

Folder eCC_00019854 is in stage Annual_Report_Review

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 02-2020 to 02-2021

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

Since many years, the staff at the CC ITA-116 has promoted the improvement of copromicroscopic techniques for diagnosis of intestinal helminths (e.g. soil transmitted helminths) and protozoa (e.g. Giardia, Endolimax, Entamoeba, Chilomastix, etc). Particular attention has been given to key diagnostic parameters (e.g. sensitivity, specificity, negative predictive values) as well as cost-effectiveness.

To this aim, Mini-FLOTAC and Fill-FLOTAC were developed by CC ITA116 as easy-to-use devices, used in combination to perform the Mini-FLOTAC technique, a multivalent, sensitive, accurate, precise, and reproducible copromicroscopic method. Over 50 scientific publications on the validation of the Mini-FLOTAC and Fill-FLOTAC have been published in international journals, whilst the Standard Operating Procedures of the technique have been published in Nature Protocols and in the new edition of the WHO Bench Aids for diagnosis of intestinal parasites. Thus, the Mini-FLOTAC technique can be situated at level 9 on the Technology Readiness Level scale.

However, to achieve the WHO 2030 targets for STH control, computerized and automated approaches 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 prototypes of the Kubic FLOTAC microscope (KFM): a new compact digital microscope for egg counts. One of the future improvements of the KFM, actually under development, is the tuning of a predictive model, for the automated identification and counting of helminth eggs, based on Artificial Intelligence (machine learning).

The main output of this activity is a scientific paper on KFM (Maurelli et al., Parasitology 2021), and the main difficulties are based on costs related to the software training for AI.

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

From 2010 to 2019, the staff of the CC ITA-116 has been throughly involved in several specialized training courses on diagnosis of intestinal parasites, particularly on copromicroscopic techniques, e.g. FLOTAC (Cringoli et al., Nature Protocols, 2010) and Mini-FLOTAC (Cringoli et al., Nature Protocols, 2017) in different endemic countries (e.g. Bangladesh, India, Indonesia, Tanzania, Argentina).

The main difficulty encountered this year was due to the COVID-19 pandemic that prevented the possibility of organizing training courses in specific 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, due to the current travel restrictions, the staff at the CC ITA-116 has started the development and production of training materials on diagnosis of intestinal parasites (manuals, guidelines, brochures, videos, interactive training). Online courses on "Mini-FLOTAC training" will be organized to support laboratories in endemic countries.

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 tfor 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

The CC ITA-116 has been entrusted in establishing regional and country datasets of the impact of Preventive Chemotherapy (PC) programmes for Soil Transmitted Helminths (STH) in six WHO regions (96 STH-endemic countries in need of PC). Over 10 online meetings have been organized between the staff at CC ITA-116 and the staff at the WHO Department of Control of Neglected Tropical Diseases (NTD) in order to plan, discuss and develop this activity.

The main action has been the set up and population of the dataset has been performed using EPRF, JRF and other data provided by WHO.

Implementation of the website has being performed with regional and country maps, tables and graphs to show the progress of implementation of WHO PC programmes as well as the impact of intervention in terms of morbidity.

Once the website will be online, the staff of the CC ITA-116 will give support to targeted endemic countries requiring support not only in terms of laboratory diagnosis but also in terms of epidemiological approach based on the use of geospatial tools.

The outputs delivered so far are country maps, tables and graphs to show the progress of implementation of WHO PC programmes as well as the impact of intervention in terms of morbidity for the countries in the following WHO regions: SEARO and WPRO.

The main difficulty that have been encountered is the availability of data but this concern has been overcome through the collaboration with the Department of Control of Neglected Tropical Diseases (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 promoted the 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 was involved in the second annual World NTD Day (30th January 2021). Two landmarks were lit up (orange and purple) in Napoli, i.e. the Colonnade of Piazza del Plebiscito and the Castle “Maschio Angioino” to raise awareness of 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	2	3

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

Senior staff	Mid-career staff	Junior staff, PhD students
8	12	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 started 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.

Specifically, the CC ITA-116 heads participated at a Working Group on Drug Efficacy held in blended modality (WHO headquarters, Geneva and online), 12 to 13 March 2020.

Furthermore, the staff of the CC ITA-116 participated at an online meeting organized on 2nd February 2021 to discuss on a network among the seven WHO Collaborating centers on STH and other helminths (TAN-8, SWI-71, BEL-42, SPA-53, ITA-102, CAN-88). The objective of this informal meeting was to evaluate the interest of the heads of CCs in establishing a network, and to define the necessary steps to reach this objective. The online meeting was very useful to strengthen collaboration, develop common research agendas and coordinate research, minimize and manage fragmentation, duplication and overlap in order to meet challenges in STH, Strongyloides, Fasciola and other NTDs.

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 submitted under the 5th Call for International Thematic Networks (2020).