

# Contribution of COVID-19 Pandemic on the Human Development of Young Researchers at Institut Pasteur de Côte d'Ivoire

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## Abstract

The response to the COVID-19 pandemic has compelled Institut Pasteur de Côte d'Ivoire (IPCI) to set up strategies for an outstanding mobilisation of human resources to fight against it. Among these strategies, we can quote the screening of people requesting COVID-19 tests at IPCI for emergency travel after the lifting of flight restrictions. Newly recruited Young researchers at IPCI, as well as Ph.D. students and trainees, were mobilised. This document describes firstly, the benefits, knowledge acquired, and difficulties encountered, and secondly, recommendations to be followed for a future large-scale epidemic. This study helped to outline some achievements, such as upgrading the talents of young researchers, strong collaboration between young researchers from different fields, and between IPCI and other institutions. The lessons learned are numerous, including mood and stress management. The difficulties encountered during this study are mainly misunderstandings, increased workload, and insufficient awareness of COVID-19 travel test procedures. These results are relevant for a possible pandemic management in our country, as well as in other African countries.

## Keywords

Pandemic, COVID-19, Human Development, Management, Travelers

## 1. Introduction

The first case of Coronavirus 2019 (COVID-19), a respiratory disease caused by

the novel severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2), was described in December 2019 [1]. It spread rapidly around the world and reached a pandemic status on 11 March 2020 [2]. According to the World Health Organization, 526 million cases were recorded worldwide, with 6.2 million deaths on 22 May 2022 [2].

In Africa, more than 700 cases in thirty countries including Côte d'Ivoire were recorded on 20 March 2020. Thus, in Côte d'Ivoire, the first diagnosis was performed on a suspected case of Coronavirus infection on 25 January 2020. That case involved a 34-year-old student travelling from China on a Turkish Airways flight. The sample from this suspected case was tested and found to be negative [3]. Following the WHO global alert, calling all countries to activate Public Health Emergency Operations Centres (PHEOC), the Ministry of Health and Public Hygiene activated its PHEOC on 31 December 2019, with the implementation of a crisis committee to better manage the risk of catching and spreading of the disease. Within this framework, the PHEOC has developed an emergency plan. The first case of Coronavirus was recorded in Côte d'Ivoire on Wednesday 11 March 2020. It was a 45 years old Ivorian man who had been in Italy. This patient was treated by the department of tropical diseases [3]. This worrying situation and the increasing number of suspected cases led to the setting up of a dozen sampling sites in the greater metropolitan Abidjan, the epicentre of the disease. The Institut Pasteur de Côte d'Ivoire (IPCI) was the only authorized center to diagnose all suspected cases.

Many countries like Côte d'Ivoire, after setting up travel restrictions, faced the issue of reopening of air borders and resumption of domestic and international flights.

Air travelers leaving Côte d'Ivoire are therefore required to provide a COVID-19 negative test result certificate with a validity period depending on destination country. Notwithstanding all efforts, the implemented national system could not provide results within 48 hours and therefore difficult to handle emergency travel. This situation coerced IPCI to develop exceptional human resource mobilization to fight against this pandemic and also screened people with emergency travel. The Institute took people among its human resources to cope with the increasing number of samples to be analysed both in the megacity of Abidjan (6 million inhabitants), which is the pandemic epicentre and within the country. Young researchers newly recruited at IPCI, as well as Ph.D. students and trainees, were mobilised. The question one could ask is to wonder whether the pandemic was beneficial to those young people.

This study aims to outline the achievements, lessons learnt and recommendations to be carried out for a future large-scale epidemic.

## 2. Overall Objective

To assess the impact of COVID-19 pandemic management on the human development of young researchers at IPCI.

### 3. Specific Objectives

- To identify achievements of the response against COVID-19 on the human development of young researchers at IPCI;
- To describe the difficulties encountered by young researchers at IPCI to the response against COVID-19.

#### 3.1. Duties and Activities of COVID-19 Traveler Team

The COVID-19 traveler team was created by the decision N°032 of September 2<sup>nd</sup>, 2020 by IPCI, brings together several young researchers under the supervision of a senior researcher. A work schedule was set up by the supervisor. The team worked from Monday to Saturday of each week from 7:00am to 6:00pm. Each young researcher had a duty day to maintain office and was assisted by the team's supervisor. An air-conditioned covered courtyard was set up for travelers' reception.

#### 3.2. Reception

Special conditions and documents to be provided are given to clients by the young researcher to allow them to be sampled at this centre upon arrival at 7a.m. A Coronavirus Epidemiological Case Investigation Form tailored for this purpose is given by the young researcher to clients requesting COVID-19 traveler tests. On this form, the traveler writes his/her surname, first names, date of birth, occupation, place of residence, local telephone number, gender and nationality. The traveler's vaccination status is written on this form. The interviews between the young researchers and the travelers take place from 7.00am to 10.00am for the first travelers in the center.

#### 3.3. Screening

The first tests of travelers' nasopharyngeal swabs begin at 8.30am the young researcher calls travelers (file) in order of arrival. The tests are carried out in the laboratory, about 100 meters from the place of reception. Samples for COVID-19 are collected by a well-trained sampling officer wearing a PPE (Personal Protective Equipment) and each traveller is given an identification code (QR code) which will enable him or her to obtain the result in the evening or sometimes in the morning of the following day.

Samples are collected as clients show up and end up at 10:30am. The team adopted strategies for sending samples to laboratories either in Cocody or Adiopodoumé (IPCI's main site) depending on the emergency of the COVID-19 test request.

#### 3.4. Sending Samples to the Laboratory

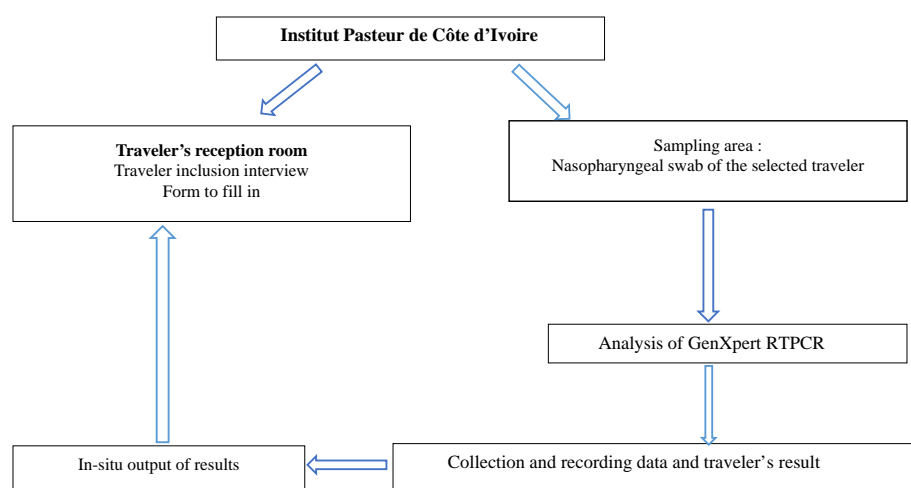
Samples of those traveling the same day are processed in a biosafety level 3 laboratory, with a 16-module GenXpert machine at the site of Cocody. For the following day's trips, the samples are sealed in a triple UN 2814 package with

frozen Ice Packs: 25 samples per package. Samples are then sent to laboratories, which are numerous with great capacity at Adiopodoumé site by a vehicle dedicated to this purpose. Samples will be analysed by laboratories at Adiopodoumé site (about 20 km from the site of Cocody) (**Figure 1**).

### 3.5. Data Management

Data input was performed by young researchers from the information provided by the epidemiological forms filled in by COVID-19 test requesters on a laptop containing a software program (TRACETUBE.CI) developed by the SAH ANALYTIC group.

### 3.6. Flowchart of Sample Collection



**Figure 1.** Flowchart of sample collection.

### 3.7. Exchange Meetings

The coordinator and young researchers meet regularly to discuss, address issues, make decisions and share experiences. These meetings help to standardise the process and improve the quality of services provided to clients.

### 3.8. Introduction of Young Researchers and Coordinator

**Table 1.** Introduction of young researchers and coordinator.

Name	Qualification	Field	Assignment Laboratory	Entry at IPCI
ABJCPA	Coordinator/research fellow	Bacteriology	Unit of clinical bacteriology	July 1 <sup>st</sup> 2013
YSS	Researcher/research associate	Parasitology	Malaria unit	February 2019
KDGR	Medical doctor	Public health	Clinical investigation unit	February 29 <sup>th</sup> 2016
KKB	Researcher/research associate	Botany	Unit of Botany and Traditional Medicine	December, 14 <sup>th</sup> 2020
GKJ	Researcher/Research fellow	Immunology	Immunity biology unit	April, 15 <sup>th</sup> 2015
DTFB	Researcher/Research associate	Functional and molecular biology	Molecular genetic platform	February, 5 <sup>th</sup> 2018

## 4. The Achievements

### - At personal level

During these activities, young researchers were given a motivational mentoring. The response to this pandemic within the institution helped young researchers to benefit from the assistance of colleagues with a wealth of experience to deepen self-knowledge, to work under pressure, to go beyond their capabilities in order to provide travelers with a quality service.

They were able to develop new behaviours and perspectives. The skills developed through conducting COVID-19 traveller screening activities enabled young researchers to be effective and efficient in providing services that were new to them. The screening activity was a way for young researchers to interact with people from different cultures and personalities. These interactions allowed them to develop their confidence and self-esteem as they were required to listen, reassure and care for people who were often angry, distressed and impatient. Through these activities, the young researchers had direct contact with the field. They met leaders (politicians) they would never have met or with whom they would never have had the opportunity to talk, and vice versa.

Professionally, the young researchers were able to interact on an ongoing basis with several members of other units within the institution and with staff from other institutions (National Institute of Public Health, USAID, WHO, New PSP etc.).

This work has highlighted the talents of young researchers and has helped to unite a team by offering a space for discussion and clarification. This work revealed the rise of a collective intelligence and transversal management.

### - At the teamwork level

The activities carried out by young researchers of IPCI aiming at helping the COVID-19 traveler's test requesters to have access to the results within a short period of time have led to bring together all units and services of the institute. The activities carried out by the young researchers of the IPCI with the aim of enabling travellers requesting COVID-19 tests to have access to the results within a short period of time have led to bring all units and services of the institute.

The teams encompassed young researchers from different units of the institution (**Table 1**). The botanist with an interest in plants was able to collaborate with biologists from different fields (Parasitology, Immunology, Public Health...).

A very good cooperation was observed between the different members of the team managing the COVID-19 traveler test. Beyond these collaborations, projects drafting was decided between the parasitologist and the botanist. These projects mainly concerned the search for medicinal plants to fight against some parasitic diseases.

Several scientific papers (2 submitted and 2 in submission), oral communication (1) and poster (1) were published by the young researchers (**Table 2**). These papers were published in peer-reviewed journals. Concerning the oral communications and posters, they were presented at the West African Consortium for

Clinical Research on Epidemic Pathogens in March 2022 in Yamoussoukro (Côte d'Ivoire).

In addition to the purely scientific collaboration, young researchers have developed relationships outside the professional framework. These relationships consisted of providing material and financial assistance to team members in happy (marriage, birth, anniversary) or unhappy (death; illness) events.

- **At the institutional level**

This work was beneficial not only for young researchers but for the whole institution. It has enabled the gathering of all the human, intellectual and moral resources needed to solve travellers' problems. The strategy set up to deal with the emergency of COVID-19 screening led to win-win meetings with some organisations such as Interpol, embassies (China, Israel, Japan, Germany, etc.), banks and private companies, etc. Moreover, this strategy has increased the visibility of the institution at the national, sub-regional and international level.

The response to the COVID-19 pandemic has allowed the institution to strengthen collaborations with other health institutions and organisations.

These structures include the Emergency Medical Service (SAMU), the Infectious and Tropical Diseases Service of Treichville (SMIT), the University Hospital of Cocody (CHU), ECOWAS (Economic Community of West African States), the Agban military screening centre and screening centres within the country (Korhogo, San Pédro, Abengourou, Man, Bouaké, etc). These institutions called on IPCI to screen personnel willing to travel or not and to follow up COVID 19 patients or delivery of results to people who underwent the COVID 19 test within the country.

This work boosted up communication between the management and young researchers facilitating their integration in the Institution. The IPCI management facilitated skills sharing, transmission of knowledge, skill improvement and vulgarisation of acquired knowledge. Young researchers were motivated by receiving incentives and congratulations from management for the work done.

- **For clients**

The COVID-19 traveler management team was beneficial to clients requesting the test, who were often in emergency situations. For clients needing their results in less than 48 hours a solution was found to their problems (travel emergency for death, medical evacuation). Most of clients arriving at IPCI with claims and requests for COVID-19 tests showed up with anxiety and stress but eventually left satisfied. They congratulated and thanked team members. The organisation set up by the team to manage emergency tests and claims was appreciated by clients.

- **In terms of understanding the concept of a pandemic**

A pandemic is a disease outbreak affecting more people in a short period of time over a wide geographical area, a country or continent. For more than two years, the whole world has been struggling with a virus unknown to the human species: SARS-CoV-2.

The World Health Organisation (WHO) recognised this reality in two stages. On 30 January 2020, its Director General solemnly declared that the progression of this Coronavirus was a public health emergency of international concern. Then, on 11 March 2022, the organization deemed the phenomenon of being a pandemic, with the speed of the virus' spread, the severity of the disease and the level of inaction to control it.

The COVID-19 pandemic was not only a health, economic and educational crisis but also a social and a scientific crisis.

In terms of health, as soon as the pandemic disease appeared in the world, handwashing with soap and water was one of the preventive measures against COVID-19 that gained the support of the population. In Côte d'Ivoire, handwashing was applied by the population throughout the country. Particularly in the district of Abidjan, washing devices, hand gel and soap at the entrance of houses, neighborhoods, shops, train stations, in offices were observed. However, due to challenges related to the availability and the additional costs generated by the practice of handwashing, some individuals or companies had decided to manufacture hydroalcoholic gel.

The global health crisis has increased the use of protective face masks by the population (surgical masks). These types of masks, originally intended for the medical staff before this pandemic, are now worn by everyone for protection. Just like the hydroalcoholic gel, the massive use of these single-use masks led to stock-outs and gave rise to the local manufacture of some protective face masks. We have seen self-medication for curative purposes, especially with medicinal plants. All these massive uses of protective masks, hydroalcoholic gel for hands and laboratory materials for RT-PCR test increased the tonnage of laboratory waste. There have been thousands of deaths per day worldwide.

At the educational level, in order to stem the spread of the COVID-19 pandemic, one of the main measures taken by the authorities was the temporary closure of schools, universities, shops, airports etc. A proposal was made to alternative measures of learning, such as participating to meetings, to scientific congresses or to online training. In Côte d'Ivoire, the concept of television-based instruction was practised.

At the social level, it appears that the COVID-19 pandemic had psychological and social consequences. For instance, there was stigmatisation of infected people and weakening of social ties. The whole world has experienced partial or total lockdown period ranging from 1 to 3 months depending on the pandemic intensity and the country. The pandemic causes social distancing in order to avoid contamination.

Scientifically, there were conflicting debates about the different types of treatment to be administered to people suffering from COVID-19 at the beginning of the pandemic.

Economically, a drastic decline was globally observed. The pandemic caused the closure of many businesses, leading to severe disruptions in the economies.

- **About result dissemination**

**Table 2.** Summary of publications and communications of young researchers during the activities of the COVID-19 traveler tests at IPCI.

Title of paper/ Oral communications/Poster	Authors	Year	Journal
Strategies for Management of Certificates of Analysis of <i>Coronavirus</i> Disease 2019 for Travellers in Times of Pandemic: Case of the Pasteur Institute of Côte d'Ivoire	<b>Diplo Tchepé Flore Bernadette</b> <sup>1*</sup> , Anné Blessa P. A. Jean Claude <sup>2</sup> , Achy Brou Armand <sup>3</sup> , Aoussi Serge <sup>1</sup> , Yéo Alain <sup>2</sup> , Golly Koffi Julien <sup>4</sup> , Blavo-Kouamé Belinda <sup>2</sup> , Yao Serge-Stéphane <sup>5</sup> , Kangah-N'goran Asseh Tatiana <sup>2</sup> and Dosso Mireille <sup>1,2</sup>	2020	Journal of Scientific Research & Reports
Survey on the knowledge of medicinal plants used against Coronavirus disease, influenza and cold among travelers who came for the COVID-19 test at Institut Pasteur de Côte d'Ivoire.	<b>KOUAME Kouassi Bernadin</b> <sup>1*</sup> , ANNE Blessa Jean Claude Pascal Aurelien <sup>2</sup> , YAO Serge-Stéphane <sup>3</sup> , DIANE Kouao Maxime <sup>4</sup> , DIPLO Tchepé Flore Bernadette <sup>5</sup> , OUATTARA Amadou <sup>6</sup> , GOLLY Koffi Julien <sup>5</sup> , COULIBALY Kalpy Julien <sup>1</sup> , KONE Mamidou Witabouna <sup>1</sup> et Dosso Mireille <sup>2,5</sup>	2021	Journal of Applied Biosciences
The Institut Pasteur de Côte d'Ivoire in the management of air travellers' emergencies during the COVID-19 pandemic: support for the response strategy in Côte d'Ivoire	<b>Anné Jean Claude</b> <sup>1</sup> , Diplo Tchepé Flore Bernadette <sup>2</sup> , Kouamé Bernadin, Yao Serge <sup>4</sup> , Golly Julien <sup>5</sup> , Aoussi Serge <sup>2</sup> , Dosso Mireille <sup>1,2</sup> .	2022	WACREP Congress
Survey on the knowledge of medicinal plants used against Coronavirus disease, influenza and cold at the sampling center of the Institut Pasteur de Côte d'Ivoire	<b>KOUAME Kouassi Bernadin</b> , ANNE Blessa Jean Claude Pascal Aurelien <sup>2</sup> , DIPLO Tchepé Flore Bernadette <sup>5</sup> , YAO Serge-Stéphane, GOLLY Koffi Julien, KONE Mamidou Witabouna <sup>1</sup> et Dosso Mireille.	2022	WACREP Congress

## 5. Difficulties Encountered

When the COVID-19 screening team was first set up at the site of Cocody, its missions were to manage claims, COVID-19 screening of authorities and diplomats, monitoring of patients and care centres. But we had to manage increasingly frequent emergencies: participants in congresses in Abidjan, cases of assignments outside the country, cases of medical evacuations, etc...), screening requirements within 24 hours. The team's workload has greatly increased over time.

Despite all efforts to manage our activity, we went through some difficulties. There was sometimes a delay of results' transmission, which were not available on the digital platform 48 hours for some travellers after they had carried out their test. Young researchers had to deal with discontent and even threats.

The digital platform sometimes malfunctioned, which has been a source of dissatisfaction and discontent. To handle these situations, young researchers had to adapt and find out solutions to satisfy clients.

After the holidays, the flow of travel from Cote d'Ivoire to European countries has increased young researchers' workload. During these periods of high demand, young researchers often worked up to 8pm in order to help all clients.

The problems were not sometimes caused by young researchers or the IPCI, but by the person requiring the COVID-19 test or by other structures involved in the COVID-19 diagnostic process (e.g. in case of an error on the name or tel-



ephone number, the client's code was not even in the database). In these cases, young researchers were held responsible by travellers who found themselves in such situations. However, claims handled by young researchers at IPCI enabled them to improve the protocol for issuing the COVID-19 certificates requested by travelers.

One of the difficulties encountered by young researchers in managing travelers is insufficient awareness of the procedures for obtaining travel certificates. Several travelers expressed their dissatisfaction because information on the acquisition of COVID-19 RT PCR tests was not sufficiently disseminated by the media. Some cases of indiscipline were observed among travelers by the COVID-19 travel team. Indeed, the pressure of flight departure times led to cases of impatience and indiscipline when travelers reached the COVID-19 management team.

## 6. Recommendations

At the end of this study, recommendations are useful for actors of health system participating in the response to COVID-19 pandemic, to the COVID-19 management team of IPCI based at Cocody site and to the COVID-19 test requesters.

For the political and health authorities, they should improve communication on procedures to get the COVID-19 travel certificate. Drafting publicity brochures and even television advertisements on these procedures could facilitate dissemination of information for COVID-19 test requests. Regular updates on measures for COVID-19 test requests should be made available to all. Raising awareness and communication on the various steps to obtain a COVID-19 test for travelers in local languages to help those who have not been to school.

For travelers, it is important to respect the COVID-19 vaccination strategy in order to avoid numerous screenings prior to trips. If the traveler refuses the vaccine, he should do his utmost to obtain results in time. The respect of procedures set up by the COVID-19 travel management team is necessary to find out all possible solutions to their requests.

Young researchers would like to share their experience between the different institutions involved in the COVID-19 response in order to better understand future pandemics. At the end of this work, young researchers had a good self-control which is essential in the process of welcoming travelers. This self-control is useful for people management.

## 7. Conclusions

This study helped to outline several achievements, such as the development of young researcher talents, the collaboration between different disciplines, and between IPCI and other structures. Lessons learned are also numerous, including mood and stress management.

Difficulties encountered during this work were misunderstandings, increased workload and insufficient awareness. These results are relevant for a possible

pandemic management in our country, as well as in other African countries.

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### **Contribution of the Authors**

All the authors participated intellectually in the preparation and revision of the manuscript before its submission.

### **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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