



**Project 17G5:  
Improving care of patients with chronic hepatitis B infection in  
Senegal through training of key personnel**

**Final project report (July 2019)**



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<b>Goal</b>	To improve local capacity for the management of chronic viral hepatitis B infection by developing a training partnership between Bern and Dakar University Hospitals
<b>Country</b>	Senegal
<b>Funding</b>	94,400 CHF

## Context

Hepatitis B virus (HBV) infection is the most important cause of liver cirrhosis and cancer in the world and its burden is especially high in West Africa. More than 10% of the Senegalese population has a chronic HBV infection and up to one-half of these individuals might need antiviral therapy. As an increasing number of individuals will be diagnosed with chronic HBV infection in West Africa in near future, it is urgent for countries like Senegal to have access to the diagnostic tools necessary for assessing treatment eligibility. Currently, availability of liver biopsy, transient elastography or ultrasonography remains very limited in the region and few physicians have been trained to perform these measurements. Recently, tenofovir, the standard of care for HBV infection, became available for HBV therapy at a reduced cost, with the support of the Senegalese Ministry of Health (MoH). Thus, HBV-infected individuals with a treatment indication could have access to antiviral therapy soon, which stresses the need for improving infrastructure and training of clinicians to assess HBV treatment eligibility.

Our project follows a successful Esther Switzerland start-up project, which allowed the organization of a workshop in March 2017 in Dakar. As access to liver disease staging tools was seen as a major challenge in this setting, we designed a project targeted at the improvement of diagnostic skills and capacity. Taking advantage of the Certificate of Advanced Studies in Hepatology, University Bern (CAS HEP Unibe) program, we planned to train Senegalese clinicians in viral hepatitis management.

## Aims of the project

The overall goal of this project was to improve HBV management capacity and quality in two public clinics in Senegal, by developing a physician training institutional partnership ([Figure 1](#)).



Figure 1: Fann and Principal University Hospitals, Dakar, Senegal



This strategy helped establish of a state-of-the-art liver disease clinical platform with access to ultrasound, TE and liver biopsy in Dakar. Specifically, we aimed to:

- 1) train two Senegalese physicians in Bern as HBV infection clinical experts
- 2) facilitate transfer knowledge from the two clinical experts to other infectious diseases and hepatology fellows and other health-care staff in Dakar, with a special focus on diagnostic procedures (TE and ultrasound) as well as on the assessment of treatment eligibility and clinical management of HBV infection
- 3) develop a simple, electronic data collection system in order to gather information on the number, type and accuracy of diagnostic procedures performed, and to monitor liver disease burden and HBV antiviral therapy eligibility, and to
- 4) engage in a stable and long-term strategic exchange with Senegalese public health authorities in order to streamline HBV screening and assessment of treatment eligibility in Dakar

### **Partnership**

This project was built on a recently established partnership between the two following institutions:

- Bern University Hospital, Switzerland, represented by the Department of Infectious Diseases (Dr. G. Wandeler, Prof. A. Rauch) and the Department of Hepatology (Prof. JF Dufour, Prof. N. Semmo). Both clinics are referral centers with outpatient clinics, each including 800-1,000 HIV-infected and HBV-infected patients, respectively.
- Dakar University Hospital, Senegal, represented by the Department of Infectious Diseases at Hôpital Fann (Prof. M. Seydi, Prof. L. Fortes) and the Department of Gastroenterology and Hepatology at Hôpital Principal (Prof. F. Fall). Both clinics are the largest referral tertiary care infectious diseases and hepatology units in the country and important training centers for medical fellows across West Africa. The infectious diseases clinic collaborates with French and American universities on specific research projects, particularly HIV therapy clinical trials.

Dr. G. Wandeler, an attending physician at the Department of Infectious Diseases in Bern, was partially based at Fann University Hospital in Dakar during 4 years (2012-2016), where he provided clinical, academic and research support to the Infectious Diseases and Hepatology clinics. With funding from the Swiss National Science Foundation and the National Institutes of Health, he helped Prof. Seydi, Prof. Fall and their teams develop a research and training



platform on HIV and viral hepatitis infections in West Africa. This collaboration started in the framework of the NIH-funded IeDEA-West Africa network ([www.mereva.net/iedea](http://www.mereva.net/iedea)), led by Prof. F. Dabis (University of Bordeaux, France) and allowed important studies on HIV, HBV and related liver disease to be published (*Jaquet, Wandeler et al. J Int AIDS Soc 2017*; *Coffie, Wandeler et al. Med Mal Infect 2017*). In 2014, we were granted a 1-year initiation contract by the French National AIDS Research Agency (ANRS) to study practices towards HBV infection in Senegal, including physician's knowledge as well as access to screening, diagnostic and treatment capacities in the country. The mapping of health care facilities and laboratories with available infrastructure and qualified personnel for the management of HBV infection was an important step towards understanding the potential gaps in HBV care in Senegal. For instance, we could show that knowledge on several key aspects of HBV care was poor among a representative sample of Senegalese physicians surveyed: only 24% of them were aware of the existence of rapid diagnostic tests for HBV and 51% knew that HBV vaccination was safe for newborns (*Jaquet, Wandeler et al. Am J Trop Med Hyg 2017*). This project was the beginning of a strong clinical, operational and research collaboration between the partners mentioned above.

Our partnership aims at improving key aspects of viral hepatitis management in Senegal: screening and linkage to care of diagnosed patients, pre-treatment assessment of liver diseases, access to treatment, clinical monitoring, and evaluation of outcomes. Knowledge transfer, training, advocacy and improvement of the infrastructure for the optimal management of HBV infection are key aspects of this partnership. These elements as well as the major challenges in achieving them were discussed with the main stakeholders during an initial



Figure 2. Esther Switzerland Workshop participants at Fann University Hospital

meeting in Dakar in March 2017, funded by an Esther Switzerland start-up grant ([Figure 2](#)). A significant part of the meeting was dedicated to discussions around the clinical database, which would help monitoring clinical parameters throughout the implementation of the project. Several database models and

concepts were discussed under the leadership of the IT team of the University of Bordeaux School of Public Health.

### Summary of project activities and progress

The following activities were successfully conducted for each project objective:

1) Training of clinical experts: Objective achieved.

Two Senegalese medical fellows completed their training within the scope of the “CAS HEP Unibe” program in March 2019 in Bern. They were fully integrated at the Bern University Clinic of Hepatology (Prof. Dufour) and receive specific clinical training in general Hepatology. Importantly, they focused on becoming independent ultrasonographers and users of transient elastography, two important tools in the monitoring of HBV-infected individuals. In addition, they gave regular case presentations and were involved in the writing of a scientific manuscript on drug-induced liver injury in sub-Saharan Africa, which was recently published (*Riebensahm, Ka, Sow, Semmo, Wandeler. Expert Rev Clin Pharmacol. 2019*). Dr. Sow and Dr. Ka obtained their Certificate of Advanced Studies in Hepatology from University of Bern at the end of March 2019.

2) Knowledge transfer in Senegal: Objective partially achieved.

During the second half of the project, the trained experts were expected to teach local physicians about HBV management and train them in performing transient elastography and liver ultrasonography to explore liver-related complications. Knowledge transfer started in early 2019, when Dr. Ka and Dr. Sow returned to Senegal. Onsite training of clinicians started with the organization of a training seminar at Fann Hospital, during which ten clinicians were trained to perform transient elastography, under the supervision of an expert trainer from Echosens®, Paris, France ([Figure 3](#)). A new transient elastography



Figure 3. Transient elastography training seminar at Fann Hospital, January 2019



device was just purchased by the Infectious Diseases clinic at Fann Hospital, allowing the staff to use it in clinical practice on a daily basis. All clinicians attending this training received the official certificate from Echosens<sup>®</sup>, making them certified users. After this session, they received further training at their clinics, under the expert supervision of Dr. Ka and Dr. Sow.

The Infectious Diseases Clinic at Fann Hospital has also purchased a new ultrasound device, which is used for clinical diagnostic evaluations and training of staff. Currently, our two expert clinicians are performing ultrasounds independently in the clinics, and have the possibility to contact a senior radiographer onsite in case of specific diagnostic challenges. Several infectious diseases fellows at the Department of Infectious Diseases at Fann with special interest in learning ultrasound have been identified. They are currently being trained by our expert clinicians in Dakar. This process will be evaluated by Prof. Semmo, senior hepatologist in Bern, and Prof Wandeler, during a site visit in Dakar planned for the second week of September 2019.

3) Development of a clinical database: Objective achieved.

The main purpose of the database is to gather information on the number, type and accuracy of diagnostic procedures performed, and to monitor liver disease burden and HBV antiviral therapy eligibility in the clinical settings. All senior infectious diseases clinicians who participated in the several Esther Switzerland workshops in Dakar were involved in the design of the data collection forms. These documents were piloted in several clinical settings and constituted the basis for the design of the electronic database. After several teleconferences with the IT teams in Dakar and Bordeaux, and clinicians from Dakar, the first version of the database was designed by the IT team in Bordeaux. The database was then piloted during clinical practice at Fann Hospital between June and July 2019. The final version of the database is expected to be ready for clinical use at the end of August 2019.

4) Intensifying dialogue with Senegalese Ministry of Health: Objective partially achieved.

One of our goals was to foster a long-term relationship with the Senegalese MoH in order to streamline HBV screening and management in Dakar. Members of the Ministry of Health were present at our workshops and were actively involved in the decision process. Their full support along the training process was guaranteed to us and they welcomed our initiative. Although these discussions have not yet translated into specific decisions for the training of medical doctors in Senegal, we are confident that our first steps towards a long-

lasting and productive partnership with the MoH are a positive sign for the future. A great



*Figure 4. I. Gueye, President of the Safara Association, at Esther Workshop, 2018*

strength of our initiative is the strong relationship it helped build with patient organizations. Mister Ibrahim Gueye, president of Safara, the most important viral hepatitis patient association in Senegal, participated in all of our meetings and was instrumental in shaping our project to become a patient-oriented initiative (Figure 4). He remains deeply involved in the project and his knowledge about the challenges faced by persons with viral hepatitis infections in Senegal is of primary importance to the success of our project.

### **Difficulties and challenges**

In the grant proposal, we anticipated the following potential difficulties:

- Delays with delivery of diagnostic devices in Senegal (Ultrasound, Fibroscan®) (low probability)
- Power cuts (medium probability)
- Difficulties in knowledge transfer/training in Senegal (from experts to other staff) due to lack of didactic skills (low probability)
- Lack of political will from Senegalese public health authorities to develop a common agenda for HBV management in Senegal (low probability)

The main difficulty we encountered during the first months of the project was of administrative nature. The procedures related to the visa and residency permit for the two clinical experts in Switzerland lasted longer than originally planned, which delayed the start of the training period of the two Senegalese candidates in Bern. During the implementation of the project, we experienced slight delays with delivery of the transient elastography device. For this reason, we decided to move forward with the first training seminar in Dakar before the return of the two expert clinicians. This change did not have a negative impact on the project, as this first training session was planned to be supervised by a professional training expert from Echosens®. Fortunately, power cuts were not an issue for our training sessions as we had good power generators in place.

It is currently still difficult to judge the efficacy of the transfer of knowledge regarding ultrasound on site, as the process was started later than originally planned and is not yet completed. We





expect to have a better idea of its success during our site visit in early September. Considering the success of our well-attended teaching seminars, we are confident that our efforts have led clinicians to gain strong knowledge on the clinical management of HBV infection and to the use of transient elastography during clinical practice.

Finally, we acknowledge that the establishment of a productive and durable relationship with the MoH and national hepatitis program takes time, and that more efforts will be needed to strengthen it. Although our initiative has not yet led to significant changes in health policy, we achieved our main goal, which was to initiate a process of discussions around important hepatitis-related issues with public health stakeholders.

### **Impact, sustainability and outlook**

This Esther Switzerland project grant allowed strengthening the partnership between two hospitals in Dakar, Senegal, and Bern, Switzerland. Furthermore, it led to a broad and successful collaboration between clinicians, researchers, public health officials, laboratories and patient organizations, with the goal of improving testing, treatment and care of persons infected with HBV in a low-income setting.

The availability of diagnostic tools such as a liver ultrasound can only lead to the improvement of the quality of care and better health outcomes if highly trained physicians use them appropriately. We decided to invest in the training of Senegalese expert clinicians at a specialized Hepatology clinic in Switzerland, with the hypothesis that this intervention would foster knowledge transfer upon their return to their hospitals in Senegal. Improved access to new knowledge and training being highly demanded by healthcare workers in West Africa, we were able to find many dedicated and motivated physicians willing to become experienced users of new generation diagnostic tools. Our two clinical experts have returned to Dakar in March 2019, and have established a group of interested young physicians willing to learn from them. For instance, at Hospital Fann, trainees have started performing ultrasound measurements under the supervision of the clinical experts on a regular basis (several days a week). Prof. Wandeler and Prof Semmo will evaluate the early experiences regarding knowledge transfer in Dakar for the first time in September 2019. Together with the clinical experts and the trainees, they will plan further steps in the teaching process and set common objectives. Increasing the number of clinical experts is expected to have an impact on the quality of care as well as on the access to state-of-the art management of common diseases for populations in low-income countries. In this regard, the proposed project fits well into the



framework of the third sustainable development goal (SDG 3, “ensuring healthy lives and promoting well-being for all at all ages”) and the aspects developed above reflect important determinants of the road towards universal access to health services. In summary, we expect our project to have a significant impact on HBV care in Senegal and could lead the way to similar efforts throughout West Africa.

The main strategic actions that will follow this project are the following:

- We will translate this report into French for Senegalese colleagues and the Ministry of Health.
- We are committed to guarantee the sustainability of our approach by implementing a continuous monitoring of progress and by helping local staff to overcome challenges. As some of the tools developed during this project will also be used in clinical research projects with secured funding, we are confident that this process can be sustained over several years.
- The current project focused on facilities in Dakar, the capital city of Senegal. However, important stakeholders from other regions (Thiès, St. Louis, Ziguinchor) also participated and showed interest in adapting some of the ideas developed during the project to their settings. Besides training collaborators in their sites, there is a strong will to expand our data collection system and database to these other hospitals. Therefore, we established a patient monitoring working group led by Prof. L. Fortes, but joined by clinicians from other hospitals early during the implementation of the project. This structure allowed us to gain insight from other hospitals and led to the development of tools that would be easily adapted in other clinical settings in the country. Provided additional funding, we will decentralize some of aspects of our clinical management platform to hospitals outside of the capital city.
- We will continue efforts towards developing a strong partnership with public health officials including the Ministry of Health and the National Hepatitis Program, by jointly deciding on the framework and milestones of a common plan to improve HBV clinical management in Senegal.
- Applications for other sources of funding (including ANRS, NIH and private sector companies) will be planned in order to help strengthen our comprehensive HBV infection clinical and research platform in Dakar. Along the lines of this Esther Switzerland grant, we have recently secured a fellowship from the Swiss Society of



Infectious Diseases for Dr. O. Ndiaye, the head of the laboratory at the Infectious Diseases Clinic at Fann hospital in Dakar, to receive training on HBV sequencing at Bern University Hospital. We intend to apply for similar grants for funding training of other investigators and clinicians, including pathologists and epidemiologists.

### Contacts

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