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Name of the University, Hospital, Research Institute, Academy or Ministry

Robert Koch Institute

Name of the Division, Department, Unit, Section or Area

Zentrum für Biologische Gefahren und Spezielle Pathogene/Centre for Biological Threats and Special Pathogens (ZBS)

City Berlin **Reference Number** DEU-135

Title WHO Collaborating Center for Emerging Infections and Biological Threats

Report Year 04-2018 to 04-2019

1. Annual report on the agreed workplan

Describe progress made on the agreed workplan. For each activity, detail (1) the actions taken, (2) the outputs delivered, as well as (3) any difficulties that may have been encountered. Three responses are expected. [maximum 200 words per activity]. Indicate, if an activity has been completed previously, has not yet started or has been placed on hold.

Activity 1

Title: Support diagnostics for known emerging infections and biological threats

Description: RKI holds specialized units on highly pathogenic bacteria, viruses and toxins. For some pathogens (anthrax, tularemia, smallpox) and toxins (Clostridium botulinum) it also holds the consultant laboratories for Germany. The units have in place evaluated diagnostics including isolation and cultivation of causative pathogens under BSL3 conditions, molecular identification and characterization, whole genome sequencing, PCR, and serology with best practice approaches. The units are experienced in analysing clinical and environmental samples. These diagnostics will be offered on WHO request for the laboratory confirmation of clinical diagnosis of emerging infections and biological threats under BSL 3 and in the future BSL4 requirements. Further, advice on patient care as well as outbreak management could be given.

Status: ongoing

The Robert Koch Institute (RKI) as the Collaborating Centre of the World Health Organization (WHO CC) for Emerging Infections and Biological Threats has supported laboratories in numerous countries in Europe, Africa, and South America in enhancing their diagnostic capabilities.

In accordance with the work plan agreed between WHO and RKI, in the framework of the Joint Action "Efficient response to highly dangerous and emerging pathogens at EU level" (EMERGE; <http://www.emerge.rki.eu>; see Activity 23423), RKI supports the networking of laboratory networks to provide surge diagnostic capacities and laboratory diagnostics in outbreaks caused by highly pathogenic bacteria and viruses throughout Europe and to support outbreak management outside Europe. Laboratory and networking capacities are available upon requests of WHO (see also Activity 23423). This Joint Action was completed end of February 2019, but the laboratory network on highly pathogenic infectious agents will be maintained in the framework of the new Joint Action "Strengthened International Health Regulations and Preparedness in the EU – Joint Action (SHARP)" with the estimated start in April 2019 and a duration of three years. Beyond the laboratory activities, the aims of this new Joint Action are also to support the implementation of the International Health Regulation (IHR) 2005 in member states of the European Union (EU) and to support the preparation of member states to the Joint External Evaluation conducted by WHO. In addition, RKI is coordinating and conducting the 3-years project "German Contribution to Strengthen the Reference Laboratories Bio in the UNSGM-2 (RefBio)" which started in 2018 and was financed by the German Federal Office. The aim of this global project is to strengthen nominated UN laboratories to get activated in an event of alleged usage of biological weapons in response to the UN-Secretary General Mechanism.

In February 2019, two scientists from RKI visited laboratories and clinical institution in Madagascar upon the invitation of the Malagasy Ministry of Health. The purpose was to figure out possibilities for collaboration with a focus on plague, strengthening the public health sector in the country, in addition to the Institute Pasteur Madagascar. Currently, funding resources are evaluated to establish a project on diagnoses and research of plague within the public health sector in cooperation with other institutions (including WHO) considering specific aspects of biosafety. Moreover, the Malagasy Minister of Health expressed the need for support of establishing a Center for Disease Control and Prevention Madagascar, which is currently out of our financial and personal capacities.

Further upon request, RKI provided the WHO Regional Office for the Americas (PAHO/WHO) with reference materials (quantified molecular standards and positive controls) for the molecular diagnosis of Yellow Fever and Dengue Viruses as part of the response to the on-going Yellow Fever outbreaks and upsurge of Dengue Fever cases of these viruses in the American region. Additionally, during the second wave of the Yellow Fever outbreak in Brazil, PAHO/WHO identified the need to provide the laboratories involved in surveillance activities with adequate controls for the processing and analyzes of histopathological samples collected from non-human primates and human deceased. To that purpose, RKI developed and validated “pseudo-tissue” preparations that were provided to PAHO/WHO for distribution to the laboratories involved in human diagnostics and non-human primates surveillance.

During this period the results of the first PAHO/WHO External Quality Assurance (EQA) Yellow Fever molecular panel distributed to laboratories that received specific training and capacitation on Yellow Fever molecular detection were compiled and analyzed jointly by RKI and PAHO/WHO. The results were shared with all participants, and those that performed poorly received an individual assessment of their protocols and practices. A new Yellow Fever EQA scheme was provided in February 2019 on request to PAHO/WHO to further evaluate the laboratory capacities in the American region to efficiently detect and diagnose Yellow Fever. In this second round, special emphasis was given to the capability to reliably differentiate between wild type infections from adverse events after Yellow Fever vaccination as this is of epidemiological relevance in the context of outbreaks. The new panel is planned to be distributed to more than 30 laboratories in 22 countries.

RKI staff attended the EYE (Eliminating Yellow Fever Epidemics) Strategy General Meeting organized by WHO Head Quarter (HQ) in Dakar, Senegal in September 2018, and the EYE Laboratory Technical Working Group Meeting held in Rotterdam, The Netherlands in December 2018. Staff of RKI actively participates in the activities of the EYE Expert Laboratory Technical Working Group. During this period, RKI staff provided advice to the preparation of the EYE Yellow Fever Country Guidance Toolkit, and the funding request to GAVI to support the activities of the Laboratory Technical Working Group. As part of the activities of the EYE Laboratory Technical Working Group, RKI staff provides expertise to establish a final harmonized testing algorithm for Yellow Fever Virus to be implemented in the laboratories that will be part of the to be established Global Yellow Fever Laboratory Network (GYFLN) with an initial focus on implementation in African countries. A new algorithm will be released by WHO in short time after final agreement by all members of the Algorithm Advisory Group.

RKI staff participates in the organization and agenda development of two Yellow Fever workshops coordinated by the Centers for Disease Control and Prevention (CDC) Fort Collins, WHO and the Association of Public Health Laboratories (APHL). The workshops will take place next summer in two African Yellow Fever Regional Reference Laboratories and will gather technical personnel from 27 African countries. The main goal of the workshops is to strengthen surveillance and laboratory capacities of regional and national reference laboratories as part of the preparedness activities of the EYE Strategy to early detect and contain outbreaks. Further in accordance with the work plan agreed between WHO and RKI, the External Quality Assurance program for Electron Microscopy of Virus Diagnostics (EQA-EMV) was completed in March 2019 (see also Activity 23422).

Since June 2017, RKI contributed as expert to the WHO Laboratory Biosafety Manual Revision for the Monograph “Laboratory Biosafety for Outbreak Response”. This contribution included the attendance at the working group meeting at 3-4 December 2018 in Porton Down, United Kingdom.

Activity 2

Title: Support identifying unknown pathogens and developing specific diagnostic tools

Description: Identification of infectious agents with a focus on viruses in clinical specimens from WHO Member States and facilitated by WHO. Applied techniques would include Electron Microscopy, PCR, Multiplex PCR, Next Generation Sequencing to identify the pathogen(s).

Status: ongoing

RKI organizes and conducts lab courses on “Electron microscopy in infectious diseases” at the RKI to implement and to improve the diagnostic standards in this particular field of pathogen detection. In April 2019 participants from Singapore, Czech Republic, Ireland and Germany attended the 26th basis lab course, which provided instructions on the preparation of samples for the rapid identification of pathogens based on morphology. An advanced course on rapid thin section electron microscopy for tissue samples was held for the first time in November 2018 and will be offered on a regular basis in future.

The External Quality Assurance program for Electron Microscopy of Virus Diagnostics (EQA-EMV) completed the 31st run end of March 2019. Six samples were sent out to 86 participants in 30 countries, including South Africa, Brazil, Singapore and Japan. RKI received about 69% correct diagnoses. However, only 19% of the participants reported correct results for all samples of the panel. This result is partially due to the complexity of the samples, but also due to changes among participants. Some participants handed over the participation at the EQA-EMV to their successors, which are obviously less experienced. In parallel, we recognize a slight increase in requests for our courses, which could be associated with this fact. The final report about the results and the sample panel focus on the faults and difficulties of the diagnosis and should finally help to improve the diagnostic performance of the participants.

Both activities, the lab courses on “Electron microscopy in infectious diseases” and the EQA-EMV program, represent worldwide unique activities supporting the identification of unknown pathogens and development of specific diagnostic tools, which are organized and conducted by RKI.

Activity 3

Title: Support establishing and managing of laboratory networks to develop guidance, tools and specific diagnostic capacities

Description: Supporting and consolidating of laboratory networks including institutions and organizations, e.g. the European Centre for Disease Prevention and Control (ECDC) and WHO to initiate worldwide quality assurance measures, harmonization of detection methods, production of reference materials, identification of best practices, and capacity building in an international context. Besides laboratory based outbreak management, training on specific diagnostic approaches and laboratory risk management could be provided.

Status: ongoing

In accordance with the work plan agreed between WHO and RKI, the EMERGE network (<http://www.emerge.rki.eu>; CHAFEA n° 677 066), funded by the EU with the duration 1 June 2015 – 31 May 2018, has been further consolidated including 40 European diagnostic laboratories specialized on highly pathogenic infectious agents, consolidating a European network on outbreak response against these biological agents. The main tasks of EMERGE include:

- to ensure an efficient response to serious emergent and re-emergent cross-border events;
- to support a coordinated and effective response to such outbreaks by linking up laboratory networks and institutions;
- and to perform external quality assurance exercises and give appropriate trainings and to ensure laboratory responsiveness, diagnostics and bio-risk management during outbreaks.

The network will be further maintained in the Joint Action SHARP 2019-2021 with the additional focus on IHR implementation in EU member states (see also Activity 23421).

Furthermore, the RefBio project was started aiming to set up a global laboratory network serving for the UNSGM in case of an alleged use of bioweapons (see also Activity 23421).

Since June 2017, RKI coordinates the EuroBioTox project (“European programme for the establishment of validated procedures for the detection and identification of biological toxins”; <https://www.eurobiotox.eu>). This project brings together 60 expert institutions – laboratories, industrial partners and end users – from 23 countries from the health, food and security sectors to improve detection and identification methods for biological toxins which could be misused as potential biothreat agents. The project addresses the need for standard analytical tools and procedures, reference materials, state-of-the-art training and will establish a European proficiency testing scheme. In this context, EuroBioTox organized two proficiency tests on biological agents in 2018 which highlighted the status quo of technical capacities and the need for further improvement. Additionally, three training courses on detection methods for biological toxins were conducted. Toxin reference materials for three selected biological toxins were produced, filled and are currently under characterization with the goal to develop certified reference materials. Overall, the project strengthens laboratory capacities for the detection of prioritized biological toxins which are available for WHO requests.

Activity 4

Title: Support the identification of antimicrobial resistance (AMR) mechanisms

Description: Support the implementation of national AMR surveillance by building on experience from a project with 4 sub-Saharan African countries including strengthening national laboratory capacities in identifying pathogens and antimicrobial susceptibility testing according to international recognized standards and identification of resistance mechanisms; and through the Global Antimicrobial Resistance Surveillance System (GLASS) implementation and regional collaboration by sharing best practice experiences.

Status: ongoing

In the framework of antimicrobial resistance (AMR), RKI participated in the third meeting of the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network on 17-19 February 2019 in Cairo, Egypt to follow the progress of the network's work plan and contribute to further priority-setting.

One goal of the network is to provide technical support that can contribute to the strengthening of laboratory capacity to conduct antimicrobial susceptibility testing and identify AMR mechanisms. RKI provided reference testing of unusual AMR. In particular, RKI distributed samples for the annual European Antimicrobial Resistance Surveillance Network (EARS-Net) Quality Control Proficiency Test for all laboratories reporting AMR data to EARS-Net and therefore the Global Antimicrobial Resistance Surveillance System (GLASS). In 2018, RKI submitted its own AMR data to GLASS and contributed to its report. RKI also contributed technical commentary on guidance related to emerging AMR reporting as well as the guidance on detection and reporting of colistin resistance. WHO guidance documents on emerging AMR reporting and colistin resistance detection were later produced and released in 2018 and 2019. RKI also previously participated in the Emerging Antimicrobial Resistance Reporting (EAR) simulation exercise in November 2017, an online simulation on data reporting and sharing component of the workflow of the EAR component of GLASS. Further activities on RKI's contribution as WHO AMR Surveillance and Quality Assessment Collaborating Centre are described below in Activity 23429.

Activity 5

Title: Support provided to the WHO clinical network EDCARN through the inclusion of the German Permanent Working Group of Competence and Treatment Centres for patients with highly infectious life-threatening diseases (STAKOB) and RKI into the EDCARN

Description: The responsible unit within RKI will contact the treatment centres of the German Permanent Working Group of Competence and Treatment Centres for patients with highly infectious life-threatening diseases (STAKOB). The unit will highlight the advantage for treatment centres to join the Emerging Disease Clinical Assessment and Response Network (EDCARN). On behalf of RKI, the responsible unit will join EDCARN. In case EDCARN needs in depth support, e.g. detailed information, collection of expert opinions, technical meetings, the responsible unit within RKI will coordinate the process, e.g. contact experts, collect information/opinions, organize and host technical meetings to support STAKOB in fulfilling WHO request.

Status: ongoing

RKI coordinates the permanent working group of competence and treatment centers in Germany (STAKOB). In response to the Ebola Virus Disease (EVD) outbreaks in the Democratic Republic of the Congo (DRC), RKI and STAKOB clinical experts offered their support to WHO and to the Global Outbreak Alert and Response Network (GOARN) to strengthen clinical management:

- STAKOB expert (treatment center Berlin) was sent to DRC (Equateur Province) to assess clinical management.
- STAKOB expert (RKI) was sent to DRC (Equateur Province) to assess infection prevention and control.
- STAKOB expert (treatment center Frankfurt) was sent to DRC (North Kivu province) to assess clinical management.

An international meeting of STAKOB was held in December 2018 in its function as a WHO CC. Topics covered were:

- Management of high consequence infectious diseases (HCID) from clinical perspective,
- MERS CoV: epidemiological Situation and clinical management, and
- Ricin: a threat to public health security.

Activity 6

Title: Support for WHO's normative functions in development of guidelines and tools. RKI will host and facilitate, in collaboration with WHO, an international workshop to draft a global guideline (interim guideline) for Crimean-Congo haemorrhagic fever

Description: The responsible unit within RKI will organize an international workshop for Crimean Congo Hemorrhagic Fever (CCHF) together with WHO. Relevant treatment centers, public health authorities, research laboratories and experts from affected countries will be identified and invited. The workshop will allow experts to exchange information, e.g. on treatment, clinical management, hospital preparedness, and to identify research and knowledge gaps. The meeting report will be provided by the unit. A WHO guideline will be drafted afterwards and consolidated by participants (working group) following WHO recommendations. WHO will be the main partner/co-leader in the whole process to assure that documents fulfill WHO requirements.

Status: ongoing

RKI offered subject matter experts to WHO for the development of plague guidelines as well as hosting a WHO Guideline Development Group Meeting in Berlin.

Activity 7

Title: 2.3. Provide expertise in outbreak response to the field

Description: On request of WHO, GOARN or related WHO networks, RKI will provide technical support and expertise in outbreak and/or emergency response including support and assessment missions for WHO Member States.

Status: ongoing

Following different requests for assistance of GOARN, RKI staff provided technical support in outbreak response in different events:

- Between March and June 2018, four RKI staff supported the GOARN operation on Diphtheria and monsoon preparedness in Bangladesh.
- Between May and June 2018, two staff supported the GOARN operation on EVD in DRC.
- Between September and December 2018, RKI staff supported the GOARN operation on EVD preparedness and readiness for DRC, neighboring countries and WHO.
- Between November and December 2018, RKI staff supported the GOARN operation on Polio in Papua New Guinea.

Further, RKI staff participated in the Yellow Fever Advisory Group Meeting, Washington, United States, 7-8 June 2018 to review the current epidemiological situation of Yellow Fever in the Americas, to revise the existing guidelines for surveillance and laboratory diagnosis of Yellow Fever Virus infection, and to propose and update recommendations for the laboratory diagnosis of Yellow Fever Virus infection in both humans and non-human primates.

Between 30 July and 1 August 2018, RKI participated in a working group at PAHO/WHO Country Office in Brasilia, Brazil organized by the Health Emergencies Department (PAHO/WHO HQ) to review the quality management of the Yellow Fever Reference Laboratories and definition of their capabilities.

RKI staff carried out recently a study aimed to determine the long-term efficacy of the vaccine against Yellow Fever following administration to infants. The vaccine is routinely given to infants aged 9 to 12 months, but the long-term outcome of vaccination in this age group is unknown, and this information is critical in the context of current international guidelines recommending a single dose of the vaccine for life. The results of the study have been timely shared with interested parties in the field of vaccination against Yellow Fever in WHO HQ and PAHO/WHO as they expressed interest in receiving a report on the findings and conclusions of the study on a pre-publication basis. The Department for Immunization, Vaccines, and Biologicals of WHO HQ considered the data of importance given their potential implications for policy, and requested permission to forward this internal report to relevant WHO advisers on yellow fever vaccination. Permission was granted by RKI to WHO for sharing the information with advisers.

Activity 8

Title: Develop training modules on epidemic intelligence exchange and outbreak response

Description: The responsible unit within RKI will develop training modules that will guide participants in implementing systems on how to gather and exchange epidemic intelligence for early warning. Units with experience both from implementing this work in Germany and from supporting partner countries will guide the development of the training materials. The training could involve study visits, workshops and follow up direct support to WHO Member States.

The training modules for outbreak response will focus on developing national guidance documents on structured outbreak responses. This work will be conducted through workshops by using scenarios and follow up support.

Status: ongoing

Under the aegis of the WHO's Pandemic Influenza Preparedness (PIP) framework, RKI collaborates with the WHO Regional Office for Europe (WHO EURO) to improve the capacities of countries of Central Asia and the Caucasus to rapidly detect and investigate outbreaks of influenza viruses with pandemic potential and other emerging respiratory pathogens. A generic outbreak response training package, based on previously developed national outbreak response plans, was developed by the RKI in collaboration with partner countries (Armenia, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan). It consists of a 4-day Outbreak Investigation and Response (OIR) training module and a 1-day Training-of-Trainers (ToT) module. Prior to the implementation of the training, modifications were made to tailor the training package to each country's specific needs. Following this, RKI epidemiologists trained national health experts in the package via ToT methodology in Armenia, Tajikistan and Kyrgyzstan. The latest ToT training took place in Uzbekistan on 10-14 December 2018. As a next step, RKI epidemiologists acted as observers/supervisors for the first in-country cascade training by national trainers in Armenia and Tajikistan in 2017 and 11-15 June 2018 in Kyrgyzstan. Further, the RKI collaborates with a number of African (Sudan, Tunisia) and Southeastern European partner countries (Albania, Kosovo, Macedonia, Montenegro) in the areas of epidemiology and surveillance in consultation with WHO EURO and/or WHO Country Offices to strengthen health care systems and provide support with implementation of the IHR (2005). The objectives of these partnerships are to rapidly detect unexpected events linked to infectious diseases, to prepare for infectious disease outbreaks by improved preparedness planning and to enable the implementation of targeted control measures in order to stop further spread through fast and efficient response to the outbreak. This is achieved through the development and implementation of training courses, support to process and tools development to strengthen national detection and response capacities. A weekly national epidemiological telephone conference to allow both horizontal and vertical exchange on infectious disease events among all states and RKI was established in Germany in 2009. This procedure has been adapted and successfully implemented in Albania and Tunisia with RKI support, and is being prepared for launch in other countries (such as Kosovo, Macedonia and Montenegro). RKI epidemiologists developed and delivered training modules, when possible applying a One Health approach comprising data management during outbreaks, analysis of surveillance data, outbreak investigation and response including laboratory involvement, event-based surveillance and rapid risk assessment in several partner countries.

Activity 9

Title: Support national antimicrobial resistance (AMR) surveillance systems including AMR and healthcare associated infection (HAI) outbreak detection and response

Description: Support the implementation of national AMR surveillance by building on experience from RKI's work in sub-Saharan African countries. Support and strengthen epidemiological capacity in data collection and analysis; national-level GLASS implementation; and regional collaboration by sharing best practice experiences. Support national activities to detect and respond to AMR and HAI outbreaks and provide technical support to AMR/HAI outbreak investigations in Member States upon request by WHO.

Status: ongoing

As mentioned above (see Activity 23424), RKI participated in the third meeting of the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network on 17-19 February 2019 in Cairo, Egypt to follow the progress of the network's work plan and contribute to further priority-setting.

The Network's work plan consists of 11 target products. Work products focus on the provision of AMR surveillance technical assistance to countries, with focus on low-income settings, including laboratory- and epidemiology-based support as well as operational research and guideline setting. RKI provides support to three African surveillance networks or collaborations which contribute to country-capacity building for AMR surveillance implementation. In Cote d'Ivoire, Burkina Faso, DRC, and South Africa, the "African Network for improved Diagnostics, Epidemiology and Management of Common Infectious Agents" (ANDEMIA) aims to build capacities for the surveillance of acute respiratory tract and gastrointestinal infections, acute febrile disease of unknown cause and antimicrobial resistance. A large range of technical support was given for the development of bacteriology and AMR surveillance standard operating procedures (SOPs), their implementation and quality control including various trainings, technical document review, regular mentorship and procurement assistance. Second, RKI provided technical expertise in the project "Real-time tracking of neglected bacterial diseases and resistance patterns in Asia" (TuNDRA) which aims to conduct standardized, real-time on-site pathogen surveillance for the pathogen resistance patterns including genetic sequencing in Vietnam, Cambodia and Bangladesh. Third, a collaboration agreement was launched with the Nigerian Centre for Disease Control and Prevention and RKI including a sub-project that specifically focuses on support for the development of their national AMR surveillance system. In August 2018, a workshop was held to discuss the standardization of antimicrobial susceptibility testing guidelines. In February 2019, a second workshop was held on the national implementation of AMR surveillance. This was jointly coordinated by the WHO CC network and lead by the WHO CC in South Africa, RKI and WHO HQ. RKI acted as a trainer for the AMR surveillance epidemiology, data management and GLASS aspects including the use of the laboratory data management software programme WHONET. Support for AMR surveillance data management capacity building and IT tools such as WHONET is a particular priority for the network.

Another target product of the network's work plan is the compilation of capacity-building resources. Through the international collaboration experiences of RKI, developed resources will continue to be shared as part of the Network's toolbox. Moving forward, RKI will make improved efforts to coordinate AMR surveillance implementation support with the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network. In November 2018, RKI held a meeting with the WHO HQ/AMR Secretariat responsible for this network to further discuss relevant priority setting for the coming year.

Lastly, as mentioned above, in 2018, RKI submitted AMR data to GLASS and contributed to the overall GLASS report.

Activity 10

Title: Support IHR implementation activities of WHO and its Member States

Description: Self-assessment of the implementation of IHR core capacities is required annually by WHO. As necessary RKI can serve as an external, independent partner to participate in Member States assessment bringing specific expertise in order to provide relevant recommendations to the requesting countries.

RKI has a long standing experience in the area of infectious diseases and aviation. The importance of Points of Entry (PoE) core capacities for IHR is increasing with increasing air travel worldwide and RKI can assist countries seeking advice and support in implementing the relevant measures at the points of entry in close collaboration with WHO and ICAO.

All rights to the data and information provided by a Member State hereunder will exclusively be and remain vested in that Member State. RKI will treat such data and information as strictly confidential, and use them only for the purpose of performing the work hereunder. In this regard, RKI shall provide the data and information only to those persons in RKI who have a need to know for the aforesaid purpose, and are bound by appropriate obligations of confidentiality and restrictions on use. It is explicitly understood and agreed that any other use by RKI of the samples and information, as well as any disclosure other than to the aforesaid persons, shall be subject to the express advance approval in writing of WHO and the Member State concerned.

With the exception of any pre-existing intellectual property rights of RKI, all rights to the results of the work performed by RKI hereunder shall also exclusively be owned by the Member State concerned.

Status: ongoing

RKI has supported the implementation of the IHR (2005) at national and subnational level in numerous countries in Europe, Asia and Africa.

The IHR Review Committee on Second Extensions for Establishing National Public Health Capacities and on IHR Implementation (WHA 68/22 Add.1) recommended "...to move from exclusive self-evaluation to approaches that combine self-evaluation, peer review and voluntary external evaluations involving a combination of domestic and independent experts." In light of this, WHO in collaboration with partners and initiatives, such as the Global Health Security Agenda (GHSA), developed the Joint External Evaluation (JEE) process as part of the IHR 2005 Monitoring and Evaluation Framework (IHRMEF). The JEE tool is intended to assess country capacities to prevent, detect and respond to public health threats independently of whether they are occurring naturally, deliberately or accidentally.

Countries can voluntarily request a JEE mission to help them identify the most urgent needs within their health system. The JEE will facilitate engagement with stakeholders and partner initiatives to support the country's national outbreak and health emergency preparedness, based on a tool revised in 2018

(<https://extranet.who.int/sph/sites/default/files/document-library/document/9789241550222-eng.pdf>).

Since 2016, RKI has provided experts for numerous JEEs to evaluate core capacity implementation and lead several of the 19 specified technical areas including that of "point of entry". During the present reporting period in total 6 experts were deployed to the following missions:

- Egypt: 1-5 October 2018
- Republic of Moldova: 1-5 October 2018
- Serbia: 8-12 October 2018
- Lithuania: 19-23 November 2018

In collaboration with partners, such as the respective WHO Country Offices, the German Corporation for International Cooperation (GIZ; WHO CC for Health System Strengthening) and national Ministries of Health, RKI has supported planning, execution and evaluation of context-adjusted simulation exercises of different formats to test current national health emergency response plans (Tunisia 2016, Sudan November 2018), and more exercises are currently under development (Tunisia, Montenegro).

In December 2018, the RKI participated in Albania's IHR-PVS (Performance of Veterinary Services) Pathway National Bridging Workshop. Its main objective was to provide an opportunity to the national human and animal health services to build on the reviews of performance, gaps and discussions for improvement conducted in their respective sectors, and to explore options for improved coordination between the sectors, to jointly strengthen their preparedness for, and control of, the spread of zoonotic diseases. In February 2019, an RKI scientist co-facilitated during a workshop on Rapid Risk Assessment of Acute Public Health Events organized by WHO EURO in Copenhagen, Denmark. Participants were representatives from South-Eastern European member states. The objectives were to strengthen critical human resources engaged in public health risk assessment of acute events at national level and to ensure a common understanding and systematic approach to risk assessment across different sectors.

With the overall goal to enable public health authorities to improve and better coordinate preparedness and response measures at points of entry to serious cross-border threats to health within the IHR (2005), RKI scientists co-organized a training course with the University of Thessaly, Greece (WHO CC for the International Health Regulations: points of entry) and the National Institute for Public Health and the Environment of The Netherlands (RIVM; WHO CC for Infectious Disease Preparedness and IHR monitoring and evaluation) in January 2019 in Luxembourg. The aim was to build capacities and to foster cooperation between the public health authorities and the transport sector among EU member states, Southeast European countries and international organizations for entry and exit screening measures at points of entry.

Activity 11

Title: Organise an IHR summer school with a focus on emerging infectious diseases

Description: The aim of the summer school is to strengthen surveillance, alert and response systems for public health events by introduction of IHR concepts to epidemiologists in relevant positions in the public health system of various countries for strengthening IHR core capacity implementation.

The methodology of the summer school will consist of a broad range of interactive teaching methods, such as didactic lectures, e.g. on legal aspects, structural requirements and basic principles of radiological, chemical and biological hazards, input presentations from the participants, e.g. concerning their experiences and specific obstacles in IHR implementation, group discussions, and table top exercises, e.g. scenario simulation of an unexpected event with application of IHR, exercise of inter-sectorial and international cooperation. A field trip to a point of entry (PoE), e.g. the Hamburg harbour and airport will provide insights to the working of different points of entry at the local level in Germany.

The Summer school will be open to representatives from all Member States, focusing primarily on the WHO European Region to allow some exchange of similar experiences. Ideally information about the summer school should be sent through the WHO European Regional Office to the respective NFPs with the offer to identify people with experience in the IHR relevant topics like Surveillance, Coordination, Point of Entries or Chemical/Radiological threats.

Status: ongoing

From 2017 onward, the RKI organizes an annual 5-day IHR Summer School in Berlin. The aim of the IHR Summer School is to strengthen the IHR core capacities of interested partner countries especially regarding infectious disease surveillance, early warning and response systems.

Although the focus is on the identification and management of biological hazards, inter-sectoral collaboration and communication remains a core element of the course. In addition, the training course intends to foster national and regional networks and exchange of experiences and knowledge. During the IHR Summer School, the main topics are taught via reciprocal presentations, case studies and group discussions (peer-peer learning). Each year, the course content is adjusted to the participant profiles and includes an excursion to a designated Point of Entry (air or sea port) is part of the programme. Despite the name "Summer School", the course offers a platform for horizontal, collegial exchange. Concrete examples are invited from participating countries to help explain and compare different methods and procedures. Relevant key experts from RKI, WHO Regional Offices and other relevant partners are invited to facilitate, chair sessions and share experiences about implementation of the IHR in Germany and abroad as well as the challenges to be overcome.

The first summer school was held between 4-7 July 2017 with 23 participants from South East Europe (Albania, Bosnia & Herzegovina, Kosovo, Montenegro, Macedonia, Serbia). The 2018 IHR Summer School included 23 public health professionals from Burkina Faso, Morocco, Nigeria, South Africa, Sudan, Tunisia, as well as two representatives from the Economic Community of West African States (ECOWAS) Regional Center for Surveillance and Disease Control and was held 25-29 June 2018. The course evaluation in both years was extremely positive from both participants and facilitators. The objectives and participants' expectations were met and the interactive teaching methods utilised were very well received. Based on the feedback received, a similar format will be used for future IHR Summer Schools.

2. Annual report on other activities requested

Should WHO have requested activities in addition to the agreed workplan, please describe related actions taken by your institution [maximum 200 words]. Please do not include in this report any activity done by your institution that was not requested by and agreed with WHO.

Within the reporting period, RKI deployed 3 highly experienced staff members as secondments to WHO. Amongst others, they contributed to the coordination of the response to the outbreak of EVD in the DRC and neighboring countries, to the coordination of the response to Yellow Fever outbreaks in Angola, Nigeria and Brazil, to the development of the Yellow Fever vaccination strategy, to the development of strategies on antibiotics consumption, as well as GOARN.

3. Resources

Indicate staff time spent on the implementation of activities agreed with WHO (i.e. those mentioned in questions no. 1 and no. 2 above). Do not include any data related to other activities done by your institution without the agreement of WHO. Please indicate staff time using the number of “full-day equivalents” – a day of work comprising 8 hours (e.g. 4 hours work per day for 7 days should be recorded as 3.5 full-day equivalents).

Number of staff involved (either partially or fully)

Senior staff	Mid-career staff	Junior staff, PhD students
28	0	3

Number of full-day equivalents, total for all staff involved

Senior staff	Mid-career staff	Junior staff, PhD students
1226	867	280

Implementation of the agreed workplan activities (i.e. those mentioned in questions no. 1 and no. 2 above) normally require resources beyond staff-time, such as the use of laboratory facilities, purchasing of materials, travel, etc. Please estimate the costs of these other resources as a percentage of the total costs incurred (e.g. if you incurred costs of USD 100 and the value of your staff time was USD 50 which makes the total of USD 150, please report 33.3% and 66.7%).

Percentage of costs associated with staff time	Percentage of costs associated with other resources	Total
82.00	18.00	100.00

4. Networking

Describe any interactions or collaboration with other WHO Collaborating Centres in the context of the implementation of the agreed activities. If you are part of a network of WHO Collaborating Centres, please also mention the name of the network and describe your involvement in that network [maximum 200 words].

The following collaborations with other WHO CCs took place; please refer to the indicated activities for further details:

- In December 2017, RKI led the preparation of a review on Yellow Fever diagnostics, amongst others in cooperation with Erasmus University Hospital Rotterdam (WHO CC for Arbovirus and Haemorrhagic Fever Reference and Research) and BNITM (WHO CC for Arbovirus and Haemorrhagic Fever Reference and Research; see also Activity 23421). Additionally, RKI organized together with Erasmus University Hospital Rotterdam an external proficiency testing activity on Yellow Fever molecular diagnostics for the EVD-LabNet Network.
- In June 2018, together with colleagues from GIZ (WHO CC for Health System Strengthening) and the BNITM, RKI staff supported development of EVD diagnostics and preparedness in the Republic of the Congo.
- In November 2018 in cooperation with GIZ, RKI supported planning, execution and evaluation of context-adjusted simulation exercises of different formats to test current national health emergency response plans.
- In January 2019, RKI co-organized a training course with the University of Thessaly, Greece (WHO CC for the International Health Regulations: points of entry) and the RIVM (WHO CC for Infectious Disease Preparedness and IHR monitoring and evaluation) aiming to build capacities and to foster cooperation between the public health authorities and the transport sector (see also Activity 23430).
- In the framework of AMR, RKI participated at the meeting of the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network on 17-19 February 2019 in Egypt, including a back-to-back meeting with other WHO CC on Surveillance of Antimicrobial Resistance and Healthcare Associated Infections (see also Activities 23424 and 23429). In addition in February 2019, an AMR training workshop was held on the national implementation of AMR surveillance in Nigeria. This was jointly coordinated by the WHO CC Network and lead by the WHO CC in South Africa, RKI and WHO HQ.



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