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Prevention and preparedness as public health deliverables

Ladies and gentlemen,

I am glad to be able to speak to you today about a subject that I believe is of great importance, namely the role of prevention and preparedness in public health.

What I hope to achieve over the next 15 minutes is to either convince you or to reaffirm your conviction that the successful delivery of public health at the national and international level requires a robust foundation built around the concepts of prevention and preparedness, and that we need to strengthen national and international capacities in this field. I should note that while today I will focus on infectious disease outbreaks this is by no means the only place for prevention and preparedness in public health. Prevention is of at least equal importance for our response to the growing burden of so-called non-communicable diseases, especially those that have behavioral and socioeconomic causes.

However, given that I will focus on infectious diseases today, the main argument I want to put forward is that - wherever possible - we need to invest into prevention measures to avoid future outbreaks. And where prevention proves impossible, we must invest into appropriate preparedness measures. While outbreaks are often unpredictable, preparedness should be built on two main pillars: strong scientifically guiding institutions and sufficient, well trained local public health and health care services, which provide core capacities that will be important, irrespective of the pathogen we are dealing with. I will argue today that we need to develop core capacities in three areas:

- 1) the detection of outbreaks,
- 2) our initial assessment of the threat, and
- 3) our ability to respond quickly and decisively.

Earlier today, Professor Fleischer already gave an excellent overview of emerging and re-emerging infectious diseases. And I am sure that all of you will recall the 2014 Ebola outbreak in West Africa, as well as the spread of the Zika virus around the globe. You may also remember the pandemic influenza in 2009/10, or the SARS outbreak that occurred over a decade ago. While the outbreaks I just listed were vastly different with respect to their place of origin, path of transmission and their effect on the human body, they all have one thing in common: the global community has been ill prepared for combatting them. But how can we improve this situation in the future? Let me start by saying a few words about prevention.

I Prevention

As I said earlier, our goal is to stop outbreaks from occurring wherever we can – but for this we need effective countermeasures. Identifying the infection sources and developing strategies to control and avoid them are key factors for reducing the incidence of infectious diseases. Together with effective hygiene measures and evidence based transmission control, these are some of the most effective tools for primary prevention, and their implementation has been one of the great success stories of public health. While this has been mentioned countless times before, it still remains true that basic infection control should always be at the center of prevention strategies. However, their successful implementation does also require considerable resources, including for education, sustainable behavior change and empowerment of communities.

Vaccines are of course another crucial component of outbreak prevention, and we should aim to build on the success they have enjoyed over the past century. I am therefore especially pleased that, together with other countries and NGOs, the German government has decided to co-fund a new global initiative: the Coalition for Epidemic Preparedness and Innovation, or CEPI. CEPI's goal is to develop a number of vaccines against

emerging and re-emerging infectious diseases that can be deployed in the case of larger scale outbreaks. Their efforts focus on infectious diseases such as Ebola and MERS. We are convinced that these efforts will pay off in the future, and that it is vital to drive innovation and close gaps in our current defense against dangerous pathogens. These pathogens increasingly include drug-resistant bacteria that we can no longer effectively treat with antibiotics. However, the development of a vaccine as a prevention strategy presupposes that we know the pathogen from the outset.

If we consider past experiences, this is an unrealistic assumption. Even in the case of seasonally occurring infectious diseases like influenza, we struggle to reliably predict the virus strain that will circulate around the globe. And newly emerging or previously unknown infectious diseases present even greater challenges. In this context, preparedness will always play an important role.

II Preparedness

For us public health professionals, preparedness implies that we must make provisions for unknown events of unknown magnitude. This is a rather daunting challenge. But I would like to make the case for a number of basic steps to strengthen the infrastructure for responding to an infectious disease outbreak. Let me briefly elaborate on the three elements of this infrastructure strengthening process;

- 1) detection,
- 2) assessment and
- 3) response.

1. Detection

It is self-evident that we can respond to an outbreak more timely and effectively if we detect it in its early stages. Since my colleague, Professor Brechot, will talk about the importance of surveillance later today, I will limit myself to a few brief observations. Many countries already have well-developed surveillance systems for a number of specific pathogens, and are currently working on the establishment of syndromic surveillance tools. These tools will allow us to track the occurrence and geographical spread of specific symptoms – an invaluable early warning mechanism in an outbreak. This, by the way will not only help us in the fight against infectious diseases. Strong health monitoring capacities, including robust reporting systems for mortality, are an invaluable tool for public health in general. Only when we know what our starting point is can we measure changes, and track the effect of public health interventions. And the more closely we monitor the public's health, the easier we will detect changes in the epidemiology of diseases. In the future, we hope to be able to combine data from health monitoring with other data about the weather, animal health, social media or traffic movements. However, I also want to stress that it will be of paramount importance to balance such efforts against individual rights to privacy and protection of medical data. The detection of outbreaks will also require the development and routine use of diagnostic tools that allow for a rapid and precise identification and classification of pathogens, as well as the identification of transmission paths. This is a field of research that we must strengthen in all countries. We need trained experts, equipment, facilities, information networks, and – most importantly – transparency. And all of these features need to be robust and collect data routinely. New technologies, such as genome sequencing allow us to identify the genetic fingerprint of a pathogen, and to uncover connections between different patients. However, a precondition for deploying these technologies widely and effectively is that we have a well-connected laboratory network that can quickly share information and that uses standardized testing equipment and methods.

2. Assessment

To assess the danger of a given outbreak, we currently rely on a number of methods to evaluate different risk factors. These tools vary between countries and disease groups, and should be based on firm evidence, to ensure their reliability. This means that their results are transparent, reproducible and as objective as possible. Developing evidence-based risk assessment tools will allow policy makers and health care professionals to choose an appropriate response strategy. Moreover, their use can help us to overcome inertia in the early stages of an outbreak when it is unclear how to best proceed in a situation that is often characterized by confusion, conflicting information and high levels of uncertainty.

The need for better evidence also includes the assessment of the containment measures that we as professionals in national and global health rely upon. These measures range from public information campaigns to social distancing measures, which might be as extreme as calling off mass events or the closure of transport hubs. Yet, it is not always clear how effective they are and what downsides their deployment may have. To respond both effectively and appropriately in outbreak situations, we must therefore continue to strengthen the scientific evidence base for our actions, in order to be able to anticipate the effect of our interventions.

3. Response

In addition to strengthening the evidence base for our actions, it will be crucial to set aside the necessary resources for responding quickly and decisively in the case of an outbreak. This is a task that must be addressed both by national health systems and the global community. Only if we have well-established coordination structures, communication channels, and procedures for collaboration can we hope to successfully stem the immense challenges that diseases like Ebola or Zika present us with. It is therefore encouraging to see that the need for global health preparedness is also being recognized at the highest political level. As part of this year's G20 events in Germany, the Robert Koch Institute will organize a table top exercise for the G20 ministers of health together with the German Ministry of Health, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the World Health Organization and the World Bank. The exercise aims to raise awareness for the challenges during international health crises and to stimulate the discussion of global health emergency preparedness. And the more we can train for a real outbreak, the better we will likely be able to respond.

As director of the Robert Koch Institute I am proud to say, however, that many of our employees do not only participate in training exercises, but have also worked directly in the midst of major health crises. During the last Ebola outbreak, for example, many of our experts volunteered to travel to West Africa and to assist in setting up surveillance and laboratory systems, as well as health care facilities. Since then, we have further strengthened our close collaboration with WHO to assist other countries in the implementation of the international health regulations. I would like to add here that Germany views the support of the World Health Organization as a vital part of global health preparedness and the RKI is proud to support the WHO. Later this week, for example, we will host a workshop of the WHO's Global Outbreak Alert and Response Network, an institution that we believe to be of great importance for the coordination and rapid deployment of aid in future outbreak scenarios. RKI will also continue its work as a WHO Collaborating Centre for emerging infections and biological threats. And of course we will build on our experience in supporting other countries bilaterally to evaluate and strengthen their respective capacities to detect, assess and respond to public health threats.

These capacities should be continuously maintained and improved in all countries – including Germany, and past outbreaks provide valuable lessons on what we can do better in the future. The most recent Ebola outbreak generated a lot of international support – but it also showed the global community, how much room for improvement remains. Taking these lessons on board is a central element in our preparedness efforts. Over the past years, a fantastic forum has emerged to assist with this exchange of experiences, the International

Association of National Public Health Institutes, or IANPHI. IANPHI has given national public health institutes the opportunity to regularly meet and discuss our own challenges and policies with other international colleagues, and we have found that this information sharing as well as evaluation platform has been extremely valuable for all participants.

Ladies and gentlemen, before I close, let me highlight one message again: a public health (and health care) infrastructure that can deal with the generic elements of outbreak scenarios is the foundation of prevention and preparedness. For many of us, creating this infrastructure will have to start with a self-critical evaluation of our own capacities, of our strengths but also our weaknesses. And it will require that we continue to expand international cooperation and assistance. For this, it is essential that we establish well-coordinated and sustainably financed institutions that we can rely upon in times of crisis.

There is a frequently cited expression in global health: A health threat anywhere is a health threat everywhere. As a result, we must not view preparedness as a national or regional endeavor, but as a global task. Together, we are responsible for strengthening preparedness, and to assist those who cannot implement all necessary measures themselves. Only when we work together in this way will we be able to successfully prepare for future outbreaks.