

Folder eCC_00019854 is in stage Annual_Report_Due

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

University of Napoli Federico II

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

Department of Veterinary Medicine and Animal Production, Laboratory of Parasitology and Parasitic Diseases
- Centro Regionale Monitoraggio Parassitosi (CREMOPAR)

City Naples **Reference Number** ITA-116

Title WHO Collaborating Centre for Diagnosis of Intestinal Helminths and Protozoa

Report Year 02-2021 to 02-2022

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: Development and testing of innovative diagnostic methods for intestinal parasites

Description: This collaboration will inform WHO's work towards the identification of innovative and rapid diagnostics methods for intestinal parasites, based on sensitivity, specificity and cost criteria

Status: ongoing

To achieve the WHO 2030 targets for STH control, computerized and automated approaches based on Machine Learning (ML) and Artificial Intelligence (AI) are needed to facilitate and speed up the accurate reading of microscopic slides and are expected to reduce the time and the number of personnel needed for the diagnosis.

In this view, the staff at CC ITA-116 has developed advanced prototypes of the Kubic FLOTAC microscope (KFM): a new compact digital microscope that is aimed at performing automated identification and counting of helminth eggs, based on ML and AI.

The main output of this activity is a scientific paper on KFM (Maurelli et al., Parasitology 2021).

In summer 2021, in order to validate KFM, stool samples infected by STH were kindly provided by the Public Health Laboratory Ivo de Carneri (PHL-IdC), Tanzania (CC TAN-08). Analyses were performed by Mini-FLOTAC and KFM and images used to improve the performance of the KFM.

The main difficulties encountered during this activities are based on demanding skills (e.g. engineering) and costs related to the development of the software for ML and AI.

Furthermore, the CC has been involved in the evaluation of the performance of different DNA-based platforms for a specific and sensitive diagnosis of intestinal protozoa.

Activity 2

Title: Training on diagnosis of intestinal parasites

Description: WHO is expecting an drastic increase in surveillance activities in the next 5-10 years, and a large number of laboratory technicians, epidemiologist in endemic countries should be trained for this purpose

Status: ongoing

The main difficulty encountered also this year was due to the continuation of the international emergency concerning the COVID-19 pandemic that hampered the organization of training courses in selected endemic countries. For the same reasons, it was not possible to host trainees at the facilities made available by CC ITA-116 for trainings to take place in the context of this activity.

In order to overcome the above mentioned limitations, the staff at the CC ITA-116 has continued the development and production of training materials on diagnosis of intestinal parasites (manuals, guidelines, brochures, videos, interactive training).

Activity 3

Title: At request of WHO support country for the conduction of surveys in the context of control programme

Description: Control activities for intestinal parasites are in place in more than 100 endemic countries. Many of these countries request support in utilizing the diagnostic techniques presently recommended for monitoring and for the introduction of innovative technique.

The support needed is not only in terms of laboratory diagnosis but also in terms of the epidemiologic approach for study area identification, selection of villages or schools where to collect samples, definition of sample size, method to collect, transport and preserve specimens to the laboratory and interpretation of the results.

Status: ongoing

With the aim to support country for the conduction of surveys in the context of PC programmes, a public WebGIS was developed. The WebGIS includes a dataset for following the impact of STH control in the six WHO regions. The website also includes high-accuracy dynamic maps that are continuously updated based on data from different sources (e.g. JRF, EPRF, reports of MoH).

Three different data maps (Progress of implementation; Impact of intervention on STH prevalence; and Impact of intervention on STH morbidity) were developed using the ArcGIS Pro 2.7 software. Each set contains a global dynamic map showing the full view with an interactive display that permits moving among the six regions and zooming into the different countries.

The main output of activity 3 are:

- the public WebGIS: www.whocc.ita116.unina.it.

- the vHealth publication (Maurelli MP, Pepe P, Montesor A, Mupfasoni D, Nocerino M, Morgoglione ME, Musella V, Cringoli G, Rinaldi L., 2021. Development of a public geographical information system-based website to follow the impact of control activities of soil-transmitted helminths in endemic countries. *Geospat Health* 16(2). doi: 10.4081/gh.2021.1049).

The main difficulty is the availability of data but this concern has been overcome through the collaboration with the Department of Control of NTD at WHO.

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.

The CC ITA-116 has implemented the activities of parasitological monitoring (intestinal helminths and protozoa) of migrants in southern Italy, in collaboration with the multifunctional health centre "Elena d'Aosta" for migrants ASL-NA1 (Naples, Italy) and the migrants centres (CAS and SIPROIMI) located in the Campania region. Monitored migrants are either newly arrived or those resident in southern Italy for months/years. Parasitological analysis are performed by FLOTAC and Mini-FLOTAC techniques and migrants resulted positive for parasitic infections are given antiparasitic drugs and re-tested at follow-up.

The CC ITA-116 organized a conference on 24th January 2022 to present its activities. The conference was attended by over 100 participants and raised awareness around control of intestinal parasites.

The CC ITA-116 was involved in the third annual World NTD Day (30th January 2022). The Main Building (Rettorato) of the Federico II University in Napoli was lit up (orange and purple) to raise awareness around NTDs.

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
2	3	2

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

Senior staff	Mid-career staff	Junior staff, PhD students
8	20	30

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
40.00	60.00	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 CC ITA-116 has implemented collaboration with other WHO CC (i.e. TAN-8, SWI-71, BEL-42) in the context of the implementation of the activities on intestinal parasites. In addition, the CC ITA-116 has been included as a partner in the Centre of Excellence for Neglected Tropical Diseases (CENTD) coordinated by the CC BEL-42 which has been approved under the 5th Call for International Thematic Networks (2020). In September 2021, staff of the CC participated at a series of online webinars titled "Progress and achievements of the global programme for STH control and prevention and the need for adaption of PC intervention".

The objectives were to:

1. present the progress, achievements and new targets of the global programme for STH control and prevention;
2. discuss the steps and actions that countries should take to assess the impact of the programme and demonstrate the achievement of 2030 targets;
3. Discuss the new tools that will help countries to demonstrate the progress and achievements.

During these activities, networking and interactions were established with WHO regional focal points, WHO country focal points, Country NTD programme managers and other partners.