

# Report of the activities performed at the National Institute of Hygiene and Epidemiology Network (Hanoi, Vietnam)

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The National Institute of Hygiene and Epidemiology (NIHE) is a Vietnamese national institute that was created in 1924 and operates under the authority of the Vietnamese Ministry of Health. It promotes research about communicable and non-communicable diseases, belongs to the Institut Pasteur International Network and is also a recognized teaching center that provides doctoral training in public health and other medical sciences. Some other healthcare centers in Hanoi work very close with the NIHE, such as the Hanoi Medical School and the National Hospital of Tropical Diseases (NHTD), where I also spent more than a half of my training time. So, my whole training program in Hanoi can be summarized as follows:

1. Detection of intestinal protozoans (mainly *Cryptosporidium* and *Giardia*) in environmental samples: vegetables and wastewater. Performed at the NIHE.
2. Assistance to a brief course of human parasitology at the Department of Parasitology of the Hanoi Medical School.
3. Detection of *Plasmodium spp* and intestinal parasites in adult samples. Performed entirely at the NHTD.
4. Performance of a brief observational study (12 weeks) about samples requested for malaria testing at the NHTD.

## **I.- Detection of intestinal parasites (*cryptosporidium* and *giardia*) in environmental samples: vegetables and wastewater**

Many public health projects are carried out at the NIHE, either supported by the Vietnamese government or either by European institutions. One of the most important projects made at the NIHE is the epidemiological surveillance of wastewater in some places of the north of the country in order to prevent waterborne infectious diseases. Vegetable and water samples are collected to identify intestinal protozoa. *Cryptosporidium spp.* are worldwide coccidian parasites that can infect humans and several animals. *C. parvum* and *C. hominis* have been identified in waterborne epidemics. Faecal-oral transmission and drinking of contaminated water are the most common sources of infection. Giardiasis is also worldwide distributed, but mainly in areas with poor sanitation. Humans are the main reservoir, but also beavers. Infection is also caused by ingestion of contaminated water or food, particularly salads.

Summary of the protocol to identify intestinal protozoa in vegetables by IFI:

- All environmental specimens were collected at villages from the Ha Nam rural province (80Km far from Hanoi).
- Aquatic plants samples are treated sequentially by several steps of pulsifying and spinning. About 100mL of the pellet resulting in the last step

- of spinning is resuspended and placed in the teflon printed diagnostic slide for further staining.
- Staining is performed using an anti-Crypto/Giardia immunofluorescence kit (Cellabs®) and slides are observed under a fluorescence microscope using the 20x objective, counting the entire well.
  - PCR is the further step to confirm the presence of *Cryptosporidium* and *Giardia*.

## **II.- Assistance to a brief course of human parasitology at Hanoi Medical School**

During my stay at the NIHE, I could join a brief training course about Human Parasitology carried out completely at the Department of Parasitology of Hanoi Medical School. Ten theoretical lectures and three practical training classes composed the course. Among all human parasitic diseases, those caused by helminthes (mainly flukes) were the main focus of the lectures.

## **III.- Detection of intestinal parasites and plasmodium in adult samples at the National Hospital of Tropical Diseases**

The NHTD is a specialized health-care facility and almost certainly it is the most important attending patients suffering from tropical diseases in the north of Vietnam. It also works closely with the NIHE in some public health projects. Furthermore, an important part of the Department of Clinical Laboratories is supported by the Oxford University (Oxford University Clinical Research Unit). The Department of Microbiology receives every day an average of ten stool samples to search for intestinal parasites, and about two or three blood specimens from patients with suspected malaria. During my training period at the NHTD I was closely working with the parasitology technical staff in order to 'train my eyes' in the optical microscopy diagnosis. Among most common parasites found are *Giardia intestinalis*, *Cryptosporidium spp*, *Entamoeba histolytica*, *Strongiloides stercoralis*, *Taenia spp*, *Clonorchis spp*, *Opistorchis spp*, *Ascaris lumbricoides*, *Necator americanus*, *Trichuris trichiura*, *Schistosoma spp* and *Fasciola spp*. On the other hand, although incidence of malaria has markedly decreased in the last years in the north, we found some positive smears weekly. So, globally the number of positive stool and blood samples is enough to train during these weeks.

## **IV.- Brief observational study about samples requested for malaria testing at the NHTD**

Qualitative data are described as proportions and age is presented as median (interquartile range). Chi-square test was performed to compare sex and results, while U-Mann-Whitney was used for age. During these 12 weeks (July 18<sup>th</sup> to Oct 4<sup>th</sup>), 175 blood specimens belonging to 147 patients (98 [66.7%] men, 46 [31.3%])

women, and 3 [2.0%] unknown sex) with initial suspicion of malaria were received at the Department of Parasitology. Patients age was 37.5 (24.3) years. Thick and thin smears were performed twice for each blood sample. Forty-five (25.7%) Giemsa-stained positive slides were recognized by optic microscopy, and corresponded to 14 patients (9.5%). No difference in sex (11.2% men Vs 9.7% women,  $p=0.55$ ) was found among malaria patients. Age was also similar (38.5 [21.3] Vs 37.5 [24.0],  $p=0.27$ ) in malaria and non-malaria patients. Among the 14 positive patients, *P. falciparum* was found in all of them and *P. vivax* in three (suffering a mix infection). No *P. ovale*, *P. malariae* or *P. knowlesi* were found.