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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**

<b>City</b>	Berlin	<b>Reference Number</b>	DEU-135
<b>Title</b>	WHO Collaborating Center for Emerging Infections and Biological Threats		
<b>Report Year</b>	04-2016 to 04-2017		

**1. Please briefly describe the progress made in the implementation of your agreed workplan as WHO collaborating centre during the past 12 months (or the reporting period listed above). Please report on how each workplan activity was implemented, if any outputs have been delivered, if any results have been achieved and if any difficulties have been encountered during this time. If an activity has previously been completed, has not started yet, or been placed on hold, please indicate this.**

**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.

The Robert Koch Institute (RKI) has supported laboratories in numerous countries in Europe, Africa, and South America in enhancing their diagnostic capabilities.

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 networks to provide surge diagnostic capacities and laboratory diagnostics in outbreaks caused by highly pathogenic bacteria and viruses throughout Europe and support of outbreak management outside Europe. Thereby, the RKI provides laboratory and networking capacities which are available for WHO requests (see also Activity 23423).

Moreover, the RKI has provided scientific advice and technical guidance in missions organized by WHO/PAHO in Colombia and Paraguay (February and March 2016, respectively) in response to the outbreak of Zika virus infections, declared as a public health emergency of international concern (PHEIC). The RKI facilitated advice on efficient and feasible diagnostics in the countries, and contributed to the implementation of alternative (both molecular and serological) and sustainable methods adapted to the epidemiological context of the American region. These activities have contributed to strengthen the surveillance systems in the countries visited, and have supported the implementation of laboratory tools for the early detection not only of Zika virus, but also of other arbovirus outbreaks. To this purpose the RKI worked closely within a multidisciplinary team, and facilitated a technical assessment on the current procedures for Zika virus diagnosis in the laboratories, as well as advice on sampling, transport and storage of samples (see also Activity 23427).

As part of the WHO team of international experts, the RKI carried out a biosafety inspection at one of the two WHO-authorized Maximum Containment Laboratories for Variola virus (causative agent of smallpox) repositories: the Federal State Scientific Institute – State Research Centre of Virology and Biotechnology (VECTOR), Russian Federation (Novosibirsk), in October 2016 in accordance with World Health Assembly resolution WHA60.1 (2007).

### **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).

Nothing to report

### **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.

The RKI as the coordinator has implemented the Joint Action EMERGE together with 34 associated partners and 4 collaborating partners from 25 European countries (<http://www.emerge.rki.eu>; CHAFEA n° 677 066), funded by the European Union (EU) with the duration 1 June 2015 – 31 May 2018. Twenty eight bacterial laboratories and 15 viral laboratories directed on the diagnostics and management of highly pathogenic risk group 3 bacteria and risk group 4 viruses are setting up and consolidating a European network on outbreak response against these biological agents. The main tasks 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.

A number of documents for the management of outbreak response regarding laboratory capabilities and capacities, biorisk management, diagnostic protocols, and recommendations for handling of Lassa fever virus have been developed. Thereby, the RKI provides laboratory and networking capacities which are available for WHO requests.

The re-activation of the Smallpox Laboratory Network (SLN) has been initiated. For the first half-year 2017, meetings in Geneva at WHO headquarter as well as at the RKI are planned to discuss the process together with the WHO CCs for Smallpox in detail. In a first step, the criteria of reliable smallpox virus diagnostics, including identification of other orthopoxviruses, need to be updated and redefined. In a second step, designed laboratories will be trained and are invited to join ring trials to validate their poxvirus diagnostic capacity.

With respect to biological toxins, RKI has worked on the consolidation of the former EQuATox network (Establishment of Quality Assurances for the Detection of Biological Toxins of Potential Bioterrorism Risk), focusing on the establishment of quality assurances for the detection of toxins. A grant proposal entitled "European programme for the establishment of validated procedures for the detection and identification of biological toxins (EuroBioTox)" has been submitted to the EU under the programme Horizon 2020 and has been selected for funding. The project will bring together 57 European organizations, expert laboratories, industrial partners and end-users from 23 countries to work on setting up a network of competence in the area of biological toxins (project start: 1 June 2017, duration: 5 years). Thereby, RKI provides laboratory capacities for the detection of 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.

In the framework of antimicrobial resistance (AMR) preparedness, RKI has participated at the first Meeting of the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network in December 2016 and will participate at the high level meeting on 26-28 April 2017 in Sweden, including the back-to-back meeting of the WHO CC Network meeting. RKI is contributing to the work plan and several target products, such as the network of supranational laboratories to provide reference testing of unusual AMR, the emerging AMR reporting and risk assessment framework and the guidance on detection and reporting of colistin resistance. Based on the description of a plasmid-encoded colistin resistance in Enterobacteriaceae isolates from food animals in Asia, RKI initiated a country-wide request to send in human clinical Enterobacteriaceae strains with colistin resistance (together with the German National Reference Centre for Gram-negative bacteria) to search for *mcr 1* and *mcr 2* plasmid-mediated resistance by PCR (sequencing for confirmation) and to elucidate alternative resistance mechanisms by sequence comparisons (e.g., mutations in *mgrB*; the vast majority of human, clinical colistin-resistant Enterobacteriaceae lacks *mcr*-mediated resistance).

#### **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.

RKI coordinates the work of the permanent working group of competence and treatment centres for highly infectious and life-threatening diseases (STAKOB). STAKOB hold a face-to-face meeting on 21 April 2016 and decided that all STAKOB treatment centres (Berlin, Düsseldorf, Frankfurt, Hamburg, Leipzig, Munich, Stuttgart) will join the WHO Emerging Diseases Clinical Assessment and Response Network (EDCARN). Representatives of STAKOB treatment centres as well as the STAKOB office have been added to EDCARN listserv.

Staff of the STAKOB office met with the WHO Epidemic Clinical Management Coordinator on 12 May 2016 and discussed how to integrate STAKOB treatment centres permanently into EDCARN. STAKOB office has provided a 24/7 telephone number for WHO to reach STAKOB if urgent support is needed. Using this number, WHO will be able to connect STAKOB office and to launch a teleconference with all STAKOB centres within 30 minutes if needed at any time.

In addition, WHO EDCARN, STAKOB and RKI co-hosted the workshop on “Lessons Learned from Ebola Virus Disease (EVD) to Enhance Preparedness for Crimean Congo Haemorrhagic Fever (CCHF)” as an EDCARN meeting in April 2016 in Berlin (see Activity 23426).

STAKOB clinical experts for highly infectious diseases offered their support to contribute to global clinical assessment and response needs identified for outbreaks at several occasion:

- Early report of Influenza A(H1N1) infection in Fiji (April 2016): STAKOB offered 24/7 support via teleconference as well as response capacity (finally not needed).
- Yellow fever outbreak response, clinical management and infection prevention and control (IPC) in Angola and the Democratic Republic of the Congo (May 2016):
  - o STAKOB treatment centres (Leipzig, Berlin) participated at drafting the emergency guidance document on clinical management of patients with Yellow fever.
  - o Expert of STAKOB treatment centre Berlin participated at the initial assessment and support mission for the Yellow fever outbreak response, clinical management and IPC in Angola and the Democratic Republic of the Congo. There was an urgent need to assess the health care facility capacities and support the first line clinicians to implement appropriate standards of care. STAKOB experts went to Angola and the Democratic Republic of the Congo under the coordination of WHO and as member of the WHO Global Outbreak Alert & Response Network (GOARN) team to provide technical support and input on clinical management and IPC.
- WHO – STAKOB training (25-27 July 2016): Infectious disease experts of the STAKOB treatment centres got at a specific WHO training to enable them to participate in future WHO EDCARN missions to strengthen clinical management in case of a viral hemorrhagic fever (VHF) or severe acute respiratory infection (SARI) outbreak.
- WHO training on VHF clinical management in Uganda, 27-31 March 2017: Participation of STAKOB treatment centres (Berlin, Frankfurt, Hamburg, Leipzig) at a training for severe syndromes due to high-threat pathogens in Africa and in low-resource settings. Unfortunately, the training had to be postponed.
- Lassa fever in Togo (April 2017): STAKOB office and treatment centre were contacted by authority from France and Togo to support them concerning the clinical management of Lassa fever cases. The treatment centre Frankfurt conducted personal recommendation. Teleconference with STAKOB was offered.

#### **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.

WHO EDCARN, STAKOB and RKI hold an international workshop/EDCARN meeting "Lessons Learned from Ebola Virus Disease (EVD) to Enhance Preparedness for Crimean Congo Haemorrhagic Fever (CCHF)" in April 2016 in Berlin. The main objectives of this workshop were to strengthen the EDCARN network and to start the process to develop WHO CCHF guidelines. A worldwide unique professional exchange between experts on EVD and CCHF took place, concentrating on clinical management, including IPC as well as on public health measures. The procedure for CCHF guideline development was initiated. The 3 days meeting was attended by 128 participants from 30 countries. Amongst others, infectious diseases physicians, veterinarians, epidemiologists, virologists and public health authority representatives dealing with EVD and/or CCHF were present. In addition to the workshop topic framework, an update on the recent two patients suffering from Lassa fever in Germany (first human-to-human transmission outside Africa) was provided.

To finalize the process of drafting a global (interim) guideline for CCHF, another workshop, entitled "Crimean Congo Haemorrhagic Fever – WHO Guideline Development Group Meeting", was co-hosted by WHO EDCARN, STAKOB and RKI on 4-5 April 2017 in Berlin. The objectives of the meeting were (i) to examine the Grading of Recommendations Assessment, Development and Evaluation (GRADE) evidence profiles or other assessments of the quality of the evidence used to inform the recommendations and provide input; (ii) to interpret the evidence, with explicit consideration of the overall balance of benefits and harms; and (iii) to formulate recommendations taking into account benefits, harms, values and preferences, feasibility, equity, acceptability, resource requirements and other factors, as appropriate. The final guideline is expected to be completed in 2017.

#### **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.



In two missions RKI has provided scientific advice and technical guidance in the missions organized by WHO/PAHO in Colombia and Paraguay in response to the Zika virus outbreak (February and March 2016). RKI facilitated advice on efficient and feasible diagnostics in the countries, and contributed to the implementation of alternative (both molecular and serological) and sustainable methods adapted to the epidemiological context of the American region (endemicity of Dengue fever and Chikungunya fever) and provided molecular standards. These activities have contributed to strengthen the surveillance systems in the countries visited, and have supported the implementation of laboratory tools for the early detection not only of Zika virus, but also of other arbovirus outbreaks. To this purpose the RKI worked closely within a multidisciplinary team, and facilitated a technical assessment on the current procedures for Zika virus diagnosis in the laboratories (National Institute of Health, Bogotá, Columbia, and Laboratorio Central de Salud Pública, Ascension, Paraguay) as well as advice on sampling, transport and storage of samples. Support of the laboratories by RKI is on-going (see also Activity 23421).

In May 2016 an expert of STAKOB treatment centre Berlin participated at the initial assessment and support mission for Yellow fever outbreak response, clinical management and IPC in Angola and the Democratic Republic of the Congo. The STAKOB expert worked as a member of the WHO/GOARN outbreak response team to provide technical support and input on clinical management and IPC (see also Activity 23425). In summer 2016, there was evidence that the ongoing Yellow fever outbreak spread to the south of the Democratic Republic of the Congo. Following a request by WHO, the European Mobile Laboratory Project (EMLab) offered assistance via the European Medical Corps mechanism. EMLab staff was deployed under WHO/GOARN. The site of operation was decided by WHO/National coordination to be in Kahemba (Democratic Republic of the Congo). The laboratory became operational on the 13 August 2016. Three teams worked in Kahemba, one team member stayed during the whole mission (9 team members from RKI). The mission revealed no major Yellow fever problem in the area and diagnostic services was terminated on 18 September 2016.

In May 2016 and June-July 2016, 2 staff members of the RKI supported the epidemiological investigation of the Yellow fever outbreak in Angola (deployment under the European Medical Corps) and in the Democratic Republic of the Congo (deployment under WHO/GOARN), respectively. Objective of these missions was to contribute to the control of the outbreak and to prevent further spread of the in the community and health care facilities. Amongst others, the deployed staff contributed to the review of the epidemiological situation of Yellow fever in the countries, to the assessment of the implemented control measures, and to the provision of advice to the EC.

### **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.

Under the aegis of the WHO's Pandemic Influenza Preparedness (PIP) framework, the RKI is working with the WHO Regional Office for Europe 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 was developed by the RKI in collaboration with partner countries (Armenia, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan) and based on previously developed national outbreak response plans. The training package is 4 days duration and consists of an Outbreak Investigation and Response (OIR) Training Module and a Training-of-Trainers module. Prior to implementation of the training, modifications were made to tailor the training package to each country's specific needs. Subsequently, the first in-country outbreak response training workshops were conducted in Armenia (31 October to 3 November 2016) and in Tajikistan (3-6 April 2017) by RKI experts and with the support of the WHO Regional Office for Europe. These trainings are to be followed by a series of in-country cascade trainings conducted by local trainers.

The WHO Regional Office for Europe, together with the RKI, conducted an inter-country workshop, under the aegis of the PIP Framework, on "Development of Training for Implementation of National Guidelines on Outbreak Investigation and Response" on 5-8 July 2016 in Vienna, Austria. The meeting presented the first version of the outbreak response training package. The training was open for discussion regarding its content, methods of teaching and further regional or country-specific adaptation needs. An outbreak investigation training in Sudan was held in Khartoum from 15-19 May 2016 and included surveillance officers and field epidemiologists from all 18 federal state health ministries in Sudan as well as junior staff from the federal ministry of health. Senior field epidemiologists facilitated the different session together with RKI staff. The workshop generated important human capacity and networks for subnational rapid response teams in Sudan and improved the country's preparedness for over-regional outbreaks and health emergencies.

#### **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.

The RKI participated at the first Meeting of the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network in December 2016 (see also Activity 23424).

The RKI hosts the national laboratory-based AMR surveillance network and has discussed and presented the methodology and approach of Global Antimicrobial Resistance Surveillance System (GLASS) with participating laboratories during the annual meeting in December 2016. The national focal point for GLASS is based at the RKI and Germany is fully enrolled in GLASS and has submitted data on the implementation status of national AMR surveillance and will share AMR data with GLASS through the European Antimicrobial Resistance Surveillance Network.

The RKI is project partner and is working closely together with the Public Health Agency of Sweden (WHO CC for Antimicrobial Resistance Containment) within the Northern Dimension Partnership in Public Health and Social Wellbeing initiative (NDPHS) in a project to promote GLASS early implementation in participating countries. The objective of the project is to identify logistic obstacles in implementation of GLASS in countries, assess the supporting material developed by WHO and identify needs for clarification or additional material and share the experiences with WHO and other countries. The project held a kick off meeting January 2017, where the technical counterparts from participating countries, the WHO Regional Office for Europe, the ECDC and representatives from Ministries of Health in Germany, Lithuania and Sweden participated.

#### **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.

RKI has supported the implementation of the International Health Regulations (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. The JEE Tool is intended to assess country capacity to prevent, detect, and respond to public health threats independently of whether they are naturally occurring, deliberate, or accidental.

Countries can request a JEE mission to help them to identify the most urgent needs within their health system. The JEE will help engage with stakeholders and partners initiatives to support country outbreak and health emergency preparedness.

RKI has supported several JEEs with experts and has covered here also the Technical Area "Points of Entry".

- Armenia: 14-19 August 2016
- Sudan: 6-13 October 2016
- Albania: 5-9 September 2016
- Kyrgyzstan: 27 November -2 December 2016
- Finland: 27-31 March 2017

#### **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.

From 2017, the RKI plans to organize IHR Summer Schools. The aim of the IHR Summer School is to strengthen the IHR core capacities of interested partner countries especially regarding infectious disease surveillance, alert and response systems. Although the focus will be on the identification and management of biological hazards, inter-sectoral collaboration and communication will remain a core element of the course. In addition, the training course hopes to foster national and regional networks and exchange of experiences and knowledge. During the IHR Summer School, the main topics will be taught via reciprocal presentations, case studies and group discussions (peer-peer learning). In spite the name "Summer School", the course offers a platform for horizontal, collegial exchange. Concrete examples will be invited from participating countries to help explain and compare different methods and procedures. Relevant key experts from RKI will be invited to facilitate, chair sessions and share experiences about successful implementation of the IHR in Germany and the challenges that had to be overcome. The formed network is intended to bring about future exchange beyond the IHR Summer School. The 2017 IHR Summer School is aimed at 25-30 public health experts from countries in South East Europe and planned to be held 3-7 July 2017.

**2. Please briefly describe your collaboration with WHO in regards to the activities of the WHO collaborating centre during the past 12 months (e.g. means of communication, frequency of contact, visits to or from WHO). Please feel free to mention any difficulties encountered (if any) and to provide suggestions for increased or improved communication (if applicable).**

The following collaboration with WHO took place, please refer to the indicated activities for further details:

- Bilateral Meeting WHO-Germany, 23 November 2016: The meeting was a high-level discussion on WHO-Germany collaboration with a focus on WHO-Germany strategic engagement in support to the Global Health Architecture (from G7 to G20), updates on WHO reform, a review of collaboration between WHO and Germany including discussion on the WHO Health Emergencies Programme and antimicrobial resistance also under the umbrella of the WHO CC.
- Zika virus outbreak: RKI has provided scientific advice and technical guidance in missions organized by WHO/PAHO in Colombia and Paraguay, in February and March 2016, respectively) in response to the outbreak of Zika virus infections (see also Activity 23421 and 23427).
- Smallpox repository: RKI carried out a biosafety inspection at the Federal State Scientific Institute in the Russian Federation in October 2016 (see also Activity 23421).
- AMR preparedness: RKI has participated at the first Meeting of the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network in December 2016 and will participate at the high level meeting in Sweden in April 2017 (see also Activity 23424 and 23429).
- Clinical network EDCARN: The German STAKOB treatment centres have been connected with WHO EDCARN (see also Activity 23425 and 23426).
- Clinical management training: Experts of the STAKOB participated in different training courses on VHF and SARI outbreaks (see also Activity 23425).
- Outbreak alert and response network GOARN: Under the coordination of WHO and GOARN, experts of German STAKOB treatment centres provide technical support and input on clinical management and IPC in the framework of the Yellow fever outbreak in Angola and the Democratic Republic of the Congo (see also Activity 23425 and 23427).
- Development of training modules for outbreak response: RKI is working together with WHO Regional Office for Europe 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 (see also Activity 23428).
- Support of IHR (2005) implementation: RKI has supported several JEEs conducted by WHO with experts and is preparing to conduct an IHR Summer School (see also Activity 23430 and 23431).

Within the reporting period, RKI has deployed 4 highly experienced staff members (Muna Abu Sin, Justus Benzler, Matthias Niedrig and Ole Wichmann) as secondments to WHO. Amongst others, they contributed to the response to the Yellow fever outbreak in Angola and the Democratic Republic of the Congo, the Yellow fever strategy, the Global Antimicrobial Resistance Surveillance System, and immunization policies and strategies.

**3. Please briefly describe any interactions or collaborations with other WHO collaborating centres in the context of the implementation of the above activities (if any). If you are part of a network of WHO collaborating centres, please also mention the name of the network, and describe any involvement in the network during the last 12 months.**

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

- In March 2016 two cases of Lassa fever were notified in Togo, however, the diagnosis could not be established in-country due to lacking laboratory capacities. Training to strengthen laboratory capacities was carried out in cooperation with the BNITM, Germany (WHO CC for Arbovirus and Haemorrhagic Fever Reference and Research) in Lomé, Togo at the Institut National d'Hygiene (INH) in July 2016. In particular, RKI was involved in the training of scientists on the diagnosis of Lassa virus and other hemorrhagic fever viruses including lessons in theoretical background, PCR and sequencing, as well as Good Laboratory Practice (GLP). Finally, the INH was prepared to identify Lassa virus cases independently, which was of great value during the imported Lassa fever outbreak in Togo and Benin in February 2017.
- In cooperation with the BNITM, Germany (WHO CC for Arbovirus and Haemorrhagic Fever Reference and Research), RKI has participated at a MODEX exercise at the Swedish Fire and Civil Protection School MSB Revinge, Sweden, between 24-27 April 2017. The exercise had a disaster scenario with an infectious disease challenge component. As an EMLab member, staff from RKI was involved as team leader and team member in this training.
- In March 2017 in cooperation with the BNITM, Germany (WHO CC for Arbovirus and Haemorrhagic Fever

Reference and Research), RKI staff was deployed to support the establishment of laboratory capacities for the diagnosis of Lassa, Dengue, Chikungunya, and Zika virus in the National Laboratory for Haemorrhagic Fever in Cotonou, Benin. The mission team provided laboratory support for the diagnosis of Lassa fever in contact persons of cases identified in the above mentioned outbreak.

- For the first half-year 2017, meetings in Geneva at the WHO headquarter as well as at the RKI are planned to discuss the process together with the WHO CCs for Smallpox (State Research Center of Virology and Biotechnology "VECTOR", Russia; Centers for Disease Control and Prevention [CDC], USA) in detail (see also Activity 23421).
- In cooperation with other WHO CCs (e.g. BNITM, Germany [WHO Collaborating Centre for Arbovirus and Haemorrhagic Fever Reference and Research], Public Health England [WHO Collaborating Centre for Virus Reference & Research (Special Pathogens)], Istituto Nazionale per le Malattie Infettive "Lazzaro Spallanzani", Italy [WHO CC for Clinical Care, Diagnosis, Response and Training on Highly Infectious Diseases]) in the framework of the EU-funded Joint Action EMERGE, RKI as the coordinator of this Joint Action contributed to the networking of laboratory networks as well as to the development of documents for the management of the response to outbreaks caused by highly pathogenic agents (see also Activity 23421, 23423). The first "Outbreak Preparedness and Response Coordinators" meeting took place in Amsterdam on 30 November 2016. Network leaders, representatives from various relevant European networks, including Emerging Viral Diseases-Expert Laboratory Network (EVD-LabNet), the European Commission (EC), the European Centre for Disease Prevention and Control (ECDC), WHO and different WHO CCs discussed a coordinated response in case of outbreaks caused by highly pathogenic agents. This was the beginning of a series of consultations to define responsibilities and coordinated activities avoiding duplications in cross-border outbreak events caused by highly pathogenic biological agents in and outside Europe.
- RKI is participating in the WHO AMR Surveillance and Quality Assessment Collaborating Centres Network in cooperation with other WHO CCs (The Prince of Wales Hospital, Australia [WHO CC for Sexually Transmitted Diseases], School of Public Health, the University of Hong Kong, China [WHO CC for Infectious Disease Epidemiology and Control], National Food Institute of the Technical University of Denmark [WHO CC for Antimicrobial Resistance in Foodborne Pathogens and Genomics], National Research Institute of Tuberculosis & Lung Diseases, Iran [WHO CC for Tuberculosis Education], National Institute for Public Health and Environment, Netherlands [RIVM; WHO CC for Risk Assessment of Pathogens in Food and Water; WHO CC for Antimicrobial Resistance Epidemiology and Surveillance], University of Utrecht, Netherlands [WHO CC for Reference and Research on Campylobacter], Institute of Antimicrobial Chemotherapy, Russia [WHO CC for Capacity Building on Antimicrobial Resistance Surveillance and Research], Centre for Opportunistic, Tropical and Hospital Infections, South Africa [WHO CC for Antimicrobial Resistance], National Reference Laboratory for Pathogenic Neisseria, Örebro University Hospital, Sweden [WHO CC for Gonorrhoea and other sexually transmitted infections], Public Health Agency of Sweden [WHO CC for antimicrobial resistance containment], Hôpitaux Universitaires de Genève, Switzerland [WHO CC on Patient Safety], Ministry of Public Health, National Institute of Health, Thailand [WHO CC for Antimicrobial Resistance Surveillance and Training], Siriraj Hospital, Mahidol University, Thailand [WHO CC for Antimicrobial Resistance (AMR) Prevention and Containment], Antimicrobial Resistance and Healthcare Associated Infections Reference Unit, Public Health England [WHO CC for Reference & Research on Antimicrobial Resistance and Healthcare Associated Infections], Brigham & Women's Hospital, USA [WHO CC for Surveillance of Antimicrobial Resistance], CDC, USA [WHO CC for International Monitoring of Bacterial Resistance to Antimicrobial Agents; WHO CC for Surveillance, Epidemiology and Control of Salmonella and other Foodborne Diseases]) and is involved in the respective work plan activities (see also Activity 23424).
- The RKI is working closely together with the Public Health Agency of Sweden (WHO CC for Antimicrobial Resistance Containment) in a project within the NDPHS to promote GLASS early implementation in participating countries (see also Activity 23429).

**4. Please briefly describe any type of technical, programmatic, advisory or other support received from WHO during the past 12 months for the implementation of the agreed activities listed above (if any).**

Not applicable