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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 04-2021 to 04-2022

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: Diagnostic support and molecular characterization of known and unknown bacterial and viral pathogens as well as detection of biological toxins.

Description: WHO's 13th General Program of Work (GPW13) sets the 'triple billion' goal and WHE is responsible for '1 billion more people better protected from health emergencies'. Under the outcome 2.2 Epidemics and pandemics prevented, this activity aims to advance WHO's work on Output 2.2.1: Research agendas, predictive models and innovative tools, products and interventions available for high-threat pathogens in collaboration with RKI with its contribution to diagnostics, innovative tools and products.

RKI holds specialized units on highly pathogenic bacteria, viruses and biological toxins. The Institute serves as the German national reference laboratory for high biosecurity pathogens (anthrax, tularemia, poxviruses, plague; botulism, tetanus). RKI's laboratory units can perform culture and isolation of pathogens under BSL3 and BSL4 conditions, molecular identification and characterization, whole genome sequencing (including forensic trace back analysis), PCR, serology, immunological detection, spectrometric identification and microscopy of pathogens in relevant targets with best practice approaches. The units are highly experienced in analyzing complex samples from outbreak scenarios, e.g. clinical and environmental samples and food samples for biological toxins.

WHO will use the laboratory investigation results for epidemic and pandemic preparedness and response.

Status: ongoing

Support diagnostics for known emerging infections and biological threats:

Details:

In the framework of the Joint Action "Strengthened International Health Regulations and Preparedness in the EU – Joint Action (SHARP)" RKI/ZBS 2 conducted EQAEs on highly pathogenic bacteria with about 30 laboratories in Europe in June 2021 and April 2022. In November 2021, the results of the EQAE from June 2021 were presented and discussed in a video conference with 63 participants from 35 WP7 partner laboratories in 21 European countries.

In the framework of the project "German Contribution to Strengthen the Reference Laboratories Bio in the UNSGM (RefBio)", in October 2021, an EQAE on Brucella, provided by ZBS 2, was conducted; for the first time also living Brucella samples (here for safety reasons non- highly pathogenic fur humans) were provided

to exercise shipment of Category A samples to the various international laboratories and their capabilities. For this exercise, 30 laboratories from 21 UN member states had been registered. During the same time frame, an EQAE on inactivated hemorrhagic fever viruses, provided by ZBS1, were successfully conducted with more than 25 participating laboratories. Also in October 2021, an EQAE on botulinum neurotoxins, provided by ZBS3, was performed with 17 laboratories worldwide. The results of all three very ambitious and complex EQAEs were discussed with the participants during workshops in the beginning of 2022. The results of the EQAE on SARS-CoV-2 (November 2020) were discussed with 53 experts from 20 UN member states in October 2021.

Between 2021–2022 the project “European program for the establishment of validated procedures for the detection and identification of biological toxins (EuroBioTox)”, coordinated by ZBS 3, continued its work on biological toxins with four proficiency tests on the botulinum neurotoxins, ricin, abrin, and staphylococcal enterotoxins. Furthermore, three training courses on basic and advanced detection methods for biological toxins were conducted.

Outputs:

The diagnostic capabilities for highly pathogenic agents and the causative agent of COVID-19 could be evaluated and improved in laboratories participating in EQAEs.

Difficulties:

No face-to-face meetings or trainings due to the COVID-19 pandemic.

Support identifying unknown pathogens and developing specific diagnostic tools:

The External Quality Assurance program for Electron Microscopy of Virus Diagnostics (EQA-EMV) completed two runs (EQA-32 and -33) and prepared another run which was shipped end of March 2022. Six blinded samples, including SARS-CoV-2 and orthopoxviruses, were sent out to over 80 participants in more than 30 countries worldwide with a more than 85% reply rate. We recognize increasing difficulties and costs with the shipment of even inactivated samples due to new regulations. Lab courses were not conducted because of the pandemic (international travel limitations, national and institutional regulations of human contact limitations). Requests for teaching and advice increase, mostly related to the pandemic coronavirus. Main topics were related to inactivation procedures and the correct identification of coronaviruses in patient tissue samples, which is a serious problem (Dittmayer et al. 2020 doi 10.1016/S0140-6736(20)32079-1). This international program is maintained by the RKI because of its general importance for the diagnosis and investigation of infectious diseases but would not be conducted at this level if not included in the activities of the WHO CC.

To further strengthen the UNSGM, a “Dry-lab” EQAE was conducted (ZBS1). Task was to identify and characterize Poxviruses from NGS-datasets. A second EQAE on respiratory viruses, to be launched in June 2022, was planned.

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

Details:

The “EMERGE Laboratory Network” has further been strengthened in the framework of work package 7 of the new EU funded Joint Action (JA) SHARP (April 2019 – March 2022), including about 40 European diagnostic laboratories specialized in highly pathogenic infectious agents, consolidating a European network on outbreak response against these biological agents. EQAEs, training and strengthening of laboratory biosafety management are included in the project. The Joint Action has been prolonged until March 2023.

A new phase of the project “German Contribution to Strengthen the Reference Laboratories Bio in the UNSGM (RefBio)” beginning from January 2022 with a duration over three years has been started. It will contain again EQAE on highly pathogenic bacteria, viruses, and biotoxins which might be used as biological weapons as well as workshops for the discussion of results and exchange of knowledge. In addition, the project will also contain training for laboratories serving for the UNSGM.

RKI further coordinates the EU-funded EuroBioTox project (“European programme for the establishment of validated procedures for the detection and identification of biological toxins”; <https://www.eurobiotox.eu>). In this project a network of 60 expert institutions – laboratories, industrial partners and end users – from 23 countries from the health, food and security sectors is established. Building on the partners individual expertise the projects seeks to improve detection and identification methods for biological toxins which could be misused as potential biothreat agents. EuroBioTox has established a repository of characterized antibodies, toxic culture supernatants and SOPs.

Outputs:

Three strong networks on diagnostics of highly pathogenic bacteria, viruses, and bio-toxins are maintained and offered for response to emergent situations in Europe and globally.

Difficulties:

No face-to-face meetings or trainings due to the COVID-19 pandemic.

Activity 2

Title: Provide clinical expertise, operational and technical support to WHO on clinical management and treatment of patients with high-impact pathogens upon request by WHO

Description: WHO's 13th General Program of Work (GPW13) sets the 'triple billion' goal and WHE is responsible for '1 billion more people better protected from health emergencies'. Under the outcome 2.2 Epidemics and pandemics prevented, this activity aims to advance WHO's work on Output 2.2.1: Research agendas, predictive models and innovative tools, products and interventions available for high-threat pathogens in collaboration with RKI with its contribution to research agenda, thereby contributing to update norms and standards, innovative tools and interventions to optimize patient care.

The responsible unit within RKI coordinates the German Permanent Working Group of Competence and Treatment Centres for high consequence infectious diseases (STAKOB), the German network of high-level isolation units. Through this collaboration, WHO benefits from rich clinical knowledge and experience STAKOB holds to support the Emerging Disease Clinical Assessment and Response Network (EDCARN) e.g. detailed clinical/laboratory information, collection of expert opinions on clinical management and treatment of patients with high-impact pathogens. STAKOB also serves as pool of clinical experts for outbreak and intra-outbreak preparedness deployment. WHO also benefits from RKI's operational capacity and resource in compilation of information/opinions, developing and implementing trainings.

Status: ongoing

RKI coordinates the permanent working group of competence and treatment centers in Germany (STAKOB). Due to the COVID-19 pandemic, deployment of STAKOB experts related to high consequence infectious diseases could not be realized.

Experts from RKI and STAKOB participated regularly at WHO Clinical Network Knowledge Exchange videoconferences in order to discuss evolvments in clinical care of COVID-19 as well as the epidemiological/clinical situation of COVID-19 in different countries.

A clinician from STAKOB Berlin treatment center acts as a panel member of the Guideline Development Groups (GDG) for WHO COVID-19 guidelines on therapeutics and clinical management. Since April 2022, she also acts as the clinical chair of the GDG on COVID-19 therapeutics.

A clinician from STAKOB Berlin treatment center participates in Cochrane reviews on COVID-19 therapeutics in close collaboration with other Cochrane centers.

April 2021 – April 2022: Activities related to the CCHF guideline were not realized during the reporting period.

Activity 3

Title: Upon request by WHO, provide expertise in outbreak response to the field

Description: WHO's 13th General Program of Work (GPW13) sets the 'triple billion' goal and WHE is responsible for '1 billion more people better protected from health emergencies'. Under the outcome 2.2 Epidemics and pandemics prevented, this activity aims to advance WHO's work on Output 2.2.1: Research agendas, predictive models and innovative tools, products and interventions available for high-threat pathogens in collaboration with RKI with its contribution to epidemiological research, predictive models and innovative tools and interventions.

One of the Robert Koch Institute's core competencies is infectious disease epidemiology. As one of the leading agency in the area of work in the Region, it has capacity to provide the expertise for events outside of Germany. RKI will support WHO in delivering rapid and effective support to prevent and control infectious diseases outbreaks in affected countries. RKI holds specialized units in ZIG & the Department of Infectious Disease Epidemiology 3 with wide technical expertise in epidemiology, outbreak investigation, digital tools for outbreak investigation, early warning, and operations support that could strengthen international response capacity, by training teams and experts to support WHO and partner countries for outbreak response.

WHO will use the deliverables to quickly contain outbreaks, increase countries' capacity to cope with epidemics and use the reports for knowledge base.

Status: ongoing

Covid 19 EMT mission Papua New Guinea – JUH

12th April – 23rd April 2021

Team: 7

Activities: primary health care and emergency care, IPC trainings, WASH, Shadowing

Achievements: continuous patient treatment, knowledge transfer

Covid 19 EMT mission Papua New Guinea – Cadus

16th November – 5th December 2021

Team:15

Activities surge support, shadowing, technical training, equipment donation in Nonga Base Hospital

Achievement: continuous support of C19 patient treatment, IPC in health facilities improved

Activity 4

Title: Develop training modules to support activities related to surveillance, preparedness and response to infectious diseases

Description: WHO's 13th General Program of Work (GPW13) sets the 'triple billion' goal and WHE is responsible for '1 billion more people better protected from health emergencies'. Under the outcome 2.2 Epidemics and pandemics prevented, this activity aims to advance WHO's work on Output 2.2.1: Research agendas, predictive models and innovative tools, products and interventions available for high-threat pathogens in collaboration with RKI with its contribution to innovative tools, products and dissemination of these by training.

RKI's unit in charge has an extensive experience and capacity in developing training modules that will guide participants in implementing systems on epidemiological surveillance, on how to gather and exchange epidemic intelligence for early warning as well as how to prepare and respond to infectious disease events. Their experience in LMICs will guide the development of the training materials. Training contents are carefully aligned with WHO standards.

Status: ongoing

RKI collaborates with a number of African (Namibia, Sudan, Tunisia) and South-eastern European partner countries (Albania, Kosovo, Macedonia, Montenegro) in the areas of epidemiology and crisis management in consultation with WHO EURO and/or WHO Country Offices to strengthen health care systems and provide support with implementation of International Health Regulations (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, as a tool for event-based surveillance and early warning, 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 the Balkan partner countries and Tunisia with RKI support, and proved to be a valuable communication and coordination platform during the COVID-19 pandemic. In the past, RKI epidemiologists developed and delivered training modules, when possible applying a One Health approach, comprising data management and analysis during outbreaks, outbreak investigation and response including laboratory involvement, event-based surveillance and rapid risk assessment in several partner countries.

In order to learn from each other's experiences with pandemic management, RKI epidemiologists conducted numerous bilateral virtual exchange sessions on COVID-19 response aspects. Both parts presented agreed aspects of interest of their response to the COVID-19 pandemic and had the possibility to discuss experiences, challenges and lessons identified. The aim was to give both sides an insight into the situation management and the measures and recommendations and, if necessary, to identify opportunities for collaboration and support. On one hand, the subject areas of previous collaborations (for exchange sessions with existing partner countries) and their application in the scope of preparedness and response were discussed in the context of a real crisis situation. On the other hand, the meeting enabled the both sides to exchange on the various areas requiring attention from the national Public Health institutes. In 2020, such events were held with Albania, Brazil, Tunisia, Morocco, Kosovo. In 2021, with Namibia, Russia and Montenegro.

In June 2021, a face-to-face COVID-19 response exchange session was implemented during a visit to RKI by Iranian delegates.

As part of the COVID-19 response during a COVID-19 exchange and support mission, in 2020 RKI epidemiologists conducted context-adjusted training courses for contact tracing teams in each of the six regions in Kosovo to ensure they understand the importance and goals of this and are familiar with the process. The aim of the courses was to improve contact tracing for COVID-19 cases and consequently reduce onwards transmission and better control the pandemic. In the frame of the mission other relevant topics were also addressed, including COVID-19 case-based and event-based surveillance, IHR communication channels, potential research projects and contact tracing software.

In 2021, RKI epidemiologists participated to a mission to Montenegro and to Iran, with the aim to exchange experiences and knowledge on COVID-19 response aspects related to epidemiological surveillance and preparedness and response.

A crucial element of crisis response are mechanisms for communication as well as the control and coordination of response measures. In the Public Health sector, this is usually a Public Health Emergency Operations Centre (PHEOC). A PHEOC is a physical location or a virtual space for the coordination of information and resources to support crisis management during health events. An effectively operated PHEOC not only requires the physical infrastructure but also the development of appropriate plans, procedures and protocols. Operational PHEOCs are part of the core capacities required under the IHR (2005). The COVID-19 pandemic has highlighted the importance and benefit of a PHEOC-coordinated communication and response system. While many WHO Member States have made progress with regards to the physical PHEOC establishment not least due to the enduring health crisis, appropriate mechanisms are still lacking: e.g. for the well-timed activation of PHEOCs, terms of reference and procedures for each of the comprised positions as well as the effective structuring of work processes in the event of a public health crisis. For optimal preparedness, the workflows resulting from the PHEOC plans, procedures and protocols must be made available to all staff and end-users through training, regularly practised and evaluated and revised accordingly. RKI scientists have supported partner countries with strengthening their PHEOCs. In 2020, RKI colleagues implemented a virtual exchange session organised jointly with WHO SEARO to which all Member States participated and actively contributed. In 2021, RKI scientists first contributed to a virtual workshop on PHEOC in North Macedonia and later to an in-country mission together with WHO to operationalise their PHEOC.

Activity 5

Title: Support WHO and its Member States in their efforts to assess, review, implement and strengthen IHR core capacities regarding surveillance, preparedness and response to infectious diseases including capacities at the human-animal interface

Description: WHO's 13th General Program of Work (GPW13) sets the 'triple billion' goal and WHE is responsible for '1 billion more people better protected from health emergencies'. Under the outcome 2.2 Epidemics and pandemics prevented, this activity aims to advance WHO's work on Output 2.2.1: Research agendas, predictive models and innovative tools, products and interventions available for high-threat pathogens in collaboration with RKI with its contribution to technically assess countries' capacity in preventing and responding to epidemics and strengthening them by training.

This TOR addresses evaluation and strengthening of IHR core capacities. Self-assessment of the implementation of IHR core capacities is required annually by WHO, in addition, Joint Extern Evaluations are recommended every 4-5 years. As necessary RKI can serve as an external, independent partner to participate in Member States assessments bringing specific expertise in order to provide relevant recommendations to requesting countries. Furthermore, RKI undertakes and supports training activities on IHR core capacities based on long-standing experience and expertise acquired in Germany and internationally on diverse topics, such as for example coordination, surveillance, reporting, preparedness, emergency response operations, Points of Entry, workforce development, etc.

Status: ongoing

- 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 (IHRMEF). The JEE tool is intended to assess country capacity to prevent, detect and respond to public health threats independently of whether they are occurring naturally, deliberately or accidentally. Based on the outcome, a targeted National Action Plan for Health Security (NAPHS) can be developed. 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 validated tool (<https://www.who.int/publications/i/item/9789241550222>).

Since 2016, RKI has provided experts for numerous JEEs to evaluate core capacity implementation and who lead several of the 19 specified technical areas.

During the present reporting period, during which very few JEEs took place, RKI deployed an expert to the one in Ukraine that took place in Nov/Dec 2021.

RKI colleagues were also approached to support the development of the NAPHS in Montenegro in 2021.

During the COVID-19 pandemic, WHO developed guidance for countries to review their response, to allow for identification of good practices and lessons that might allow improvement to better respond to the COVID-19 outbreak. The Intra-Action Review (IAR) is a country-led facilitated process to review selected public health response pillars (https://www.who.int/publications/i/item/WHO-2019-nCoV-Country_IAR-2020.1). In 2021, RKI scientists supported four partner countries with their respective IARs (Montenegro, Tunisia, Kosovo and North Macedonia). RKI supported a second IAR in Tunisia in March 2022.

Aiming to strengthen the IHR (2005) core capacities and competencies, RKI scientists implemented interactive online training modules to engage public health experts from different sectors and levels in Europe. This initially consisted of five modules covering basic IHR (2005) aspects, e.g. detection, assessment and communication under the IHR (2005), intersectoral collaboration and coordination and risk communication. Each of these modules was offered twice. The first module was conducted in June and July 2020. After a pandemic related interruption, modules 2-5 were then carried out from August to October 2021 supported by WHO experts. In total, 60 people from 21 European countries took part in at least one module of the training. The number and composition of participants changed significantly between Module 1 in 2020 and the other Modules in 2021. A total of 46 people took part in Module 1, while 32 people attended Modules 2-5.

In June 2021 a training on In(tra) Action Reviews (IAR) was delivered (again in two sessions to allow for broad participation). Objective of the training was to familiarize participants with scope and goals of an IAR and its implementation in a virtual setting drawing upon resources provided by WHO and ECDC.

In February and March 2022 RKI scientists implemented 10 further IHR basic online training modules, based on the concept of the first training in 2020/2021. This second round of the training was again supported by WHO staff. In total, 32 participants from 14 European countries joined this course.

With the overall goal to enable public health authorities to improve and better coordinate preparedness and response measures at Points of Entry (PoE) to serious cross-border threats to health within the IHR (2005), RKI scientists co-facilitated a training course on preparedness and response to public health events at ground-crossings in May 2021, including diverse topics like IHR requirements, planning and communication, contact tracing, investigation and data protection, risk assessment and decision making, etc. In addition, an RKI scientist participated as the IHR NFP for Germany in a multi-sectorial table-top exercise at EU level for Ports (24th March 2021). The aim of the exercise was to support the competent authorities and organisations at national and European level test the communication guidelines produced for inter-country communication and information flow in outbreak investigations and management of public health events.

- IHR Summer School:

The IHR Summer School is a GHPP project (<https://ghpp.de/en>) constituted of a course for public health professionals who hold key positions in IHR core capacities implementation in their respective countries. It aims to strengthen IHR core capacities regarding infectious disease preparedness and response. Its main objectives are to contribute to partner countries being able to more effectively address health threats of biological origin and to provide a context where intersectoral and regional partnership as well as international communication and regional networking is enhanced. 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. Concrete examples from participating countries are sought to incite horizontal, collegial exchange about methods, procedures and lessons identified. Relevant key experts from RKI, WHO Regional Offices and other stakeholders 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.

In 2017-19, three IHR Summer Schools were held with 66 participants from 13 countries (Albania, Bosnia & Herzegovina, Kosovo, Moldova, Montenegro, Macedonia, Serbia and Burkina Faso, Morocco, Nigeria, South Africa, Sudan, Tunisia), twice focusing on Southeastern Europe and once on selected countries in Africa. The course evaluations were extremely positive from both, participants and facilitators; objectives and participants' expectations were met and the interactive teaching methods well received.

Due to the worldwide COVID-19 pandemic, no IHR Summer School could be held in 2020 and 2021. The next course will be held in June 2022 with participants from selected African partner countries.

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.

In the following section we report AMR-related activities for the reporting period April 2021 until April 2022 that have been taken place and that were included in the WHOCC for Emerging Inf. and Biol. Threats's designation period 2016-2020.

These activities have been omitted for the re-designation period 2020-2024 since a separate WHOCC for Antimicrobial Resistance Consumption and Health Care-Associated Infections has been designated in February 2022;

Activity 23424 : Support the identification of antimicrobial resistance (AMR) mechanisms
Type of Activity: Implementation of WHO programmes and activities at country level

Responsible Staff: Tim Eckmanns

Annual report on the agreed workplan:

Due to the continuing COVID-19 pandemic, the capacity of the staff of Robert Koch Institute remained constrained and activities related to national pandemic response were prioritized over other projects. However,

prioritised workplan activities, including both laboratory and epidemiology capacity-building, were still accomplished and are described in-full under TOR 3 Activity 23429. As it relates specifically to laboratory-capacity building, the organized annual WHO AMR Collaborating Centers Network meeting included sessions on the support activities for the identification of AMR mechanisms such as training and guidance development. The survey on the global impact of COVID-19 on AMR which was organized by RKI as the coordinator included specific components on laboratory personnel, resources, diagnostics and analytics. Plans for workplan technical activities relating to in-person training were revised and selected learning opportunities such as on infection prevention and control (including the laboratory) were organized virtually.

Networking:

The level of exchange with the respective leads of the target products and other WHO CCs was reduced due to the burden of COVID-19 activities. Please see a description in-full of the Network exchanges that was still prioritised under TOR 3 Activity 23429 of the WHO CC Designation 2026-2020.

Activity 23429: Support national antimicrobial resistance (AMR) surveillance systems including AMR and healthcare associated infection (HAI) outbreak detection and response

Responsible staff: Tim Eckmanns

Annual report on the agreed workplan:

Due to the continuing COVID-19 pandemic, the capacity of the staff of Robert Koch Institute remained constrained and activities related to national pandemic response were prioritized over other projects. However, prioritised workplan activities were still accomplished as follows:

The survey on the global impact of COVID-19 on AMR surveillance, prevention and control which began in 2020 continued into 2021. In total, 73 countries participated in the survey (75% response rate) and shared the experiences in their countries. The results were published in the 'Journal of Antimicrobial Chemotherapy' (<https://academic.oup.com/jac/article/76/11/3045/6362680>), and we were invited to give a key note speech on these findings at the European conference "One Health EJP Annual Scientific Meeting". Furthermore, RKI continued to support the WHO-COVID-19 Committee on Infection Prevention and Control (IPC) as a member, reviewing a range of technical documents and contributing to guidance development.

The annual network conference was again organized and held virtually in 2021. More than 20 network institutions participated in the meeting. In addition, the WHO AMR Secretariat was supported to host an additional consultation and conduct a technical review process for the revision of the Global AMR Surveillance System (GLASS). This included ongoing planning and communication with members to coordinate accordingly.

Plans for the other workplan technical activities were again reviewed. This included contributions such as document review for several Target Products, such as: Target Product5 (capacity building in epidemiology for countries); Target Product6b (report on policy and practice); Target Product6e (a protocol for integrated health care associated infections (HAI) and AMR surveillance); and Target Product11b (report on laboratory-based surveillance systems). On-site training and visits by international experts were again postponed till 2022.

Networking:

The level of exchange with the respective leads of the target products and other WHO CCs was reduced due to the burden of COVID-19 activities. However, a range of communications with the WHO CC Network members were still held in the form of e-mails and online meetings. For examples, quarterly newsletters were still exchanged to provide urgent updates and exchange on important requests with the other Network members. Instead of in-person meetings, the annual conference and additional GLASS consultations was organised virtually.

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
5	5	1

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

Senior staff	Mid-career staff	Junior staff, PhD students
198	247	200

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
47.42	52.58	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].

Networking related to AMR-activities in 2020-2022 are given under "2 Annual Reports on other activities requested".

Other networking related activities are (if any) given within the activities above.