedia. You can follow her on Twitter (@IlonaKickbusch).*

## **Global Health Responses**

History is critical if we want to understand some of the failures of the present. A review of over 160 years of international health diplomacy and cooperation shows the constant tension between a vision of health where disease knows no borders and the continuous difficulty in overcoming national interest. At regular intervals, a global health crisis like the Ebola outbreak in 2014 reminds the world that there is a need to act together because the health of one part of the globe is inextricably linked to the health of another. But the crisis mode rarely turns into long-term action, which requires states to act together consistently for the health of all. This is a threat to the world's health security.

Health was one of the first trans-border issues to employ multilateral diplomatic mechanisms during the 19th century.<sup>1</sup> Increasing globalisation brought with it the more rapid and extensive spread of infectious diseases. As major cholera pandemics hit big cities in Europe between 1821 and 1851, and the fear of contagion began to affect trade through quarantine measures, it was recognised that international cooperation was necessary. Nation-states subsequently “invented” a new way of working together in health:

- In the first phase, international conferences were convened with the object of enabling nations to reach agreements on “non-political” subjects such as health. The first International Sanitary Conference took place in 1851 in Paris and the first international convention on health was agreed in 1892. It was negotiated in a joint effort between diplomats and medical experts.
- In a second phase, 1919 marked the beginning of a new stage of diplomatic endeavour to address problems “common to all”, and health was included in the Covenant of the League of Nations. The League established a health office in Geneva, which was very active, for example, in the typhus epidemic in Eastern Europe that broke out in 1919.
- Finally, in a third phase following World War II, the World Health Organization (WHO) was created in Geneva to “act as the directing and co-ordinating authority on international health work”.

There was much optimism at the time that the creation of this agency would help eliminate most diseases, and indeed one of its historic achievements was the victory over the scourge of smallpox; in 1980, the WHO could declare the eradication of this disease. Major successes have been achieved with the control of measles and polio, but today—70 years after the founding of the WHO—the world still faces major old and new infectious disease threats, many of them of a trans-border nature. Yet, 160 years after the first engagement, the political commitment to invest significantly in common health security—which includes the need to build strong health systems in all countries—and in health as a global public good has not manifested itself sufficiently.



**A relative mourns next to a Red Cross burial team, which is preparing to take away Ofori Gweah's body. Gweah died due to Ebola in Monrovia, Liberia.**

REUTERS/SCANPIX

## **The Ebola Epidemic**

The Ebola epidemic of 2014–5 in some of the poorest countries in the world—concentrated in Liberia, Sierra Leone and Guinea—provided a wake-up call: neither the countries nor the international agencies were able to respond with the required speed and expertise to this complex health emergency. Over 10,000 people have died of the highly contagious disease for which there is no vaccine and no treatment, and probably at least the same number have died of other diseases because the health services were overwhelmed in the face of the crisis. Initially it was mainly non-governmental actors that responded on the ground, in particular *Médecins Sans Frontières*, which was subsequently pushed to the limit of its capacity.<sup>2</sup> But others must be mentioned, such as local volunteers, especially from the Red Cross and NGOs such as Save the Children. Severe criticism has been levelled at the WHO—both of its work at country and regional level and of the fact that it took much too long to make use of the provisions of the International Health Regulations (IHR)<sup>3</sup>—available to the WHO as an international legal instrument—to declare a Public Health Emergency of International Concern (PHEIC).<sup>4</sup>

Ebola is not yet over—but as the outbreak is being contained, a number of evaluation panels have been established with the task to explore “what went wrong”. An interim assessment panel established by the Executive Board of the WHO issued its first report for the 68th World Health Assembly (WHA68) in May 2015 and highlighted the need to consider the structural and political shortcomings that lie at the root of the crisis and the failures of the response.<sup>5</sup> Some of the questions being asked include: Why did the established mechanisms of humanitarian and health response not work? Why were countries so badly prepared? Why was community engagement not prioritised from the start? Why do we not have a functioning global emergency health workforce? Why is it still so difficult for UN agencies to work together? Why are there no diagnostics, vaccines or treatments? Why was this area of the WHO’s work so underfunded? Why did the

different levels of the organisation not work together better? Why did the UN agencies not work more efficiently?

The WHO underlines that “good outbreak control relies on applying a package of interventions, namely case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilisation. Community engagement is key to successfully controlling outbreaks.”<sup>6</sup> All of these are critical at country level and are usually not in place in fragile states. We also have to face the fact that the Ebola outbreak was a failure of the global emergency and response system. At present there is much lip service paid to acting and to supporting countries to move from a crisis mode to one that addresses the long-term requirements to build sustainable health systems.

In a resolution to take the Ebola work forward, WHA68 underlined the need to engage in international cooperation and collective action and to revisit the IHR, the need for a contingency fund and a global health emergency workforce, and the urgent need to build in-country capacity.<sup>7</sup> Yet, while the Ebola outbreak crisis reinforced the point that countries must work to implement their responsibilities under the IHR and that poorer countries will need support to do this, many countries still insisted on self-assessment of their capacities on a voluntary basis only, rather than establishing a peer-review process and/or external evaluation that allows for mutual learning and joint health security.

The experience with outbreaks shows that countries are rightly worried about declaring an outbreak because of the severe economic consequences that can come in its wake, as borders are closed and planes stop flying. Trade bans in particular are much debated.<sup>8</sup> Of course, this is short-sighted, since the economic costs of the outbreak can be much greater if the response begins late. Current calculations by the World Bank Group show that Liberia, Guinea and Sierra Leone will lose at least US\$1.6 billion between them in forgone economic growth in 2015 as a result of the epidemic.<sup>9</sup> Challenges include job losses, smaller harvests and food insecurity.



The crisis also showed that, despite the agreement in the IHR to follow WHO advice on travel bans and trade restrictions, many countries acted unilaterally—frequently to appease their populations, respond to media hysteria or gain political points in an election period. At present there are neither incentives nor sanctions to counteract such behaviour by countries; this too must be explored in the future. Despite the fact that the IHR is a legally binding treaty mechanism, it lacks “teeth”. It is a key health-diplomacy challenge to develop a global health-security framework that will ensure both higher investment and compliance.

### **Can There Be Change?**

If Ebola was a global systems failure, then the response has to be at system level. There has been action following other global health crises, which has led to new institutions and approaches in global health governance. Three can be mentioned here.

- The threat of HIV/AIDS led to the creation of new organisations such as UNAIDS and financing mechanisms such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and UNITAID, as well as to a wide range of very proactive civil-society organisations.
- The SARS outbreak of 2002–3 led to the revision of the IHR in 2005, broadening their scope and redefining the powers assigned to the WHO as well as the responsibilities of countries.
- The H5N1 influenza outbreak led to the Pandemic Influenza Preparedness (PIP) Framework in 2011, which introduced a multi-stakeholder approach to pandemic influenza preparedness and response.

Ebola is the second disease (after HIV/AIDS) to be taken to the United Nations Security Council and declared a threat to peace and security worldwide. As in the case of HIV/AIDS, the Ebola crisis has led to proposals for new health agencies and new financing mechanisms; the World Bank Group has been very prominent in this debate, for example suggesting a new kind of insurance mechanism for countries through a Pandemic Emergency Facility.<sup>10</sup> This time round, WHO

member states have said very clearly that there must be no proliferation of agencies, and responsibility for outbreaks needs to stay with the WHO. Given the historical phases of international disease control outlined above, it seems obvious that the response to public-health emergencies of international concern must be the core business of the organisation. However, it is exactly this key insight that has eluded the member states and the secretariat over recent years, as they cut back funds and staffing in this area of the WHO's work in response to an overall budgetary crisis in the organisation.

Global challenges can only be resolved jointly, and they need reliable financial resources to enable the agencies tasked to address them. But countries are normally not very willing to provide such resources for global public goods or to agree to instruments and mechanisms that might challenge their sovereignty. Yet, sometimes there is hope. The sociologist Ulrich Beck has developed the concept of cosmopolitan moments, meaning that a crisis can become a prism that brings collective action into focus.<sup>11</sup> Cosmopolitan moments also open up new political spaces and new actors to join the global governance effort. Many argue that Ebola might be such a critical point in time that kick-starts a new dynamic in global health security that will also bring in other actors such as the private sector, which is highly dependent on safe global environments.

Apart from being discussed at the UN Security Council, Ebola also led to other new approaches: the UN Secretary-General established the first-ever UN emergency health mission, UNMEER—modelled on peacekeeping—to provide support to the Ebola response by redeploying financial, logistical and human resources. Ebola is also the subject of a High-Level Panel on the Global Response to Health Crises, established by the UN Secretary-General to analyse the overall UN system response and make proposals for the whole UN system. The global Ebola response is also prominent in the G7's deliberations and the German Chancellor, Angela Merkel, current chair of the G7, addressed WHA68, reinforcing the need for the global community to act together on health security.<sup>12</sup>

## **The Larger Question**

As a consequence, health security has become highly political, with heads of state and government being involved in many different ways, both in the affected countries and in the countries providing support. Maybe this level of political involvement will finally address the much larger question at hand: how will nation-states deal with the issues of sovereignty in relation to health security challenges in the early 21st century? “In the past, it was enough for a nation to look after itself. Today, it is no longer sufficient,” said a leading diplomat.<sup>13</sup> Indeed, my health can no longer be separated from your health when a virus is just a plane ride away—health diplomacy implies the double responsibility to represent the interests of a country as well as the interests of the global community.

For example, cases of Ebola were exported to Nigeria, Senegal, the USA, Spain, Mali and the United Kingdom. SARS travelled on aircraft from China initially to Hong Kong, Hanoi and Toronto, and then infected thousands of people around the world. The Spanish flu pandemic of 1918–9 probably killed 50–100 million people worldwide.<sup>14</sup> Bill Gates has drawn attention to the danger of complacency: “The world lost time in the current epidemic trying to answer basic questions about combating Ebola. In the next epidemic, such delays could result in a global disaster.”<sup>15</sup>

While the world was focused on Ebola, China was dealing with H7N9; the Middle East with the MERS Corona virus; South Sudan, Benin and Ghana with cholera; DRC with yellow fever; Benin with Lassa fever; Madagascar with plague; Niger and Nigeria with meningitis; and Uganda with Marburg virus and typhoid fever. The world faced more than 90 outbreaks of infectious disease between March 2014 and April 2015. There were also a range of ongoing grade-3 events under the Emergency Response Framework of the WHO: these included natural disasters in the Philippines and Nepal, as well as conflicts in Syria, the Central African Republic, South Sudan and Iraq. In addition, the world is dealing with the re-emergence of polio and increasing anti-microbial resistance. However, no priority is given to health security

in the context of the WHO's work, or in the Sustainable Development Goals due to be adopted in September at the UN General Assembly in New York.<sup>16</sup>

The problem relates to the narrow and outdated understanding of what countries consider to be a domestic health issue. Today, no health minister can ensure population health “at home” without a concern for the regional or global context. Each national health system is now a core component of the global health system. In order to ensure health security, health investments need to be made both at home and abroad—and particularly in the “weakest link”. One is the extension of the other, not a separate field of activity. This means that countries need to invest in the implementation of the IHR as a global public good, both domestically and in other countries, as well as in regional and global mechanisms to prevent, detect and respond.

One such important health diplomacy initiative is the Global Health Security Agenda (GHSA), which brings together countries, international organisations and civil society to promote health security as a national and international security priority.<sup>17</sup> Twenty-nine countries, the FAO, the WHO and the World Organisation for Animal Health (OIE) are committed, as are Interpol, the African Union, the European Union, ECOWAS and the World Bank Group; the G7 has endorsed the initiative. Countries have committed to action packages to prevent avoidable epidemics, contribute to the early detection of threats and ensure a rapid and effective response against infectious disease outbreaks.

WHO member states have underlined that they continue to see the WHO as the key agency to ensure global health security, but they have not committed the financial resources that the organisation would need to play this role responsibly and effectively. There is no common understanding yet that assessed contributions to the WHO's pandemic preparedness and response, as well as to emergency mechanisms, are not contributions to foreign aid but are (by extension) investments that ensure domestic health. We cannot wait for an airborne outbreak to scare the world into responsible action.

Health security and health diplomacy are as challenging and as important today as 160 years ago, even though we have so much more knowledge and so many more mechanisms and instruments to address the challenges at hand. It is irresponsible not to apply them. Health security must again be recognised as a political priority to be addressed at the highest level of government and the United Nations. It requires access to universal health coverage and reliable public health systems that can prevent, detect and respond. And it demands the investment in collective mechanisms—a global warning-and-response system—that serve all countries through a strong WHO. That is the key lesson to be drawn from the Ebola outbreak.

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# Health Diplomacy in Europe

## Health Diplomats are Experienced Negotiators



ERAKOGU

### **Zsuzsanna Jakab, WHO Regional Director for Europe**

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*Dr Jakab has been the WHO Regional Director for Europe since February 2010 and was recently elected to continue in the position for a second term. Earlier in her career, Dr Jakab established the EU's European Centre for Disease Prevention and Control, which operated in Stockholm, and was its first director. In 2002–5 she was the secretary general of the healthcare, social and family ministry of Hungary and led the country's preparations in the field of public health for acceding to the EU.*

Health diplomacy has been at the core of international action for health since countries began to cooperate on health-related matters. For over 100 years—from the first International Sanitary Conferences to the establishment of a health office of the League of Nations and finally the creation of the World Health Organization—countries have

been engaged in coordinated and cooperative action, not only to counter common threats to human health but also to address the many factors that determine health. In a global world with an increasing number of health challenges, the WHO is the legitimate leader with the authority to set agendas, adopt treaties and coordinate international health work. Today health diplomacy includes not only many different actors in the global health arena, but also new mechanisms that allow the wider public to engage. It is a two-way street: health helps build relationships between countries and can act as a bridge for peace, while diplomacy can help create the alliances needed to achieve health outcomes.

Health is a human right—yet equality in access to health and universal health coverage is not always prioritised (or even considered) in international agreements. Health diplomats negotiate for health in the face of the interests of other sectors and of other global players, so that health is placed high on the political agenda. The high relevance of global health as “a pressing foreign policy issue of our time” was strongly recognised by the foreign ministers of Norway, France, Brazil, Indonesia, Senegal, South Africa and Thailand, who launched a declaration on health and foreign policy in Oslo in 2007(1). The relevance of health to the well-being, wealth and security of nations is reflected in the Post-2015 Development Agenda and the increasing interest it is gaining in deliberations at the United Nations General Assembly(2). Health is now also on the agenda of many global and regional meetings, many of which bring together heads of state and government such as the G7, BRICS, ASEAN and the European Union. And it is taken into account when business leaders meet at the World Economic Forum.

At the WHO, much health diplomacy takes place during the World Health Assembly and WHO Executive Board sessions, and in the regional committees. These meetings have been subject to significant changes over recent decades as delegations face an extensive and complicated agenda requiring intensive preparation as well as significant intersectoral consultations. Health issues are now part of wider agendas: the security agenda, driven by the fear of global

pandemics; the economic agenda, which sees the health sector as a US\$7-trillion global growth industry; and the social-justice agenda, which advocates health as a social value and human right.

Many sophisticated global negotiations take place at the WHO. Countries work together to agree on instruments and mechanisms to take health forward as a common goal through resolutions, joint global action plans, and international frameworks and codes, as well as legally binding instruments such as the Framework Convention on Tobacco Control and the International Health Regulations. The subject matter ranges from combating non-communicable diseases and ensuring access to safe medicines, to promoting universal health coverage and addressing health-worker migration. Technical and political issues intersect, and often the protection of sovereignty by nation-states clashes with the need for collective action, as in pandemic control.

No progress can be achieved without skilled negotiators, now often referred to as health diplomats. This was recognised by WHO member states in the Twelfth General Programme of Work, which provides the WHO's high-level strategic vision for the period 2014–9. It acknowledges the significance of increasing capacity-building in global health and training health diplomats(3). In response, the WHO and its member states have partnered with academic institutions (such as the Global Health Programme of the Graduate Institute in Geneva) to train staff, including country representatives as well as representatives from ministries of health and of foreign affairs. A wide range of courses, books and case studies have been developed over the last decade to support global health diplomacy(4, 5).

In the European Region of the WHO, the environment and health process can be understood as the practice of modern health diplomacy. In the late 1980s, European countries initiated the first-ever collaboration to eliminate the most significant environmental threats to human health. Progress towards this goal is driven by a series of ministerial conferences, held every five years and coordinated by WHO/Europe(6). Successful health diplomacy is also

exemplified by the two-year development process (2010–2) of the European health policy framework—Health 2020(7)—and cooperation with the European Union in health matters. Because the increasingly political nature of the meetings of the governing bodies creates an increasing demand for health diplomacy, a resolution titled “Health in foreign policy and development cooperation: public health is global health” at the 60th session of the WHO Regional Committee for Europe (Moscow, 2010) requested the regional director to “contribute to strengthening the capacity of diplomats and health officials in global health diplomacy”(8).

In order to respond to this request, between 2010 and 2015 WHO/Europe commissioned European executive training events (of two to five days), including countries of the South East European Health Network and the Commonwealth of Independent States, as well as interregional activities and global online courses, which also enrolled European participants. In the European region, around 300 national delegates and WHO staff have participated in health diplomacy training so far. Public-health professionals and diplomats attend these workshops together and learn from one another, especially during simulation exercises. Future plans in capacity-building for health diplomacy include a textbook with case studies tailored to Europe to strengthen the consistency of education and the extension of WHO-sponsored courses to EU member states.

The year ahead will open up enormous opportunities for health diplomacy for European countries. Three high-level international meetings share the responsibility to chart a new era of sustainable development including health:

- the International Conference on Financing for Development, in Addis Ababa in July
- the Special Summit on Sustainable Development in September (the culmination of a long process to define the Post-2015 Development Agenda)
- the 21st Conference of the Parties of the UN Climate Convention, in Paris in December.

These conferences are all connected, and coherence and reinforcement between them is critical also from the point of view of health. The 68th World Health Assembly (WHA69)—in the wake of Ebola—has put global health security firmly back on the agenda, which requires extensive negotiations not only between countries but also between many different sectors and agencies. In a way, both the WHO and health diplomacy have come back to their roots: to agree to pool sovereignty for the benefit of all. German Chancellor Angela Merkel expressed this in her statement to WHA68: “[The] WHO is the only international organisation that enjoys universal political legitimacy on global health matters”(10). Health diplomacy is at the core of the obligation to work towards the attainment by all peoples of the highest possible level of health.

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# The UN's Sustainable Development Goals and Improving Healthcare in the World

**It is important to support the entire world population, not only certain groups**



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**Kristel Lõuk,  
First Secretary at the Permanent Mission of Estonia to the UN**

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Intensive discussions are going on at the UN to agree, by September 2015, a set of universal Sustainable Development Goals (SDGs) that will affect all the world's people and countries. The goals are a follow-up to the Millennium Development Goals (MDGs), which are due to



be fulfilled by the end of 2015. Although there have been shortcomings in realising these eight relatively simply worded goals agreed in 2000, they have still had groundbreaking importance in development cooperation. The goals have helped to direct and coordinate development cooperation with the help of the international unity that has been achieved, as well as to mobilise resources for alleviating the painful problems the world faces.

When conclusions were drawn about the MDGs, it was found that new development goals for the subsequent period were necessary, and these should focus on reducing poverty and be more comprehensive than the eight MDGs. It was also found, during the UN Conference on Sustainable Development in Rio de Janeiro in 2012, that economic, social-protection and environmental subjects should receive equal attention in achieving sustainable development. Discussions in the UN on the new SDGs have lasted for several years, and several substantial agreements have been reached: coordinated and unified goals are necessary for the entire world, both developing and rich countries. In place of the eight MDGs, 17 SDGs and 169 supporting detailed sub-goals will be adopted in September, covering the next 15 years. They will be as valid for Estonia and the US as for China and Nauru. If agreement is reached, all national governments must link the goals with their national sustainable development strategies and implementation plans.

Health has long been considered one of the most important human rights; UN surveys have also indicated this. At the same time, it can be claimed that the good health of members of society contributes to the sustainability of that society. It is therefore natural that four of the eight MDGs were directly or indirectly connected to the health of humankind.<sup>1</sup> Global efforts to fight against disease are not new—the establishment of the World Health Organization in 1948 and the Alma-Ata Declaration of 1978 are two examples. However, greater success was achieved in the field of healthcare only after the adoption of the development goals in 2000.

The MDGs helped to direct global attention and resources towards healthcare-related problems in the entire world, decrease hunger, improve the health of mothers and children, and fight against malaria and HIV. Similarly, improvements in the field of healthcare were supported by the development of medical research and modern medicine, and developments in growing and producing food. International organisations, governments, non-governmental organisations and private enterprises cooperated in alleviating and resolving issues in the field of healthcare. Together, poverty was reduced by half and important steps were taken in combating malaria and tuberculosis; daily access to potable water was made available for more than two billion people. The most extensive public and private sector cooperation programmes, such as Roll Back Malaria and GAVI (The Vaccine Alliance), have been realised in healthcare.

Estonia has also contributed to achieving healthcare goals through development cooperation projects: it has supported the development of the healthcare system in Moldova and helped to create related necessary e-services, supported the creation of a healthcare counselling system in Macedonia, and organised training courses in Afghanistan.

Despite the many success stories in realising the MDGs, several shortcomings have been found in analysing the results—development in the field of healthcare has been unequal, both within and between states. For example, life expectancy at birth is now nearly 80 years in developed countries (77.28 years in Estonia), while it is 60 years in less developed countries.<sup>2</sup> The World Bank estimates that in the period 2010–5, an average of 52 of every 1,000 children under the age of five die. In developed countries, the figure is seven and in developing countries 57; in less developed countries it is as high as 99 children per 1,000. The organisation has managed to reduce chronic malnutrition, as well as child and mother mortality, but there is still much to be done in this field. Each year millions of children, primarily in developing countries, die of diseases that could be prevented or cured. Our general knowledge about HIV/AIDS has improved; diagnostics and more efficient medications give HIV-positive patients

a longer life expectancy. But at the same time, the medications are not available to many, constant preventative work is necessary, and the discrimination of HIV/AIDS patients must be avoided.

The experience gained from the MDGs showed that better results were achieved by countries that invested in their healthcare system so that it offered support to the entire population, not a section of it (e.g. only pregnant women, children and women). Research has shown that even small additional investments in the healthcare system of poor countries significantly contribute to improving the population's health. It is therefore necessary to invest in healthcare systems in general, in addition to dealing with specific diseases in the future. A recent negative example of a weak healthcare system is the Ebola epidemic and the rapid spread of the disease in West Africa. Moreover, the world has changed a lot since 2000, including in healthcare.

Notwithstanding the positive developments in medicine, new issues have emerged in the field of healthcare. Increasingly, more people—both in developing and developed countries—are dying of non-infectious diseases such as cerebrovascular insults, malignant tumours and diabetes. It has been raised many times in UN discussions that mental health and the healthcare services connected to it should receive more attention. Environmental impacts on health should also receive greater consideration—e.g. air quality, both outside and in interior spaces, and the purity and usability of water. Painful issues vary, in part according to a country's level of development, but are also somewhat similar. Development has been uneven in several countries with a fast-developing economy—part of their population still suffers from the problems that the MDGs were supposed to address, while other people already have “modern diseases” like diabetes and cardiovascular disease. Globalisation, travel and migration have created a situation in which various regions are increasingly more closely connected; for example, due to the fact that people travel more, diseases now reach regions where they had not occurred for many decades.

In addition, UN member states have proposed during the discussions that healthcare should have a separate goal in the sustainable development agenda beyond 2015. Consequently, the following objective has been specified as one of the 17 potential SDGs: “[to] ensure healthy lives and promote well-being for all at all ages”. This goal has nine sub-goals that allow continuation of the work that was left unfinished in realising the MDGs: reducing mother and child mortality, restricting the spread of AIDS and tuberculosis, and malaria and other tropical diseases, and combating infectious diseases. There are also new elements in the sub-goals: reducing the number of deaths resulting from non-infectious diseases, greater engagement in preventative work, promoting mental health and general well-being, fighting against drug and alcohol abuse, reducing the number of traffic deaths and injuries, ensuring universal access to sexual and reproductive health services, ensuring wider access to healthcare services and immunisation, and reducing the number of fatalities and diseases caused by hazardous chemicals as well as air, water and soil pollution.

The international healthcare goals for the period 2015–30 that will probably be adopted at the September 2015 summit are thus quite ambitious. Both developing countries and wealthy states need to make an effort to achieve them. Estonia is exemplary in many areas. For instance, its mother and infant mortality rate is very low in comparison to global figures, and it has the cleanest air in the world, according to a 2013 UNICEF report. At the same time, Estonia needs to make a bigger effort in fighting against HIV/AIDS; there are problems with multidrug-resistant tuberculosis, and the incidence of non-infectious diseases needs to be reduced, and preventative work increased.

1 Goal 1 (to eradicate extreme poverty and hunger), but primarily goals 4 (to reduce child mortality), 5 (to improve maternal health) and 6 (to combat HIV/AIDS, malaria, and other diseases).

2 2013: Statistics Estonia (12 September 2014).

# Estonia in the World Health Organization

## The Tallinn Charter is a source of pride in the WHO



**Taavo Lumiste**  
**Diplomat**

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In order to explain the foundations, goals and methods of Estonia's activity in the World Health Organization (WHO), some broader key questions about international health diplomacy need to be addressed. Posing broader and perhaps more philosophical questions needs, first and foremost, to provide an answer to why an international approach to health issues is necessary and where health stands in the broader

context of international relations. Based on this understanding, we can answer the question why it is necessary for Estonia to be involved in this organisation and how this can be done in the most useful and efficient way for the country.

### **What is Health Diplomacy?**

In order to explain health diplomacy and its international implementation, we need to start at the very beginning. The WHO was established as a specialised agency of the United Nations at the 1946 International Health Conference on the basis of Article 57 of the Charter of the United Nations. This means that it was created to deal with one specific field, in this case healthcare. The preamble to the WHO constitution clearly outlines the goals and activities of the organisation.

The very first sentence of the constitution states that an important part of the organisation's activity is aimed at the security of all people. Estonian readers are probably well aware of the extensive national defence model, discussion of which has been wide-ranging and thorough, and so it does not require further explanation. However, I believe that so-called "soft" security threats, including health matters, might require slightly greater attention in the vital services subsection in the non-military sections of the National Defence Development Plan, which should address more than just preparations for a smooth transition to wartime needs.<sup>2</sup>

The WHO constitution outlines the elements considered to make up the aforementioned security. The idea is that health is a human right; it is fundamental to the attainment of peace and security; the contribution of each state regarding health is of value to all states; the unequal level of development in countries is one of the main threats (to security); healthy development of a child is of primary importance; an informed public and its active involvement are important in the improvement of the health of the people. This is a selection of the issues that explain the wider concept. We can see that, in addition to security, health diplomacy in a broader sense includes social and



economic aspects. When we look at the topic more broadly, healthcare is indeed a topic that relates to a person even before he/she is born and still matters after they die. But is there any other topic that relates to us for longer than we are alive?



**Demonstrations in support of people living with AIDS are evidence of growing awareness in society. A support rally for people living with AIDS at Toompea in 2012.**

TEET MALSRÖÖS/ÕHTULEHT/SCANPIX

### **A Selection of WHO Topics Important for Estonia**

The best way to present an overview of Estonia's activity in the WHO is to base it on a human lifespan.

#### *HIV/AIDS—A Matter of Existence*

There is one healthcare issue that can affect human beings before they are born: HIV/AIDS. It is estimated that, without effective intervention, the virus passes on to 15–45% of infants during pregnancy, birth and breastfeeding, thereby having a pre-natal effect on children.<sup>3</sup>

Estonia is at the top of several HIV/AIDS-related rankings. Over the years, 9,127 people in Estonia have been diagnosed with the HI virus, including 443 who have been diagnosed with AIDS. As of the end of May 2015, 134 new HIV-positives had been diagnosed in Estonia this year. Compared to the trends of previous years, I dare to assume that, by the end of this year, the number of people newly infected in 2015 will be slightly more positive than the 291 last year. In terms of numbers, the success is not significant but, if we examine long-term trends, we can see important shifts. 2001 was the peak year, with 1,474 new carriers of the virus, and today the number has fallen below 300—an 80% decrease. The majority of this decrease has been among men. There has been a clear shift in the age groups of infected people. In 2008, more than half the newly infected were in the age group 20–29, but since 2010 the trend has shown less than a third of the newly infected are in that age group today. The number of newly infected in the younger age groups has dropped to sixth place: 20–24-year-olds outnumber the next segment, 45–49-year-olds, by 50%. This trend shows that people’s awareness of ways to avoid HIV/AIDS has increased significantly; in addition, various programmes aiming to stop the spread of the virus have been implemented effectively, including syringe exchange and methadone maintenance treatment. The topic has also been covered thoroughly in schools. Taking into account that many of those infected in Estonia are in the fertile age group, the number of cases where the virus is transmitted from mother to child is also rather positive.<sup>4</sup>

The UN programme UNAIDS deals with the fight against HIV/AIDS. Estonia has not been very active in this, mainly because so far it has been a “receiving” country that needs to focus on its own national problem. However, changes in trends, which are proof of successful action, have received positive international feedback. Due to their similar backgrounds, Ukraine—which has the second-largest number of infected people in Eastern Europe—and Central Asian countries are interested in Estonia’s experience. The positive trends give Estonia an opportunity to become a contributing country in HIV/AIDS matters

and attempt to join the governing bodies of the international organisation.

Why am I focusing so much on an already much-discussed topic? Estonia was once compared to a country that has the same colours on its national flag: Botswana. The percentages there are far different from Estonia's—in this African country of 2.1 million people, there are an estimated 300,000 HIV-positives, which is about a quarter of people aged 15 and over. Only Swaziland has more.<sup>5</sup> In Botswana, life expectancy fell from 64 years to 49 between 1990 and 2002 due to HIV/AIDS. As a result of successful action, life expectancy in Botswana went back up to 53 years by 2012. However, these development trends demonstrate that HIV/AIDS was an epidemic that threatened not only the security of a population but also its very existence.

### *A Healthy Mind in a Healthy Body*

Moving forward along the lifespan, we come to the health of mothers and children. The promotion of breastfeeding is very important for Estonia. This year marks 25 years since the adoption of the Innocenti Declaration, produced in cooperation between the WHO and UNICEF, which places breastfeeding infants at the centre of their healthy growth and development.<sup>6</sup> The first week of August each year is dedicated to the promotion of breastfeeding. This issue is familiar to Estonians and the country's breast-milk bank is an asset that could be an example for many developed countries.

From breast milk we can move on to the closely related topic of nutrition—primarily mothers' nutrition, because there is an obvious link between a healthy mother and a healthy child. Estonians have a relatively varied diet and are far in the lead of developing countries in this respect. However, Estonians also need to be reminded of the principles of a balanced diet. The activity of the National Institute for Health Development, such as last autumn's campaign "A Man Must Be Fruitful", may be light-hearted but it also has the necessary

substance (and addresses women as well as men) to remind people of the recommendation to eat at least five portions of fruit and vegetables every day.<sup>7</sup> Programmes promoting balanced school meals serve the same purpose.

This is an important issue, bearing in mind that nutrition is a problem not only for developing countries but also for developed nations—only the narrower focus of the topic differs. An increasing problem for the developed world is the population's growing bodyweight and insufficient physical activity, which in combination lead to more serious health issues. Research among Estonians indicates that this issue needs to be tackled because the trends are heading in the wrong direction.<sup>8</sup> The promotion of healthy eating is a clear priority, and Estonia also stands for these principles at the global level.

From nutrition to an increasingly serious issue: antimicrobial resistance (AMR). The resistance of microorganisms to antimicrobial drugs is a growing global trend. At the beginning of June, Estonians learned that quails eggs imported from Latvia—considered to be a great source of vitamins and which, unlike cod-liver oil, are also a children's favourite—contained traces of antibiotics. AMR is also a problem in agriculture, so providing healthy food requires effective cooperation between different sectors.

The food Estonians currently eat is relatively *bio* and *organic*. However, in order to establish a monitoring system for AMR that simultaneously covers veterinary medicine, agriculture and human health, we need to work at the national and international level. Although the problem in Estonia is relatively small, in several southern and Eastern European countries AMR has made the treatment of pneumonia very difficult.

Antibiotics are related to another important topic for Estonia: e-health. An electronic prescription and purchasing medication with the prescribed active agent is nothing virtual but, rather, a clear attempt to avoid the misuse of medication and the unwelcome consequences this causes. It also reveals efforts to improve the provision and accessibility of healthcare services. As tends to happen with systems

in the works, in many instances there is room for improvement, but, even compared to many developed countries, the overall system in Estonia today is quite good. The best possible access to healthcare services is a goal for Estonia in the WHO, as well as in the country's development cooperation and contributions to crisis relief.

### *Healthcare Support Systems—The Healthcare Provider*

Healthcare services do not reach people only via the virtual environment—personnel are also required. The 2010 World Health Assembly adopted the Global Code of Practice on the International Recruitment of Health Personnel.<sup>9</sup> One of the principles of this code is the recognition that there are not enough healthcare personnel in the world and that they move around the globe according to demand and pay. It also integrates aspects of migration—currently a very hot topic, also from the viewpoint of the country's sustainability and security. The code calls on countries to follow voluntary principles which take into account the capabilities and needs of source countries and destination countries, and the rights, obligations and expectations of migrant healthcare professionals. Estonia is mainly affected by the regional movement of healthcare personnel—many people on a waiting list for medical treatment have probably thought about bringing home Estonian doctors who have moved to Nordic countries. As countries often have different interests on this topic, progress is not being made with Estonia's otherwise efficient and successful Nordic cooperation. But trends in the cross-border movement of healthcare personnel are under scrutiny across the region.

It is crucial to have an efficient healthcare system and ensure its capacity, as was demonstrated by the Ebola outbreak, which continues to this day. Notwithstanding the Millennium Development Goals, a majority of which are healthcare-related, the creation of sufficiently robust healthcare systems has failed in many countries. The Sustainable Development Goals and targets which will be adopted in New York in September will take the required actions forward. Estonia's position among the world's healthcare systems is

demonstrated by its being one of the very few countries that have contributed to stopping the Ebola outbreak in three ways: financially, with experienced personnel, and through work by researchers at the University of Tartu on developing an Ebola vaccine. It might be said that this is a small country's flexibility in rapid-reaction situations, but it is certainly evidence of Estonia's ability to contribute to global healthcare during a very critical period.

Ebola is also an example of how the relativity of healthcare exceeds the timeframe of human life. Those who have followed the topic know that one of the three goals set by the WHO to end the Ebola outbreak emphasised the importance of safe burial. One way that the extremely contagious disease is transmitted is related to the cultural and religious traditions of the affected region, including interment. There have been several cases in which the deceased person who had been buried in a safe manner by rescue teams was later re-buried in the traditional way, and the disease was transmitted from the deceased after their death. Close cooperation between healthcare workers and cultural anthropologists is essential if such cases are to be avoided.

For countries to be able to contribute effectively to global healthcare, the WHO itself needs to be effective. The expert group on WHO reform, composed of member states, was created at the beginning of this year and includes a representative from Estonia as one of two from the Europe region. One of the aims of the working group is to provide solutions to how the global organisation could act more effectively on three levels of responsibility—global, regional and national.

The results of the reform will certainly affect the (currently) few Estonians who work in the WHO system. In order for Estonia to be more successful in this field, it should attempt to create special courses on healthcare diplomacy in the country's universities. Compared to, for example, studies on the European Union, the number of specific courses in Estonia about other international organisations is low. Estonia's presidency of the EU in 2018 provides an opportunity to get much more involved in these topics.

### *Estonia's Pride and Joy in the WHO—The Tallinn Charter*

Finally, Estonia's very own creation in the WHO—the Tallinn Charter. This was adopted in 2008 in Tallinn at the WHO European Ministerial Conference on Health Systems, which was titled “Health Systems, Health and Wealth”. The purpose of the charter is to commit member states of the WHO in the Europe region to improving people's health by strengthening health systems, while acknowledging social, cultural and economic diversity across the region.<sup>10</sup> The preamble to the Charter outlines several issues mentioned in this article: healthcare systems are related to policies in other spheres, to global health challenges, including demographic and epidemiological changes, to limited resources, to the development of technology, and to people's growing expectations of healthcare services. We know that a healthy body has a healthy mind. Similarly, we can acknowledge that health is an asset in its own right—the improvement of health contributes to the growth of social well-being, affects economic development, competitiveness, and productivity, and helps to establish the wealth of the whole population. In the Tallinn Charter, member states committed to promote shared values but also to invest in health systems and to foster investment across sectors that influence health and, at the same time, to be accountable for health system performance and measurement.

### **Conclusion**

It is clear that the Tallinn Charter is related to all the previously discussed topics with which Estonia is dealing in the WHO. Although the UN and its agencies are often considered prime examples of the inefficiency of global politics, we must admit that healthcare is a sphere that involves everyone—and not only during their lifetime, but also before birth and after death. It is certainly possible to see similarities with the principles of the Estonian constitution. Like international politics and multilateral relations, political processes are two-dimensional. This means that, on one hand, countries contribute on an international level to advance world development while, on the

other, the international agenda is also delivered to our doorstep. A strong country demands strong international involvement in those fields as well, whether this means passive observation or active leadership. Taking into account its size and capacity, Estonia's activity in the WHO can be considered a high-level contribution.

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3 <http://www.avert.org/prevention-mother-child-transmission-pmtct-hiv.htm>

4 Data are available on the Estonian Health Board website:

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7 <http://tervis.postimees.ee/2920491/algas-kampaania-mees-peab-olema-viljakas>

8 Triin Eglit's doctoral thesis "Obesity, impaired glucose regulation, metabolic syndrome and their associations with high-molecular-weight adiponectin levels", defended at the University of Tartu in 2014, offers a good overview of the topic and the situation in Estonia.

9 [http://apps.who.int/gb/ebwha/pdf\\_files/WHA63/A63\\_8-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_8-en.pdf)

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# WHO Reform Strengthens Country Offices Across the World

**A widespread network provides the World Health Organization a good overview of the health systems in different countries.**



**Marge Reinap,  
Head of WHO Country Office in Estonia**

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WHO

## **Jarno Habicht, WHO representative in Moldova**

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*This article expresses the authors' personal views.*

When talking about the topics that the World Health Organization (WHO) deals with, it is easy to point out that they cover all aspects of health. Established in 1948, the WHO is the only international organisation that has received from its member states such a broad mandate in the field of health. It is expected to contribute to achieving the highest possible level of health of all peoples. This goal cannot be achieved merely by creating standards and implementing change at the global level; countries must also be supported in dealing with

challenges and strengthening health systems. This can best be done via country offices that are familiar with local circumstances and needs. Public health as well as health system's issues and important topics are somewhat similar in different countries, irrespective of the countries' income and level of development. At the same time, every country has its own set of problems and challenges, in resolving which international experience as well as the experience of other countries is useful; the WHO's competence and substantive technical assistance is therefore welcome and provides additional value. Because of this, the WHO has the largest network of representation of all UN organisations.

### **WHO Country Offices and Adapting Them to Today's Challenges**

In the field of international cooperation, parallels can be drawn between the WHO's country office and diplomatic representations. However, in the field of health they can also be compared to primary care centres, which deal with diagnosing, counselling on, treating and coordinating health issues on all levels under a family doctors leadership. Hence, a WHO country office deals with assessing the health situation, counselling different stakeholders and strengthening the health system, while also paying attention to the most vulnerable population groups. In addition, WHO country offices provide the member state, UN organisations, international partners, civil society organizations and others the possibility to communicate effectively with the different structures of WHO.

There are WHO country offices in 29 European countries, plus an office in Kosovo. They vary in size and structure according to need, the level of development of a specific country and the intensity of cooperation. The WHO's diplomatic representations in Europe have been established over recent decades (in the case of Estonia and Moldova, in the first half of the 1990s). There are a few WHO country offices with a longer history; for example, the first country office in Europe was established a little over 55 years ago, in Turkey.

One of the aims of the WHO reform initiated in 2012 was to harmonise the role of all country offices and adapt them according to

today's needs. As a result, their activities focus more on providing policy advice and technical assistance as well as increasing the capacities of countries' institutions, at both national and local levels. Moreover, besides the ministry of health, it is important to expand the scope of regular cooperation to other ministries and partners from the private and third sectors to include everyone in health development. Among other things, strengthening the teams in country offices and increasing the number of staff rotations between countries has become one of the developing trends.

Today, WHO representations vary from small representative offices, mainly in Eastern Europe, to large ones in Central Asia. For example, most of the countries that joined the EU after 2004—including Estonia—have only small offices with one representative. In crisis hotspots, however, such as Turkey and Ukraine, there are also sub-offices for coordinating and resolving humanitarian crises, including for disease prevention, ensuring basic healthcare services and the availability of medications. Up to 20 specialists work in the larger WHO country offices in Europe. The size of offices in other parts of the world varies—for example, there are offices with more than 100 staff in Latin America, and a centre involving thousands of personnel in India, where the main aim is to strengthen the health system, but also to organise focused programs, such as eradicating polio.

One thing specific to Europe is the direct cooperation between a regional office and a country without a WHO country office. But also the cooperation with EU member states has intensified in recent years; for example, the WHO teams operating in Greece and Cyprus deal with restructuring health systems at national level. In addition to the role of a health-specialised agency, in five EU member states, including Estonia, the WHO is the only UN organisation represented and fulfils a wider remit of coordinating and representing the UN as a whole.



**Indian artist Sudarsan Pattnaik building a sand sculpture against smoking, part of the WHO's promotion of World No Tobacco Day in India on 31 May 2015.**

AFP/SCANPIX

### **Activities of a WHO Representation**

The WHO's activities across the whole organisation are described using six core functions:

1. providing leadership on matters critical to health and engaging in partnerships where joint action is needed
2. shaping the research agenda and stimulating the generation, translation and dissemination of valuable knowledge
3. setting norms and standards, and promoting and monitoring their implementation
4. articulating ethical and evidence-based policy options
5. providing technical support, catalysing change, and building sustainable institutional capacity

## 6. monitoring the health situation and assessing health trends.

Due to the fact that the WHO has a three-layered structure, some of its six main functions (see box) are more centralised than others, but the country offices have a central role in all of them in one way or another. The majority of the work performed by the representations is related to leading and partnerships, providing policy guidance, technical assistance and capacity building. Should the need arise, countries are also supported with expert missions from other levels of the WHO. Nearly 400 expert missions dealing with very different health-related topics were conducted by WHO staff in Europe in 2014. The country offices also have an important role in the event of emergencies and humanitarian crises, when the WHO is responsible for coordinating health-related humanitarian aid (Ukraine is one current example) and supporting the country in dealing with crises as leader of the health cluster in the UN system.

The country offices have an ever-more important role in exchanging experiences between countries and creating networks, including south–south cooperation and three-way partnerships. Several sub-regional structures have been created for this purpose in Europe in recent decades. For example, the Baltic Policy Dialogue has gathered every year since 2004 to discuss the challenges in health systems; the South-east Europe Health Network has competence centres in several countries; and there is a functional health information network in Central Asia. In recent years, similar institutional networks have been established across regions (for example, the Joint Learning Network on Universal Health Coverage). The aim of the various networks is to complement each other, but a future challenge will be to maintain their effectiveness and participation by smaller member countries.

As already mentioned, the size of WHO country offices varies from country to country; so do the scope and methods of their operations. WHO representations in Estonia and Moldova provide a good example. The representation in Estonia—similarly to other representations in the so-called new EU member states—comprises a two-member team: the head of the country office and an assistant.

One of its main roles is to identify the need for technical assistance and find the best solution for supporting the country in cooperation with the corresponding field experts from regional office—be it sharing the experience or best practice of other countries, organising training courses and seminars to increase capacities, or providing policy guidance. The country offices are also responsible for conducting independent evaluations and providing suggestions for improving health systems based on assessments. Good examples of the latter are evaluations concerning the arrangements for HIV treatment and care, the sustainability of financing health systems, and the management of non-communicable diseases in the health system.

Due to the flexibility of its operations, the operating area and cooperation of the country office in Estonia is very wide despite its small size, covering a number of topics ranging from environmental health to pharmaceutical policy. Other continuing priorities include tuberculosis and HIV, health system financing and the prevention of non-communicable diseases, with special attention to risk factors such as smoking and nutrition. It is useful to share Estonian knowledge and expertise with other countries, especially the countries of the former Soviet Union, where Estonia's experience in restructuring the healthcare system and efficient operations in the area of tuberculosis and reproductive health are the most sought-after, but there is also a growing interest in e-health from European and other regions.

The WHO country office in Moldova consists of 15 people, who provide advice in most fields and coordinate the WHO staff and external experts visiting the country. In addition, the team coordinates development aid in the health area and actively promotes policy dialogue on all levels. In recent years, the main priority areas have been the prevention of non-communicable diseases, especially tobacco control (stemming from the WHO Framework Convention on Tobacco Control), and reducing the harmful effect caused by alcohol, developing the health system—including working in areas such as health financing, —addressing the mobility of healthcare workers, structural changes in service provision and the availability of medicines. These areas account for three-quarters of all resources. At

the same time, the prevention and control of tuberculosis, as well as other fields agreed upon in the UN Millennium Development Goals, also require attention. Thanks to the WHO's neutral position and its standards setting function, it has been possible to start a dialogue and share knowledge in several areas in the Transnistria region, for example concerning the prevention and treatment of tuberculosis and HIV, vaccine preventable diseases, maternal and child health, healthcare financing and so on. Since 2012 activity increased in particular region and support for the development of the health system in the whole country is expected in the years to come.

### **Health, Partners and Diplomacy at the State Level**

On a wider scale, there have been two important health-related developments in recent decades that require more and more attention in the WHO's regular activities. Several new partners have emerged, including funds such as GFATM (which deals with HIV, tuberculosis and malaria), GAVI (which specialises in immunisation), several charitable organisations interested in the health area (Bloomberg, the Bill and Melinda Gates Foundation and others) and non-profit organisations. In addition, health is an important priority for several countries offering development assistance (for instance USAID), and some (such as Norway, the United Kingdom and Switzerland) have clearly stated their positions related to health in their foreign policy. Although the WHO is a normative, standard-setting organisation that does not directly provide financial aid, it has become increasingly necessary to coordinate the limited resources of development assistance effectively and ensure their integration into countries' health systems.

Internationally, the WHO cooperates with increasing number of partners through different mechanisms and the situation is the same at the state level. Using Moldova as an example, different groups of partners can be involved, with various impacts in the field of health.

The first area is the general coordination of development assistance in health, which involves the largest number of partners; there are 20 organisations, funds or countries active in this field today. The



number of partners has increased in recent years (new partners include Estonia, Norway and Japan) or addressing health challenges has received increasing priority for development aid (Switzerland, for example) . In Moldova, various partners provide an additional 15% a year to public-sector health funding.

The second area is other UN organisations, of which ten (including UNICEF, UNFPA, UNAIDS, UNODC, OHCHR, UNDP, IAEA, UNECE and UNESCO) have their own activities in the health area, providing additional knowledge and support. This is integrated into a document summarising UN activities in a country (the UN Development Assistance Framework), but also often requires the coordination of several parties. It is also important to implement at the state level UN resolutions—such as that from 2011 addressing the non-communicable diseases—or global health and foreign policy from 2012, as well as to bring together all UN organisations according to their mandates in health-related topics.

Third, international non-profit and charitable organisations increasingly support countries with their network and activities, and complement local organisations. The role of the WHO at the country level is to ensure the transparency of the coordinated overseas funds and their effective use, and share information to create synergy in cooperation with local health ministries.

Finally, in order to improve people's health greater cooperation is needed with different sectors within a country, along with promoting the so-called “health in all policies” approach.

Each country office has a different number of partners, depending on the country's level of development. Unlike Moldova—which is classified by the World Bank as a medium-income country—Estonia (a high-income country), does not have other international organisations or foreign donors as WHO partners. Nevertheless, the continuous strengthening of health systems is important in all countries—this is one of the most important lessons learnt from the Ebola crisis. The WHO's main partners in Estonia are, first and foremost, government health-related institutions, such as the Ministry

of Social Affairs, National Institute for Health Development, Estonian Health Insurance Fund, and Health Board; plus various local health-related non-profit organisations operating in this field and networks promoting health, such as health-promoting hospitals, cities, schools, workplaces, etc., a movement Estonia started in the 1990s. In recent years, a trend stemming from the WHO reform has been to increase cooperation with partners outside the health sector whose decisions have an impact on health. These are mostly in the government sector, such as the ministries of justice, agriculture and the environment, and their agencies. The possible circle of partners changes over time and their number is growing.

## **Conclusion**

Compared to the era when the WHO was found, a number of different parties have appeared on the international health landscape, all of whom fulfil a different role in solving health problems. Nevertheless, there is a continuing need for an independent organisation, unaffected by special interests, to act as a leader and coordinator in health matters and establish evidence-based norms and standards on which participants in the health field can rely in their activities and decisions.

The WHO continues to be an important partner at the state level too, as shown by the wide network of WHO country offices across the world and in Europe. Various countries have expressed the need for the direct technical assistance provided by the WHO and its physical presence, irrespective of the country's regime, income and level of development. A major factor is undoubtedly the WHO country offices' flexibility, and the ability to adapt their operations and roles according to a country's circumstances, needs and relevant health issues, and also according to the partners operating in the health field. In recent decades, while the WHO country offices fulfil a similar role in different countries and the topics they deal with are much the same, the differences lie in the intensity of cooperation and involvement, policy dialogue and readiness for change, the competence of local institutions and experts, and international partners.

Thanks to its widespread network of country offices, the WHO has a very good overview of different countries' health systems, developments and needs, and different experiences concerning reforms as well as expert knowledge that can be flexibly shared with other countries, adapted to the local context and thus enabling countries to make better decisions. This trend is also supported by the WHO's reform carried out over recent years, the aim of which is to strengthen the representations even further.

More information about the ongoing reform can be found on the WHO website: [http://www.who.int/about/who\\_reform/en/](http://www.who.int/about/who_reform/en/)

### **World Health Organization in Europe**

Established in 1948, the World Health Organization (WHO) is a specialised agency and part of the wider UN system. The WHO has 194 member countries, and country offices in 149 countries, territories or areas, and is thus the UN organisation with the largest representation network. Its headquarters are in Geneva, and the WHO's three-layered structure also features regional offices on the basis of which countries and territories are divided into six regions. In addition to countries in Western, Central and Eastern Europe, the European region also covers the former USSR countries in the Caucasus, Central Asia, Turkey and Israel.

Cooperation with the 53 countries in the Europe region is not limited to the WHO country offices' operations in these countries—the states have an active role in the WHO's regional and global structures and governing bodies, while the countries participate in the annual World Health Assembly taking place in May, and the relevant Regional Committee in September, hence deciding the WHO's priorities and activities. Countries also actively participate in representative bodies and several thematic work groups. Ministerial Conferences are

organised on priority health topics, the most familiar of which for Estonians is probably the ministerial conference on the topic of health systems, which took place in Tallinn in June 2008 and concluded with the Tallinn charter titled “Health Systems for Health and Wealth”. Similarly, in recent years there have been agreements between ministers, countries and partners concerning fields important to public health, such as tobacco control, non-communicable diseases, nutrition and environmental health.

# E-Health Brings Democracy to Healthcare

**Patients can have a say in their treatment with the help of information technology**



EERO VABAMÄGI

**Ain Aaviksoo,  
Deputy Secretary General of the Estonian Ministry of Social Affairs**

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There is a creeping revolution taking place in healthcare—whether we define it as medical assistance in the event of illness or a family nurse-practitioner’s advice on healthy living. An authoritarian regime is being replaced with a democratic one. The revolution is proceeding at a threatening pace and cannot be stopped; it is supported by information technology—it is e-health.

Doctors have had indisputable authority in matters of health for thousands of years—they know where diseases come from and how to fight them. In the 21st century, doctors can use technology that

literally allows them to control life and death, and, if it is so wished, change a person's gender.

On the other hand, it is clear to all that decisions affecting our health are made more often without a doctor's advice by each and every one of us. We make the decisions during our everyday life: to eat a certain foodstuff or not, to drink something or not, to go and exercise or not, etc. Many little decisions have an enormous collective impact. And, even though a doctor will write us a prescription if we are ill, it remains in the individual's hands whether to take the medicine and follow the doctor's advice. It is known that 50% of people who have received prescription drugs do not take them in the prescribed manner.

Using information technology in improving or maintaining health—i.e. e-health—helps primarily with closing the gap between the roles of specialists with extensive knowledge (doctors) and decision-makers with great influence (people).

E-health helps people to understand their health condition better and presents potential choices for improving it, according to the doctors' understandings. This facilitates making the correct decisions and improves cooperation with healthcare specialists.

E-health helps doctors to bring information about a person gained from various sources together into a comprehensive whole and prepare a treatment plan that best suits the person's individual characteristics and preferences. This may also mean that cooperation between specialists, each of whom only works with a part of a larger problem, will become easier. As a result, the treatment is more person-centred and efficient, as well as of high quality.

At the system level, digital data allow the quality and efficiency of healthcare to be evaluated more quickly than hitherto—considering all factors that have an impact on a person's health has not been achievable alongside the provision of healthcare services. The very same algorithms that coordinate the logistics of millions of postal deliveries, buy shares on the stock market or match advertisements to user profiles in search engines allow the discovery with increasing

accuracy of how the complex combination of a person's individual traits and behaviour and the healthcare services provided to them contribute to the final outcome.

The democratisation of healthcare thus means the gradual transfer of the burden of decision-making from the specialist “mediators” to ordinary people. Or, rather, the paternalistic model transforms into one of co-decision, in which the doctor and patient sit in front of a computer screen together and consider the various alternatives for intervention on the basis of the same information by combining medical aid and the person's behavioural choices.

As with all technological innovation, e-health is initially a clumsy solution with varying levels of quality. However, taking into account the experience of other sectors, the efforts of millions of people and machine learning, there is no reason to doubt that, in terms of factual knowledge, people will quite soon know nearly as much about their health as the healthcare professionals aiding them. Already, family doctors in Estonia say that an increasing number of patients have managed to find out more details about their illness than any doctor ever could about any of their patients' conditions.

Thus, in a democratic healthcare system, a person is not an object on which treatment is implemented but rather a subject who, by making decisions, chooses the direction of his or her own health, including the associated activities of the doctors. The healthcare system is an active participant in the process in a supporting role, and e-health helps to translate between the two worlds as well as to make them cooperate with each other efficiently.

How does this concern Estonia? How far is our e-health system from this vision of the future? Actually, not that far, since, in Estonia, a solution has been found for one of the most complex technical components—the safe integration of data originating from various sources. A health information system uniting data from all healthcare institutions and, if necessary, from other sectors, is an asset. To comprehend this, one may contemplate why countries far more powerful than Estonia have invested billions into creating this type of

capability, but still envy our elegant solution that currently remains out of their reach.

To realise the vision of the future described above, Estonia needs to harness the existing potential in doctors' and nurses' work computers and patients' smart devices. The capability to implement positive solutions fast is proven by the already legendary digital prescription and the recent digital medical certificate proving a person's fitness to receive a driving licence: the former went from idea to 80% application in nine months, the latter in just six. In fact, some Estonian hospitals have found that a digital system for ordering and planning radiological investigations or an application with which a doctor may comfortably administer patients' data increases efficiency by a third, i.e. the hospital is able to perform 30% more investigations or a doctor service 30% more patients in the same length of time.

If we examine the local criticism of e-health more closely, we see that there is a need to homogenise the general stimuli in the field of health policy: the fees of healthcare institutions should be linked to the quality of results, not the volume of services performed; those networks of service providers that cooperate efficiently should be rewarded with the money saved by the Estonian Health Insurance Fund owing to them; patients' feedback should be considered in reimbursing healthcare institutions, or healthcare budgets should be added to local-government budgets in addition to social-welfare allocations—these sums could be used to provide treatment and care at home instead of using hospital facilities. These are not the only examples, but decisions in the field of healthcare policy much like these are the main and most powerful drivers of development in all countries where e-health is developing swiftly—for example, Denmark, Sweden, the US and Singapore.

We could learn from such systems and quickly implement desktop applications developed for end-users, while we can already offer the possibility for analysing large amounts of data based on the extensive joint use of health data, and, for example, developing the possibilities of personal medicine based on the joint use of genetic and health data.



The development priorities of e-health over the next five to ten years and the ways of achieving them will be agreed in the new Estonian e-health strategy, which will be ready by the autumn. It is important for the population that, instead of listing technical applications, the objectives should be:

- a specifically improved and measurable quality of healthcare
- cooperation between various service providers
- application of the principles of individual (i.e. personalised) medicine in prevention and treatment, and more specifically prevention activities that consider a particular person's risks
- using the potential of telemedicine to create a more efficient healthcare system.

In addition to other e-services, the long-awaited digital hospital reception or smart applications are a natural part of e-health that offers actual, quantifiable value for people and society.

Does e-health involve risks? Undoubtedly—just like any other activity in life.

Health data are especially sensitive, which is why it is feared that privacy is in danger, as digital data can be processed conveniently and in large volumes. But in fact, it has been proven many times in Estonia that the greatest security and privacy risk is connected with the weaknesses of people, not technology. When someone looks up data in a paper file, they leave no trace, but our ID-card-based authentication leaves a very clear trace of each data use, on the basis of which healthcare providers have been punished where a violation has occurred. This transparency, including in the case of national databases, is a luxury that the specialists of other countries admire and want to learn from.

Another, more serious, issue is the overabundance of information occurring due to the large quantity—and often low quality—of data. At best, this may hinder reaching a decision, while, at worst, it may even be misleading. Time and determined work help against noisy data. It has been proven all over the world that the quality of data can

only be improved by using it—no one would bother to make improvements solely for collecting data; that would be pointless. However, if a stimulus supported by healthcare policy were created, owing to which the collected information was used for making decisions, the users of the data would start to demand correct data from the primary data inputters. This, in turn, would create pressure to agree upon specific data standards, and rules for entering data conveniently and checking data quality.

It may be that the most intangible anxiety is connected to changing the trust-based relationship—when a computer (a machine) begins to stand next to or come between a doctor and the individual. This is explained by the fact that the computer would provide support in decision-making, as the volume of data exceeds the amount that can be processed by a human brain, but also by the fact that the interpretation of health-related information—thus far only offered by a doctor—would begin to compete with the probabilities provided by a computer. In this question, we can hope that time will make us wiser and a new balance of responsibility and obligations will be found in the new situation.

Digital solutions have greatly changed business, tourism, entertainment, banking and other sectors. Today, education and healthcare are developing quickly and in a very interesting direction. The common denominator of radical digital changes in all fields is that solutions that used to be created by a small circle of specialists and sold to society at a high price are now becoming gradually and cheaply available to everyone, while taking account of their individual preferences. This is a revolution in progress.

# Estonian Genome Center—16 Years of Achievement

**An ageing population and changes in the environment and lifestyle put more pressure on healthcare systems**



**Andres Metspalu**  
**Academician, Director of the Estonian Genome Center**

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*Andres Metspalu has been Director of the Estonian Genome Center since 2008. He was Director of Research at the Estonian Biocentre from 1986 to 1992, after which he was Biotechnology Professor and Head of Chair of the Institute of Molecular and Cell Biology, and (from 1996 to 2007) Director of the Center for Molecular Diagnostics in the United Laboratories of Tartu University Hospital. Metspalu was elected a member of the Estonian Academy of Sciences in the field of biotechnology in 2010. He has published a number of research articles in Estonia and abroad.*

It has been such a long time since the establishment of the Estonian Genome Center that it is worth reminding ourselves how we got to where we are. An idea always needs a certain environment to develop

and come to life. There were a number of prerequisites for the idea for the Center that emerged in 1999:

- The human genome project led by the US National Institutes of Health, and another project that had emerged alongside it, carried out at the private Celera Genomics institute led by Doctor Craig Venter. This project had discovered that the human genome is very varied and this variation is the reason people look different, get sick and react differently to medications.
- A private enterprise called deCODE Genetics was established in Iceland under the leadership of Professor Kári Stefánsson with the aim of describing the genomes of the local people and their relation to health.
- In Estonia, the government led by Mart Laar was looking for ambitious projects, and we presented the idea for a genome centre with the then director of the Tartu University Hospital, Doctor J. Pikan, which attracted interest.
- And finally, as always, a visionary article in the journal *Science*, which explored the idea of relating population health databases with gene science.<sup>1</sup>

As a result of a broad discussion, on 13 December 2000 the Parliament of Estonia approved the Human Genes Research Act that provided the foundations for establishing and maintaining the Estonian Genome Center and has fulfilled that goal well ever since. The state allocated 1,000,000 kroons to establish a foundation for the Center. This foundation gathered an additional 4,500,000 kroons from private investors in Estonia and the US, which made it possible to build the primary infrastructure for the Center, train the staff and general practitioners, and gather the first 10,000 or so gene donors into a database with health information and blood samples.

Since additional private investors could not be found, the government decided to continue the process of establishing the Genome Center in a way that would make the University of Tartu responsible for its operation and administration, while three ministries (Education and Research, Social Affairs, and Economic Affairs and Communications)

would be responsible for covering the costs of its establishment. Further costs of maintenance would be reimbursed to the University of Tartu from the state budget by the Ministry of Social Affairs. And that is how it has been. By the end of 2010, more than 50,000 gene donors had joined—that is nearly 5% of the Estonian population over the age of 18—and since then, new people have joined in smaller numbers and on a project basis.

According to the Human Genes Research Act, the University of Tartu has the following tasks as the Genome Center's operator:

- to promote the development of gene studies
- to gather information about the health and heredity of the Estonian population
- to apply the results of gene studies to improve the health of the nation.

Looking back at how these tasks have been accomplished so far, it could be said that gene research has been widely promoted, mostly by the research and development facility at the Genome Center, with extensive domestic and international cooperation. Thanks to the financial support of the European Union, the Genome Center possesses world-class DNA analysis technology, which has served hundreds of research projects led by Estonian and foreign researchers in addition to facilitating a thorough analysis of donor gene samples.

Research facilities have always been an important part of Estonian medicine and, in addition to a number of other examples, in my own field I can point to the screening of newborns and the establishment, 20 years ago, of the Molecular Diagnostic Center in cooperation with the Tartu University Children's Hospital and the Estonian Biocentre. Now, with the help of Tartu University Hospital, the Estonian Biocentre and the Estonian Genome Center have helped to implement microchip analysis and second-generation sequencing for diagnostic purposes. This is a classic example of technology transfer.

The Estonian Genome Center was a founding member of international biobank consortiums on a global ([www.p3g.org](http://www.p3g.org)) and European

([www.bbmri-eric.eu](http://www.bbmri-eric.eu)) Level. We have published a considerable number of research articles in high-impact journals such as *Nature*, *Nature Genetics*, *Science*, *The Lancet*, *The Journal of the American Medical Association* and *The New England Journal of Medicine*, and have won a number of research grants from EU research support programs.

The domestic and international research conducted so far has led to the development of a research base and technological opportunities for studying the genetic variety of Estonian people and applying it in real medicine in the form of pilot projects; there are still a number of questions that need to be answered, such as the real extent of false positive and negative responses, clinical applicability, cost-income ratio, doctors' ability to use genetic information along with decision-supporting software, and increasing people's contribution to practising a healthy lifestyle. However, one has to get into the water to learn how to swim and this is exactly what Estonia is planning to do, since the government approved the drafting of a pilot project in December 2014; the Ministry of Social Affairs is currently exploring the possibilities of and prerequisites for starting this project in a preliminary research basis.

In the research program for the coming period, the EU has also allocated significant sums to the development of personalised medicine. For example, the end of March saw the deadline for submitting projects on the topic "Piloting personalised medicine in health and care systems"; 63 projects from around Europe, each worth up to €15 million, were submitted in the first round, of which 11 proceeded to the second round, from which two winners will be chosen in the next few months. Although the corresponding programmes in the US (the Precision Medicine Initiative) and the UK (the 100,000 Genomes Project) are better known, the Finnish Gene Atlas programme—introduced at a conference in Helsinki specially organised by SITRA, the Finnish Innovation Fund, a few weeks ago—is expected to have a very significant budget.

In this way, world healthcare is always moving towards creating decision-supporting software for doctors which, in addition to using

regular health data (age, sex, body mass index, etc.), would also be able to employ genetic information—which alone has the power of prediction since gene variants generally do not change throughout life. An Estonian reference genome database has been created in the Genome Center—in July this year, it will hold the full genome sequences of 2,400 donors—and a gene-mapping analysis has been performed for over 20,000 gene donors. Using the new reference database, today we are able to significantly complement and specify the genome information of those 20,000 donors, and—when combined with the health information in the Genome Center (data collected before donors joined, as well as medical cases that have occurred since)—we can create very good algorithms for predicting the risks of disease and therapeutic effects of medications on people.

So much for the Estonian Genome Center. But why are more and more biobanks being created around the world? There are several reasons:

- Understanding the information hidden in the genome has been one of the most important developments in biology ever since Watson and Crick published a two-page article on the discovery of DNA structure in the journal *Nature* on 2 April 1953, in which they modestly noted that “It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material”, highlighting that heredity is passed on through DNA. In order to study genome variety, large biobanks containing people’s genetic and health information are needed.
- The pharmaceutical industry is no longer able to create effective new medications stemming from combined synthesis and screening because people respond to medications differently due to the structure and function of their genome and the fact that diagnosed diseases have a number of different causes. The time when there were a couple of histologically differentiable “lung cancers” is long gone—today, we have malignant tumours with nearly 15 different

molecular (i.e. genetic) causes, each of which requires different medication.

- An ageing population and changes in the environment and lifestyle (food, urbanisation, little physical activity), have increased the burden on healthcare systems and the prevention and prediction of disease needs to be improved in order to provide the same volume of healthcare services even ten years from now. In this context, innovative solutions, including those using genetics and involving changing one's lifestyle, are particularly needed.

Smaller biobanks existed in the Scandinavian countries, the Netherlands and Germany before the Estonian Genome Center was established. The Europe-wide biobank is the European Prospective Investigation into Cancer and Nutrition (EPIC) and is hosted by the WHO's International Agency for Research on Cancer in Lyon (<http://ibb.iarc.fr>). The UK biobank (<http://www.ukbiobank.ac.uk>), where the health information and blood samples of 500,000 people were gathered during 2006–10, was established at the same time as the Estonian Genome Center. In the near future it will complete compiling gene maps for all the people in the UK biobank.

In 1996, Iceland's deCODE Genetics established the first private biobank, which was sold for \$415 million to Amgen, a US biopharmaceutical company, in 2012. A California-based company, 23andMe (<https://www.23andme.com>), asked people to send their saliva samples and a completed short health questionnaire, and cover the expenses themselves. Nearly a million people, including a number of Estonians, have used this service; the kit is now sold in pharmacies in the UK, where anyone can buy it and have a gene map analysis prepared. In addition to providing feedback to people and for research purposes, several pharmaceutical companies have shown interest in this database. In the last few years, 23andMe has signed more than ten contracts with various companies for the anonymous use of their genetic data. (An especially large number of such transactions were made after Amgen bought the Icelandic biobank.) It appears that companies, too, are moving towards personalised



medicine. Today many medications require determination of the patient's genotype before being prescribed.

So why is it that not everyone is cheering, journals still publish sceptical articles and conferences cast doubt on the present results? The reasons are very human-centred:

- Many people are used to living and working “in the old days” when there was no genetics and everyone was “cured”
- Treatment fees depend first and foremost on a person being sick and the type of illness; being/staying healthy or, in other words, preventing disease, receives less funding. For example, according to the Estonian Health Insurance Fund, only about 1% of its €1 billion budget is allocated to prevention
- Thanks to the Internet, smart devices of all kinds and social networks, people have become more active in observing and evaluating their health. The balance of power continues to shift from the omnipotent doctor to the patient, who might be more familiar with one of his/her conditions than the general practitioner, who must know the whole spectrum of diseases, along with diagnoses, treatment and observation. This is why doctors need computer-based decision-supporting software that is easy to use, as mentioned above. Airline pilots also turn to a computer when they need to land a plane carrying 300 people in darkness and rain on an unfamiliar airfield. I believe that doctors, too, are going to like this—once they realise that it actually helps them in their daily work.

1 Fears, R. and Poste, G., “Building Population Genetics Resources Using the U.K. NHS”. *Science* 284(5412) (9 April 1999) pp. 267–8.

# Antimicrobial Resistance— A Major Global Health Risk

**Nakatumine ei sõltu üksnes üksikust inimorganismist, vaid ka muudest teguritest ja nakkusprotsess võib muutuda juhitamatuks.**



**Kuulo Kutsar MD, PhD**  
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Infectious diseases are one of the leading causes of death in the world. Even though the situation is more dire in developing countries, serious problems occur even in the developed world, as globalisation and open borders allow infectious agents to travel with people, animals, food and goods and to move freely from one continent or

country to another with no regard for state boundaries or distance. Today's high-tech healthcare should be able to save the life of every person suffering from an infectious disease but, in reality, the infection process is not only influenced by a human organism and its biological features, but also by epidemiological, social and economic factors that can make it uncontrollable, which is why infectious diseases pose a great threat to every country and society.

One of the main reasons why the infection process becomes uncontrollable and makes the treatment complicated, if not impossible, is the pathogens' increasing resistance to pharmaceuticals. For the patient, this means prolonged ailments, time-consuming and more expensive treatment, extended absence from work and a decrease in income; it also imposes a great additional burden on healthcare institutions and the system as a whole. For instance, antimicrobial resistance causes 4,000,000 cases of disease and 25,000 deaths in European Union countries, which in turn creates additional healthcare costs and €1.5 billion euros worth of lost productivity; and more than 2,000,000 cases, 23,000 deaths and \$20 billion in additional costs in the United States.

### **What is Antimicrobial Resistance?**

Antimicrobial resistance is the insusceptibility of pathogenic microorganisms (bacteria, viruses, fungi, parasites) to the effect of antimicrobial drugs. A disease-causing microorganism is resistant if it has developed insensitivity to one or several antimicrobial drugs. Resistant pathogens stay alive in a human organism despite the patient's use of doctor-prescribed medication.

Antimicrobial drugs are medical substances or compounds that inhibit the reproduction of pathogens or destroy them.

Antimicrobial medications are classified as: (a) antibacterial—most of these are antibiotics; (b) antiviral; (c) antifungal; and (d) antiprotozoal.

Antimicrobial resistance is far from being a modern phenomenon. Its development in living nature was foreseen by the creator of the theory of evolution, Charles Darwin—in order to survive, living organisms

must adapt and protect themselves against harmful factors by developing resistance. Pathogenic microbes have indeed adapted, by developing resistance against other malicious microorganisms and drugs that kill them, namely antibiotics. Penicillin, a widely known antibiotic, is actually a compound produced by a fungus in order to protect itself from the harmful bacteria that share its living environment. Due to a factor that has been influencing the process for decades—imprudent and excessive use of antibiotics—evolution continues, as confirmed by the increasing development of antimicrobial resistance in pathogens on one hand and the emergence of new highly infectious pathogens on the other.

Resistance develops in pathogens wherever antimicrobial drugs, especially antibiotics, are used—in human, animal and bird organisms, and also in external environments where the drugs or their degradation products are expelled. Consequently, the issue of antimicrobial resistance does not belong only to the field of human medicine, but is equally relevant in veterinary medicine, animal husbandry and environmental protection.



**The next wave of infectious diseases will probably come from South Korea, where an outbreak of coronavirus MERS has been identified. The photo depicts South Korean soldiers on parade.**

AFP/SCANPIX

### **Dawn of the Age of Antibiotics and Antibiotic Resistance**

While many pathogens of dangerous diseases were discovered in the second half of the 19th century, it took another 50 years to bring about the age of their powerful adversaries—antibiotics. The age of antibiotics was heralded by Alexander Fleming, who discovered

penicillin in 1928. During the Second World War, this “miracle cure” saved the lives of hundreds of thousands of Allied soldiers. New antibiotics such as tetracycline, erythromycin, methicillin and gentamicin were added to the list, but it was penicillin that ushered in the rather sinister age of antimicrobial resistance: the first case of penicillin resistance was identified in 1940 and involved the microbe *Staphylococcus aureus*, or golden staph—a generally harmless microbe colonising human skin, which can become highly pathogenic and cause malignant pneumonia, toxic shock syndrome and other major diseases.

This was only the beginning, as microbes—pressured by new antibiotics—made a natural choice in their own favour by using the mutation process to become antibiotic-resistant mutant microbes, which defied one or two antibiotics at first and often eventually became completely uncontrollable by antibiotics.

The line of causality is quite clear: the antibiotic tetracycline came into medical use in 1950 and its resistance in *Shigella* was detected in 1959; methicillin was introduced in 1960 and resistant *Staphylococci* were discovered in 1962; gentamicin came into use in 1967 and its resistance in *Enterococci* was detected in 1979; vancomycin was introduced in 1972 and *Enterococci* developed resistance to it in 1988; levofloxacin came along in 1996 and its resistance in *Pneumococci* was discovered in the same year. One recent example of fast resistance development comes from 2010, when ceftaroline came into medical use and had caused *Staphylococci* to become insensitive to it by the following year. One example of long-term development of drug resistance involves *Pneumococci*—after penicillin was introduced in 1943, pneumococcal infections could be productively treated until 1965, when *Pneumococci* finally developed penicillin resistance.

For the patient suffering from an infectious disease, drug resistance meant that the outlook was bleak. There was a time when even doctors did not know its cause and blamed it on “bad and ineffective drugs”.

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Golden staph has been considered the epitome of drug resistance for years—having emerged as the winner after running the gauntlet of many antibiotics, it has become insusceptible to previously highly effective antibiotics like penicillin, linezolid, vancomycin and ceftaroline. Golden staph is famous for its resistance to methicillin, as a result of which it is known as Methicillin-resistant *Staphylococcus aureus*, or MRSA. Due to drug resistance, this almost uncontrollable microbe has assumed a life of its own by spreading quickly at any given opportunity and causing irreparable damage to those infected.

### **Antibiotic Resistance is Highly Dangerous to an Infected Person**

Antibiotic resistance has been called one of the greatest threats to modern medicine, as it remains without a definite cure. The number of different pathogenic bacteria with decreased or lost sensitivity to antibiotics has risen in the past few decades. A pathogenic bacterium continues its unrestricted destruction in an infected patient's organism because it has developed partial or full resistance to the antibiotics used for treatment.

These antibiotic-resistant bacteria are dangerous because they can spread in hospitals and social welfare institutions as well as families, and transfer to people who are in contact with an infected person like other patients, family members, visitors or fellow workers and students. The bacterium may therefore not develop antibiotic resistance in the organism of an infected person, but a person may become infected through contact with other patients. Antibiotic-resistant bacteria that are transferred via droplet-aerosols or direct or everyday contact are most easily spread this way.

It is wrong to believe that a patient becomes resistant to a certain antibiotic during treatment. What becomes antibiotic resistant is the pathogenic bacterium that is damaging the patient's organism.

If a pathogenic bacterium has developed resistance to many antibiotics, it becomes a multidrug-resistant (or MDR) bacterium, which makes treatment complicated and often futile. Such cases may result in serious complications or even death.

## **Why do Bacteria Develop Resistance to Antibiotics?**

Widespread, imprudent and unreasonable use of antibiotics in both human and veterinary medicine facilitates the development of drug resistance in pathogenic bacteria. Each time a patient uses the antibiotic prescribed to them, the susceptible bacteria are killed, while stronger bacteria survive and continue multiplying, because they retain their ability to neutralise the effect of antibiotics.

The main factor that promotes the development of drug-resistant bacteria is the repeated, improper, indiscriminate and irrational use of antibiotics. Antibiotics must be used to treat a laboratory-confirmed bacterial infection, and the fact that they are not effective in the case of viral infections should always be kept in mind.

The main principle is to detect the pathogen that causes the infection, using laboratory tests to determine whether it is a bacterium, virus, pathogenic fungus or parasite; only then is the correct drug to use decided upon. In cases where the cause is unclear, using antibiotics is a stab in the dark, which is conducive to the significant development of long-known antibiotic resistance. The development of antibiotic resistance in unconfirmed cases is also furthered by the prescription of antibiotics with a view to preventing complications of bacterial origin or as a prophylactic—an unknown cause means that we do not know what to prevent, either.

## **How do Bacteria Develop a Resistance to Antibiotics?**

Antibiotic resistance develops when antibiotics affect the life functions of bacteria so that their susceptibility to antibiotics is weakened or eliminated. As a result, bacteria will survive and continue to reproduce.

Antibiotic resistance in bacteria can develop in several ways: (a) a bacterium is capable of neutralising the active substance in antibiotics before it starts damaging it; (b) bacteria can exchange genes that encode resistance with one another—susceptible bacteria receive resistance-conferring genes from bacteria that are insensitive to antibiotics; (c) bacteria may alter the antibiotic's target site so that it

does not affect its function; (d) some bacteria are able to quickly remove the antibiotic from the cell or to pump it out; (e) by mutation; and (f) by acquiring antibiotic-resistant plasmids (DNA fragments that encode resistance) from resistant bacteria.

### **Sources of Antimicrobial-resistant Pathogens**

The sources of antimicrobial-resistant pathogens are: people receiving inpatient or outpatient care; healthcare professionals—chronic carriers of microorganisms; visitors to patients of healthcare institutions; people who have received medical treatment in countries other than their own; travellers who have contracted a disease abroad; and farm animals, birds and pets.

### **Spread of Resistant Pathogens**

Antimicrobial-resistant—specifically antibiotic-resistant—pathogens are transferred in the same way as other disease-causing agents: via droplets and aerosols, everyday contact, blood, sexual transmission, vectors, and animals and birds.

The spread of antimicrobial-resistant pathogens is furthered by the imprudent use of antimicrobial drugs (mainly antibiotics), the transfer of resistant genes within and between pathogen species, and the international spread of resistant pathogens. (For example, these could be brought into Estonia by Estonian residents who have received medical treatment abroad, foreigners being treated in Estonia, and travellers who have contracted a disease abroad.)

Refugees from developing countries may bring antimicrobial-resistant microorganisms to receiving European countries. The state of these people's health is often unknown and an antimicrobial-resistant pathogen unfamiliar to Europe reveals itself only after they become ill. How long and to what extent refugee microbe carriers have spread resistant pathogens in the local community will remain unknown for now. The consequences of this will become clear only when the pathogens causing diseases in locals stop reacting to treatment. Moreover, determining the origin of foreign pathogens is costly, as



their genotype has to be identified. At the same time, at least 30% of people in each population are carriers of some kind of asymptomatic potential disease-causing agents, at least 2% of whom carry antibiotic-resistant pathogens.

Antimicrobial-resistant pathogens may also spread from a hospital or other healthcare institution to the local population via a former patient or a healthcare professional or visitor infected at such an institution.

It is very dangerous to transfer patients with antimicrobial resistance to welfare institutions, retirement homes, medical institutions for the chronically ill, children's institutions, other closed collectives and families that include immuno-compromised members.

### **Resistant Bacteria Spread from Animals and Birds to Humans**

Antibiotic-resistant bacteria are transferred from animals and birds to humans through food of animal origin and via direct contact with animals and birds or their excrement and excretions. For instance, *Campylobacteria* colonise the digestive tract of chickens without causing much damage, and humans can contract them by eating chicken meat that has not been properly heat-treated.

In several countries where broiler chickens have been fed antibiotics, *Campylobacteria* showing drug resistance to these antibiotics have been discovered in humans. Since antibiotic-resistant bacteria occur in the organisms of farm animals and birds in the same way as they do in people who take antibiotics and can easily transfer to people, the treatment of patients with bacterial infection places great importance on determining the origin of the drug-resistant bacteria, which requires cooperation between doctors of human and veterinary medicine.

### **Antibiotics are Also Given to Farm Animals and Pets**

Antibiotics are used in farm animals, birds and pets for three reasons: to treat infectious diseases, to avoid infections during a certain growth period, and to promote growth (antibiotics are banned from use for growth promotion within the European Union). In the first two cases,

antibiotics are administered to animals or birds in large quantities during a short period of treatment, and in the third case, in small quantities over a longer period of time. Since in each case antibiotics are administered to a large number of animals or birds, the chances of the emergence of antibiotic-resistant bacteria are high. Antibiotic-resistant bacteria developed in the organisms of animals and birds could transfer to the human population through people who keep and take care of them.

### **Antibiotic-resistant Bacteria are Also Transferred Through Food**

Many pathogenic bacteria colonise the digestive tract of humans, animals and birds. For instance, a large number of farm animals, especially those raised for human consumption, carry *Salmonella*, *Campylobacteria* and pathogenic *Escherichia coli*, all of which are dangerous to humans. On the other hand, humans also carry pathogenic bacteria such as *Shigella* and *Salmonella*. These bacteria may come into contact with food via food producers and animal keepers. Since these and other pathogens can be antibiotic-resistant, these bacteria may transfer to food—and from there to the human organism, infecting people.

### **Soaps, Cleaning Agents and Probiotics Do Not Influence the Development of Drug Resistance**

Hygiene requirements play a big role in avoiding the spread of infectious diseases among the population—washing hands and cleaning everyday items and work surfaces is of the utmost importance. There are no data to support claims that antibacterial soaps and other washing and cleaning substances influence the development of drug resistance in pathogens.

Probiotics are microorganisms that have a positive effect on an organism's function and a person's health, which can also in certain conditions inhibit the proliferation of pathogens in an organism. There is no information on whether they influence drug resistance.

## **Antibiotic-resistant Bacteria Develop Mainly in Hospitals and Welfare Institutions**

In Europe and other parts of the world, drug-resistant microbes develop and spread mainly in hospitals, with welfare institutions, outpatient treatment centres and care facilities for the chronically ill or the elderly not far behind. Approximately 70% of microbes that cause hospital infections today are resistant to at least one antimicrobial drug. Why do new drug-resistant pathogens develop in hospitals and welfare institutions? There are several interlinked reasons, and this is why infections related to healthcare services are easier to prevent than to control later on.

1. The immune system of people who end up in hospitals has been weakened by a prolonged or sudden illness. In this type of patient, the sedentary so-called normal flora bacteria (present in every human) in their organisms can become pathogenic, which brings about the development of a new infectious process unconnected to the main illness. This risk group also includes people with age-associated immunodeficiency like small children and the elderly.
2. Hospitals conduct many large- and small-scale surgical and other procedures that involve penetrating the skin and mucous membrane, and indwelling catheters are inserted in organs and cannulas in blood vessels. Even the slightest deviation from hygiene or safety requirements during surgery or an invasive procedure creates an opportunity for pathogens to enter the patient's organism. This is one reason why hospital infections mostly occur in surgical and intensive care departments.
3. A person admitted to hospital carries pathogens that colonise their living environment.
4. Healthcare professionals bring pathogens from their living environments to hospitals or welfare institutions, or may treat patients while being ill themselves.
5. Visitors can bring pathogens to hospitals or welfare institutions not only during epidemic periods of influenza, for example, but also on a daily basis.

6. The spread of antimicrobial resistance has no restrictions—in cases of intensive international communication, drug-resistant microbes enter countries with tourists who need treatment abroad, natives who have received medical care abroad and travellers or patients who go abroad specifically to be treated there, especially those who travel to receive surgery. Countries thus face drug-resistant non-native pathogens. Travellers can also bring drug-resistant viruses to the country via the same mechanism. For instance, during the 2007–8 influenza season in several EU member states, including Estonia, resistance to the medication Oseltamivir was detected in those A/H1N1/-influenza viruses that had caused illness in patients who were not treated with Oseltamivir.
7. It has been discovered that in the working environment of large hospitals, where a large number of potentially disease-causing or indeed pathogenic microorganisms are circulating between patients, personnel and equipment, bacteria can exchange genes that encode drug resistance, as a result of which antibiotic-resistant bacteria may begin to inhabit the organism of a patient who has not previously been treated with this antibiotic.
8. It has been noted that even the doctors who prescribe antimicrobial treatment to patients are not without blame: antibiotic treatment is prescribed for cases in which the disease-causing microorganism has not been laboratory-confirmed. This means that it is not known whether it is a bacterial, viral, parasitic or other infection and therefore (a) prescribing antibiotics for acute respiratory viral infections when there is no risk of bacterial complications is very common; and (b) when empirically prescribed antibiotic treatment turns out to be necessary, it is not known whether or not the patient has antibiotic-resistant microbes and, as a result, the prescribed treatment may not show any positive results. The main problem therefore lies in the excessive and incorrect use of antibiotics.

Doctors do not provide patients with sufficient information on the rules for taking antibiotics and the need to complete the treatment (many patients are known to quit antimicrobial treatment after the

first signs of improvement), or the risks and negative results of incorrect use of antibiotics and drug resistance.

### **Antimicrobial Resistance is Also a Problem in Agriculture, Veterinary Medicine and Environmental Protection**

Most antibiotics used in veterinary medicine are similar to or the same as those used in treating humans. Pathogens causing infectious diseases in animals can also develop drug resistance. Drug-resistant pathogens found in farm animals and pets can transfer to humans.

In addition, antibiotics have been used in agriculture as feed additives to prevent animal and plant diseases and for growth promotion. Antibiotic-resistant genes are also removed from genetically modified plant cells. Most EU countries have now stopped using antibiotics for these purposes, because the underlying threat to human health has been clearly confirmed.

After circulating in the organisms of infected people, and bacteria-carrying humans, animals and birds, drug-resistant pathogens are finally expelled via excrement, excretions and wastewater to the external environment—soil, bodies of water, and ground and drinking water. From there, entering a human organism is only a matter of an opportune moment or the laws of nature. The occurrence and proliferation of antibiotic-resistant pathogens in the external environment are generally acknowledged risks to human health.

### **Antibiotic Resistance in Human Medicine**

Antibiotic resistance in human medicine also describes the situation in veterinary medicine and its spread in the external environment, because the main purpose of society is to protect human health. Estonia does not have a monitoring system for antibiotic resistance that includes these three areas.

In the EU, the European Centre for Disease Prevention and Control has organised a monitoring programme in the field of human medicine that involves observing antibiotic resistance on the basis of determining resistance to major antibiotics in seven indicator

pathogens causing bacterial diseases. For instance, in Estonia, the incidence in 2013 and 2014 of resistance to aminoglycosides (a group that includes, among others, the antibiotics gentamycin, amikacin, streptomycin and kanamycin) in indicator bacteria detected in patients was as follows:

- *Escherichia coli* 7.6% and 4.7% (the EU average for 2013 was 9.9%, with the highest rate in Bulgaria at 32.1%)
- *Klebsiella pneumoniae* 9.9% and 17.9% (2013 EU average 24.5%; highest in Slovakia, 64.0%)
- *Pseudomonas aeruginosa* 9.5% and 4.8% (2013 EU average 15.9%; highest in Romania, 51.2%)
- *Enterococcus faecalis* 20.0% and 38.1% (2013 EU average 30.9%; highest in Latvia, 61.1%).

The penicillin resistance of the main causative agent of pneumonia *Streptococcus pneumoniae* was 1.3% in 2013, with no resistance detected in 2014 (the highest figures for 2013 were Poland with 32.2% and Cyprus with 40.0%)

The incidence of dangerous methicillin-resistant *Staphylococcus aureus* was 3.5% and 3.1% respectively (2013 EU average 18%; highest 64.5% in Romania and 40.3% in Greece).

The general incidence of antimicrobial resistance in Estonia is therefore relatively low. As a whole, pathogens' antibiotic resistance is greater in southern and eastern European countries and lower in northern and western European countries.

According to the 2013 data, Estonia had problems with 46.4% resistance of *Escherichia coli* to aminopenicillins; 26.7% resistance of *Klebsiella pneumoniae* to fluorokinolones and 23.3% resistance to third-generation cephalosporins; and 25.0% resistance of *Pseudomonas aeruginosa* to fluorokinolones. The downside of these data is the fact that the number of test samples was relatively small and they only describe the situation in hospitals (forms of resistance can differ even within hospital boundaries) and there is no information about the

spreading frequency of antimicrobial resistance in first-level medical care and the population.

The consumption of antibiotics within the population is also significant. According to 2012 data, the rate in Estonia was 11.6 prescribed daily doses per 1,000 residents per day, which is a reasonable figure. The EU average was 21.5 prescribed daily doses per 1,000 residents per day, while in Greece the number was as high as 31.9 prescribed daily doses.

### **The Resistance of the Causative Agents of Tuberculosis is a Serious Health Risk**

Drug resistance in the causative agents of tuberculosis is a very serious problem and has long-term consequences in many countries, including in Eastern Europe and Estonia. There are 18 tuberculosis epidemic countries in the World Health Organization's Europe region, and five in the EU (one of which is Estonia).

In the three years 2005–7, the incidence of the multidrug-resistant tuberculosis mycobacterium (MDR-TB) in cases of primary infection of tuberculosis was 9.9%, 9.7% and 12.7% respectively; it was 20% in 2014.

In the same years, the incidence of extensively drug-resistant tuberculosis mycobacterium (XDR-TB) in cases of primary infection of tuberculosis was 21.4%, 5.5% and 5.8% respectively (0.6% in 2014).

High drug resistance in the causative agents of tuberculosis poses a major problem for the treatment of patients, because they can only be helped partially, if at all, and the treatment is time-consuming and expensive.

### **The Development of Antibiotic-resistant Bacteria Can Be Prevented**

The prevention of the development of antibiotic-resistant bacteria is based on a simple truth—that antibiotics should only be used to treat bacterial infections, and not viral ones. This lays the groundwork for suggestions that help to avoid the development of antibiotic-resistant bacteria in the organism of an infected person.

- Ask your family doctor or attending physician to explain antibiotic resistance and its development:
  - a) whether the antibiotics prescribed to you are specifically meant for treating your illness
  - b) whether the causative agent of your illness has been laboratory-confirmed and whether it is susceptible to the antibiotic prescribed to you.
- Do not use antibiotics when suffering from viral infections like influenza and other acute upper respiratory viral infections.
- Do not keep the antibiotics left over from a completed course of treatment, and do not use them at your own discretion if you fall ill again. The doctor will decide on the course of treatment and prescribe you an antibiotic, if needed, for each individual new case of infection.
- Follow the doctor's instructions when using the antibiotics prescribed to you—do not decrease or increase the dose or stop the treatment when your health shows signs of improvement. (Some bacteria may survive and the illness may become acute again.)
- Do not use antibiotics prescribed for another person and do not give your prescriptions to anyone else.
- If your family doctor or attending physician has used laboratory tests to determine that you do not suffer from a bacterial infection, do not ask them to prescribe you an antibiotic; follow the doctor's instructions to treat an illness of different origin.
- Do not buy antibiotics from online suppliers or foreign countries where they are sold over the counter.

### **Healthcare Professionals Can Prevent the Development of Antibiotic-resistant Bacteria**

- Doctors use laboratory tests to identify the pathogen. If it is a bacterium, its susceptibility and resistance to antibiotics will also be determined.



- A doctor prescribes an antibiotic treatment for a patient who has been infected with a laboratory-confirmed bacterium, and should not prescribe antibiotics to a patient suffering from a viral infection who does not have any bacterial complications.
- A doctor will decide on the duration and dosage of antibiotic treatment. The doctor will explain to the patient the need to follow the rules of the treatment closely, and will monitor the course of the treatment and its result.

## **Protect Yourself from Antibiotic-resistant Bacteria**

Proper use of antibiotics protects you from antibiotic-resistant bacteria: use them only according to the doctor's prescription and follow their instructions. This is the best way to treat an illness and restore your health as well as to protect the health of your family and others close to you.

### **You should**

1. ask your family doctor or attending physician to explain the development of antibiotic resistance
2. when a doctor has prescribed you an antibiotic, then
  - follow the doctor's orders in detail and complete the course of treatment even if your health shows signs of considerable improvement soon after starting the treatment
  - the previous suggestion also applies to sick children—they too must use antibiotics carefully by following the doctor's orders and completing the prescribed course of treatment
  - dispose of any drugs left over after you have completed the prescribed course of treatment if the doctor does not recommend continuing the treatment using the same antibiotic.

### **You should not**

1. use antibiotics to cure viral diseases, because they do not kill viruses
2. ask the doctor to prescribe you an antibiotic if they have decided that you do not need it

3. stop using doctor-prescribed antibiotics at your own discretion.

Therefore, do not

- miss any doses
- end the course of treatment early
- keep any antibiotics after you have completed the course of treatment in order to use them against future infections
- use antibiotics prescribed for other patients or your family members. In most cases, the antibiotic will not be suitable for treating your illness; the use of the incorrect antibiotic promotes the development of drug resistance
- prolong the course of antibiotics, as this may complicate the course of the illness and does not kill the pathogenic bacteria in your organism or contribute to inhibiting their growth.

### **Controlling the Spread of Antimicrobial Resistance is a Problem Shared By Europe and the World**

The monitoring and prevention of antimicrobial resistance in the EU began in 1999. In January that year, the European Commission formed the European Antimicrobial Resistance Surveillance Network for epidemiological monitoring and control of antimicrobial resistance, one of the most important priorities of which was to coordinate methods of antimicrobial resistance prevention in its member states. The European Council adopted the resolution “A Strategy against the Microbial Threat” in June 1999, and six months later, the “Council Conclusions on Future Actions in the Framework of the Strategy against Antimicrobial Resistance”. These documents served as a basis for the 2001 European Council Recommendation on the prudent use of antimicrobial agents in human medicine. This recommendation serves its purpose despite the spread of antimicrobial resistance having become considerably more serious in recent years and changes in the prevention strategy.

In November 2011, the European Commission issued a thorough action plan against the increasing threats from antimicrobial resistance, which includes 12 actions to combat the spread of

antimicrobial resistance in the EU. In February 2015, the European Centre for Disease Prevention and Control and the European Food Safety Authority published a joint report on antimicrobial resistance in zoonotic and indicator bacteria from humans, animals and food in 2013. The European Commission has cooperated with the European Federation of Pharmaceutical Industries and Associations in the field of developing and producing new antibiotics.

**EU members' main principles on the prevention and treatment of antimicrobial resistance are:**

- to organise multisectoral monitoring, data collection and analysis with regard to antimicrobial-resistant pathogens and the use of antimicrobial drugs
- all antimicrobial drugs must be dispensed on the basis of a prescription
- to compile and implement a strategy for the prudent use of antimicrobial drugs and to control the spread of antimicrobial resistance
- to devise national instructions and principles for the prudent use of antimicrobial drugs and a system for assessing their implementation
- to improve preventive measures against the spread of communicable diseases by reducing the use of antimicrobial drugs, improving immunisation plans, promoting hygiene, preventing and stopping the spread of hospital and communal infections and following the infection control standards set for medical and welfare institutions
- to inform the general public and patients and raise their awareness of questions of antimicrobial resistance
- to intensify antimicrobial resistance training for healthcare professionals
- to promote research on antimicrobial resistance and develop reliable and highly sensitive rapid diagnostic tests for the early detection of infectious diseases and to start justified antibiotic treatment

- to found and name a national intersectoral institution to exchange relevant information and coordinate joint activities, as well as to implement the national strategy for controlling the spread of antimicrobial resistance.

Most EU member states have used these principles to devise their own national strategy and action plans for the prevention and control of the spread of antimicrobial resistance, and have implemented them.

Since antimicrobial resistance is a global health risk, the World Health Organization coordinates the compilation and implementation of measures dealing with its prevention and control. This is handled at the highest level by the World Health Assembly, the 68th of which (in May 2015) issued two important documents: the fulfilment of the resolution “Containment of Antimicrobial Resistance” adopted at the previous Assembly and a new “Global Action Plan to Tackle Antimicrobial Resistance”. Unfortunately, good action plans tend not to be implemented, mainly due to lack of political will and support.

# “Spanish flu”: The Infamous Pandemic of the 20th Century



INTERNET

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## **Influenza Pandemics**

Influenza, commonly known as “the flu”, is an infectious disease caused by the influenza virus. Influenza is caused by a variety of species and strains of virus, which can cause epidemics and

pandemics. The Influenza virus belongs to the *orthomyxoviridae* family and the “Influenza Virus A” species and its strains are the most virulent human pathogens which can cause severe disease. In general, wild aquatic birds are the natural hosts of the virus, but sometimes the viruses are transmitted to other species and may cause devastating outbreaks in domestic poultry and/or give rise to human influenza pandemics.<sup>1</sup>

According to Cox et al. (2003),<sup>2</sup> However, it is difficult to predict the occurrence of pandemics, with the exception of a clue from historical analysis that pandemics occur in periodic cycles.

The 20th century witnessed three such influenza pandemics: in 1918 (Spanish flu), 1951 (“Asian flu”) and 1968 (“Hong Kong flu”). Of these, the 1918 Spanish flu pandemic was considered the most devastating in modern history.



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## **Formamint was advertised in newspapers as the pill to take against Spanish flu.**

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### **Historical Overview of the 1918 Spanish Flu Pandemic**

The 1918 flu pandemic, also known as “*La Grippe*”, was caused by H1N1 influenza A virus<sup>7</sup> This is unusual since influenza is normally most deadly to the very young (under the age of two) and the very old (over 70 years).

Historians and biomedical researchers argue that two major contemporary issues contributed to the gravity of the flu pandemic—the effects of World War I, and limited scientific knowledge. In 1918, little was known about influenza virus biology and antiviral therapies. There were mixed theories on the origin of the H1N1 influenza virus and its outbreak into pandemic. Some researchers believe it might have originated in China, while others theorise that it was already in existence before 1918, with minor outbreaks in France in 1916 and England in 1917. Some also argue that the first wave of pandemic started in the United States in early 1918.

#### *Disease Spreads in Three Waves*

The 1918 pandemic occurred in three waves over an 18-month period and spread around the world. The first wave, or “spring” wave, began in 1918 and spread unevenly through the United States, Europe and parts of Asia over the following six months. During this wave, high illness rates and above-normal mortality rates were reported. The second, or “autumn”, wave—from September to November 1918—was highly fatal and swept across the globe, leaving no major inhabited region untouched. The focal point of the epidemic in terms of mortality was India, with an estimated death toll in the range of 10–20 million, and an estimated population loss of 13.8 million for the British-controlled provinces.<sup>8</sup> This was followed by the third wave in 1919, which lasted for a few months in Australia, Spain and many other countries. The rapid succession of these waves limited preparedness and response, eventually claiming millions of lives.

### *A Wartime Outbreak*

The influenza pandemic of 1918–9 coincided with the end of World War I, but scientific enquiry into the relationship between the flu pandemic and world war started much later. War conditions facilitated the trans-border transmission of Influenza virus and optimised the conditions for the spread of influenza in high-density population pockets such as military barracks, troopships, troop trains, prisoner-of-war camps, labour compounds, factories, mineshafts, schools, mass meetings and processions.<sup>11</sup>

### *The 1918 Pandemic as “Spanish Flu”*

There are varying opinions on why the Influenza pandemic was also known as “Spanish flu”. During World War I, press censorship in countries such as Britain and the US halted the distribution of information considered detrimental to the war effort, including the influenza outbreak. The press in Spain was not subject to wartime censorship due to the country’s neutrality, and was the first country to report the pandemic; ever since, it has been popularly known as Spanish flu. Another reason to emerge from historical research was that the most accurate information about the flu came from Spain as its king at the time, Alfonso XIII, contracted the illness and became its most high-profile victim. News organisations in Spain frequently released reports on the state of the king’s health.<sup>13</sup>

### **Public Health Response to Spanish Flu**

The 1918 flu pandemic that swept the globe was perhaps the greatest ever public health challenge as public health measures were minimal to non-existent, and no antibiotics or anti-retroviral drugs for influenza were available. There was no certainty over the causative factors of flu, and the lack of scientific knowledge over viral pathogenicity and limited medical advances posed challenges to public-health responses to the Spanish flu pandemic. In addition, World War I had left many countries with a shortage of physicians and healthcare workers who could respond to the health crisis caused by the pandemic.



Although there were many limitations, public-health practitioners were active in finding means to minimise the impact of the influenza. In many countries, the activities of practitioners on the ground were all employed—quarantine, isolation, public propaganda, warnings, campaigns against spitting, legal restrictions on commercial activities, inspection, surveillance, and compulsory (often public) identification and (perhaps) stigmatisation. With no ability to see the virus and no vaccines available to prevent its spread, the public-health community's ability to fight the pandemic depended on its moral, political and legal authority.<sup>14</sup>

### **Policy and Scientific Progress Against Influenza Pandemics Since Spanish Flu**

Influenza prevention and mitigation are key strategies for public health. However, in 1918, lack of scientific knowledge was a major limitation on the strategic public-health approach. It was only in 1940s that the successful development of an influenza vaccine began. The first licensed flu vaccine appeared in the US during World War II; by the 1950s, pharmaceutical manufacturers could routinely produce vaccines that would help control and prevent future pandemics.<sup>15</sup>

The devastating effects of the flu pandemic led the global community to rethink pandemic preparedness, which eventually helped the development of preparedness and response for the 20th century and beyond. In 1947, following a request by a respected group of scientists, the Interim Commission of the WHO agreed to establish the World Influenza Centre (WIC) to collect and distribute information, conduct and coordinate laboratory work on the virus, and train new laboratory personnel.<sup>17</sup> stated that all these efforts towards influenza pandemic preparedness were the outcome of the 1918 pandemic. Ever since the start of the programme to combat influenza, it has evolved to serve the global good.

Two approaches are currently available for the prevention and control of influenza:<sup>18</sup> vaccines and antiviral agents.

- **Vaccines:** The haemagglutinin and neuraminidase proteins are the primary targets of the protective antibody response; antibodies against haemagglutinin neutralise virus infectivity, and antibodies against neuraminidase can modify the severity of disease.
- **Antiviral drugs:** Two anti-Influenza A drugs are currently licensed in some countries. These are the chemically related adamantane compounds, amantadine and rimantadine—both of which are 70–90% effective in preventing illness caused by naturally occurring influenza A viruses when administered prophylactically to healthy adults or children during the period of exposure in a normal epidemic or outbreak situation. When used therapeutically within 48 hours of the onset of symptoms, these two compounds can also reduce the severity and duration of signs and symptoms of illness caused by Influenza A viruses.

### **Global Governance for Influenza Pandemics**

Globalisation has enabled and intensified the trans-border transmission of influenza viral pathogens, and with it the potential occurrence of pandemics. In order to prevent and mitigate influenza pandemics, effective governance is critical. Lee and Fidler (2007)<sup>19</sup> emphasised that effective governance to prepare for, and respond to, a pandemic depends on four key functions:

- **Surveillance:** Knowledge of what influenza strains are circulating enables the planning and implementation of interventions, such as vaccines
- **Protection:** A second key function of influenza governance is to protect populations against influenza-related morbidity and mortality
- **Response:** When influenza breaks through protection efforts, effective governance requires timely and appropriate responses to its impact on populations
- **Public communication:** A key function in influenza governance is to provide accurate and timely information, essential for ensuring an appropriate perception of risk among the public. However, access to vaccines and virus-sharing issues have challenged influenza

pandemic governance and helped the creation of new governing frameworks.

The governing system for influenza began with the creation of the World Health Organization. The core component of this system has been the Global Influenza Surveillance Network (GISN), established in 1948. The GISN, also known as FluNet, a network of 112 national Influenza centres in 83 countries, recommends the formulation of the influenza vaccine for the approaching season, and serves as an early-warning mechanism for the emergence of a virus with pandemic potential.<sup>20</sup> In 2011, GISN was renamed the WHO Global Influenza Surveillance and Response System (GISRS) with the adoption of the Pandemic Influenza Preparedness (PIP) Framework. The PIP framework brought together member states, industry, other stakeholders and the WHO to implement a global approach to pandemic influenza preparedness and response, which includes the sharing of influenza viruses with human pandemic potential, and aims to increase the access of developing countries to vaccines and other pandemic-related supplies.

## **Conclusion**

Influenza pandemics date from the 9th century, and occur roughly every few decades. The occurrence of three pandemics during the 19th century and another three during the 20th has led experts to conclude that pandemics occur in cycles. According to historical patterns, the 21st century will also see at least three influenza pandemics (one occurred in 2009). Pandemic cycles may occur in the coming decades, although speculation about the timing of the occurrence and the influenza virus subtype causing it remains inconclusive. In 2018, the world will be commemorating the centenary of the Spanish flu outbreak and its devastating effects, the scientific progress made in vaccine and drug discoveries, and the establishment of governing frameworks for pandemics including the International Health Regulations (IHR). However, “governance” remains the key factor for preparedness and response to influenza and many other emerging pandemics.

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# Summary

The June edition of Diplomaatia deals with questions related to health. **Tiina Intelmann**, the Head of the EU Delegation in Liberia, writes about how Ebola has affected the well-being of the country and how it has finally won the battle with the virus. Professor **Ilona Kickbusch** gives an overview of what kind of action has been taken all over the world to fight Ebola.

“At regular intervals, a global health crisis like the Ebola outbreak in 2014 reminds the world that there is a need to act together because the health of one part of the globe is inextricably linked to the health of another,” she writes. “But the crisis mode rarely turns into long-term action, which requires states to act together consistently for the health of all. This is a threat to the world’s health security.”

**Zsuzsanna Jakab**, WHO Regional Director for Europe, writes about health diplomacy in Europe.

**Kristel Lõuk**, a diplomat in the Estonian Representation to the UN, writes about the Millennium Development Goals, while **Taavo Lumiste**, of the Estonian Representation in Geneva, discusses Estonia’s activities in the World Health Organization. **Jarno Habicht**, Head of the WHO Country Office in Moldova, and **Marge Reinap**, Head of its representation in Estonia, give an overview of the WHO’s network around the world and how important it is in using the experience gained in one country in another.

**Ain Aaviksoo**, Under-Secretary at the Estonian Ministry of Social Affairs, is convinced that the introduction of so-called e-health is a revolution, since it allows patients to get involved in their treatment more than ever before. Professor **Andres Metspalu** writes about the Estonian Gene Pool, and Doctor **Kuulo Kutsar** about the importance of fighting infections around the world.

**Srikanth Reddy**, Visiting Fellow at the Global Health Programme of the Graduate Institute of International and Development Studies in Geneva, writes about the devastation caused by the Spanish flu

outbreak after World War One. “The 1918 flu pandemic, also known as ‘Spanish flu’ or ‘La Grippe’, was caused by H1N1 influenza A virus and infected 500 million people across the world, including remote Pacific islands and the Arctic. Among those infected, an estimated 50 to 100 million were killed—three to five percent of the world’s population at that time, making it one of the deadliest natural disasters in human history,” he says.



SPAIN 2015