

Dominican Republic

**Postevaluation Report on
the Medical Education and Training
Project in the Dominican Republic**

November 2008

Japan International Cooperation Agency

Preface

The Japan International Cooperation Agency realized this postevaluation study on the Medical Education and Training Project in the Dominican Republic in 2008.

I hope that the report will be helpful for doctors and medical personnel in the Dominican Republic, and that the project promotes the strengthening of the medical education system in the country.

Finally, I would like to extend my gratitude to all the individuals concerned who provided collaboration and support for the countries concerned.

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Dominican Republic

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ABBREVIATIONS

ARS	Administradoras de Riesgos de Salud (Health Risk Administrators)
CEMADOJA	Centro de Educación Médica Amistad Dominico-Japonesa (Dominican-Japanese Friendship Center for Medical Education)
CEASA	Centro de Estudios Ambientales, S.A. (Environmental Studies Center)
CMD	Colegio Médico Dominicano (Dominican Medical Association)
CT	Tomografía Computarizada (Computerized Tomography)
JICA	Japan International Cooperation Agency
MRI	Magnetic Resonance Imaging
OMS	Organización Mundial para la Salud (World Health Organization)
OPS	Organización Panamericana para la Salud (Pan-American Health Organization)
RD\$	Peso Dominicano (Dominican local currency)
SENASA	Servicio Nacional de Salud (National Health Service)
SESPAS	Secretaría de Estado de Salud Pública y Asistencia Social (Ministry of Public Health and Social Welfare)

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SUMMARY

Content of the Project			
Country	Dominican Republic	Project title	Medical Education and Training Project in the Dominican Republic
Issue/Sector	Health	Cooperation scheme	Technical cooperation
Section in charge	Human Development Department	Total cost	594 million of yen
Period of cooperation	1999–2004	Institution related in the country	Secretariat of State of Public Health and Social Assistance (SESPAS)
		Support Organization in Japan	Oita University
Related cooperation	Construction of Dominican-Japanese Friendship Center for Medical Education (CEMADOJA)		
1.1 Background of the Project			
<p>The government of the Dominican Republic promotes socioeconomic and public health policies that are implemented by the Ministry of Public Health and Social Welfare (SESPAS). JICA provided a technical cooperation program in the Gastroenterology Center of the Dr. Luís E. Aybar Health and Hygiene City hospital complex from 1990 for a period of seven years. The project was successfully implemented, and its clinical and research capabilities were improved, as expected. However, the lack of capable medical staff was still a serious issue for the Dominican health sector, and the government requested further cooperation in this respect. In response, the government of Japan approved a technical cooperation program to create the Dominican-Japanese Friendship Center for Medical Education, which was to be focused in the area of medical imaging and epidemiology in the Dominican Republic, during the period 1999–2004.</p>			
1.2 Description of the Project			
<p>The government of the Dominican Republic, through the Ministry of Public Health and Social Welfare (SESPAS), requested grant aid from the government of Japan for the purpose of constructing the Dominican-Japanese Friendship Center for Medical Education (CEMADOJA) within the Dr. Luís E. Aybar Health and Hygiene City hospital complex. Through invaluable studies by Japanese missions, the need for technical cooperation in the form of specialists in the area of medical imaging and epidemiology was implied. Finally, in October 1990, an agreement was made between the two countries, and since then medical training programs have been carried out in Japan for Dominicans, and Japanese experts have worked at CEMADOJA as their counterparts for the transfer of technology.</p>			
General Objectives			
To contribute to strengthening the national health system and medical education in the health sector in the Dominican Republic.			
(1) Purpose of the Project			
To strengthen the national health system and medical education of the health sector in the Dominican Republic focused in the area of medical imaging at CEMADOJA, located in the Dr. Luís E. Aybar Health and Hygiene City hospital complex.			
2. Evaluation Team			
Team members	JICA Office DR: Dr. Abel Hernández, Coordinator; Bienvenido Núñez Ramírez, Economist; and Dr. William Hernández, MD, Epidemiologist, Assistant		
Period of evaluation	28 December 2007, to 28 February 2008	Evaluation type	Post-project evaluation
(3) Outputs			
<ul style="list-style-type: none"> • The quality of training in diagnostic imaging has been improved. • Epidemiology has been introduced into the curriculum as basic education. • Management capabilities in the area of training resident doctors have been improved. 			

(4) Inputs (as part of the termination of the project)

By the Japanese:

- Long-term experts (15)
- Short-term experts (36)
- Training received (23)
- Equipment: 1.39 million yen
- Local cost: 3.84 million yen

By the Dominican Republic:

- Counterparts (39 counterparts trained in Japan)
- Equipment: NA
- Local cost: NA
- Land and facilities: Provided by the Dominican government

3. Evaluation Results

3.1 Summary of the results of the evaluation

3.1.1 Impacts

- Strengthening medical service at the third level of attention in the Dr. Luis E. Aybar Health and Hygiene City hospital complex, other hospitals, and private clinics in the national health system.
- Strengthening the interinstitutional network among entities of the health sector by cooperation among different universities and SESPAS through CEMADOJA. • Increase of the medical services offered by the Center with the laboratory analysis and image diagnosis of high quality.
- Increase in medical services offered by CEMADOJA with laboratory analysis and image diagnosis of high quality.
- Increase in training specialists in medical imaging and contribution to other specialties in family and community medicine and epidemiology.
- CEMADOJA is used as the national core center in medical imaging for the JICA Training Program for Third World Countries for medical education in medical imaging for technicians and physicians coming from countries in Central America and the Caribbean.
- Access to CEMADOJA services by the lower-income population.
- Contribution of CEMADOJA to the progress of Dominican medicine. • Income increment and better work opportunities for the physicians and technicians.
- Income improvement and better work opportunities for physicians and technicians.
- CEMADOJA's laboratory is in the process of being designated a national reference laboratory at the recommendation of the OPS/OMS and SESPAS for analysis of morbidity from the dengue virus and human influenza.

3.1.2 Sustainability

- CEMADOJA is under the organizational structure of SESPAS, which is the institution responsible for the selection and designation of technical and administrative personnel for CEMADOJA in coordination with CEMADOJA authorities; however, a certain degree of instability in personnel is perceived every four years as the government changes, which affects CEMADOJA's institutional sustainability.
- CEMADOJA is under the organizational structure of SESPAS, which tends to reduce CEMADOJA's budget. However, CEMADOJA realized the upgrading of equipment and facilities with its own budget, using the increase in income due to the rise in the number of patients served at CEMADOJA.

3.2 Factors promoted by the project

(1) Impact

- An important issue is to improve the level and technique of diagnostic imaging. The Program for Diagnostic Imaging, organized by the project, is incorporated in the national medical training program.

(2) Sustainability

- CEMADOJA's income has increased through improvement in diagnostic imaging techniques and a rise in the number of patients served. It allowed CEMADOJA to upgrade its facilities and equipment.

3.3 Factor that have affected the project

(1) Impact

- Utilization of the financial resources created for equipment upgrading and maintenance for other activities.
- Lack of upgrading of imaging and computer equipment.

(2) Sustainability

- Delay in disbursement of CEMADOJA's budget by SESPAS.
- Instability of trained personnel every four years due to the change of government.
- Lack of budget for maintenance and upgrading of equipment.

3.4 Conclusions

The Program for Diagnostic Imaging, which was organized by the project, is incorporated in the national medical training program, and is attributed to efficient execution of medical education. It shall achieve this general objective because SESPAS and the Dominican School of Medicine admit that CEMADOJA is the national model for diagnostic imaging and personnel training.

Regarding the impact of the project, it has improved diagnostic imaging techniques at CEMADOJA and has made it possible for vulnerable people to receive modern diagnosis at lower cost. It brings an increase in the number of patients to CEMADOJA and raises CEMADOJA's income.

CEMADOJA holds a congress on diagnostic imaging every year, and CEMADOJA instructors participate in courses to renew and upgrade their knowledge.

The sustainability of the technical and financial aspects of CEMADOJA are assured.

3.5 Recommendations

- To obtain a major budget for CEMADOJA in order to guarantee the continuity of the institution's services in all areas; and to keep the continuity of medical education programs, research, upgrading and actualization of medical equipment, computers, and the electricity generator.¹
- To strengthen collaboration and communication within CEMADOJA and with the Health and Hygiene City hospital complex.
- To improve the coverage of the agreement on provision of services with public and private health institutions in order to guarantee the financial sustainability of CEMADOJA, according to the Social Security Act 87-01.

3.6 Lessons obtained from the Project for JICA

- Technical cooperation for personnel training and equipment, as in the case of the CEMADOJA project, has a great impact on strengthening health education in the national system as well as in institutions of the private sector as a result of the improvement of human resources.
- The possibility of taking advantage of the experience of CEMADOJA, which allows trained technologists and physicians from CEMADOJA to participate in triangular cooperation programs for the countries of Central America and the Caribbean.

¹ The electricity generator is used to provide power during blackouts of the national electric service.

1. Introduction

The government of the Dominican Republic through its Ministry of Public Health and Social Welfare (SESPAS) requested from the government of Japan the construction of the Dominican-Japanese Friendship Center for Medical Education (CEMADOJA) on the site of the Dr. Luís E. Aybar hospital complex under the Grant Aid Cooperation Program for the purpose of educating and developing specialists in the fields of imaging and epidemiology. Currently, this is the largest teaching hospital in the Dominican Republic. The medical complex is composed of the Dr. Luís E. Aybar main hospital, CEMADOJA, the Gastroenterology Center, the Burn Center, and the Cardiorenal-Ophthalmological-Transplant Center (CECANOF). The Dermatology Institute is located in the surroundings of the complex. All these hospitals and centers serve as teaching facilities for different medical specialties.

The government of Japan accepted the request and carried out technical and grant aid cooperation through the Japan International Cooperation Agency (JICA), with an emphasis on giving greater focus to human resources development (medical, educational, resident doctors, and nurses) in diagnostic imaging fields. Both parties agreed to include as another component of the project a Basic Epidemiology Program for resident doctors attending radiology and other medical residency programs of the Luís E. Aybar hospital complex.

2. Project Objective

The purpose of the Medical Education and Training Project is to establish a national system of continuous education for doctors and technicians in the field of health at the Dr. Luís E. Aybar hospital complex in order to contribute to training specialists in the fields of imaging radiology and epidemiology in the Dominican Republic.

2.1 General Objective of the Project

The objective of the project is to provide education in the field of public health and diagnostic imaging to improve the level of medical education and the quality of health care at the Dr. Luís E. Aybar hospital complex, which is one of the main educational and medical establishments in the country for the third level of attention.

2.2 Implementing Technical Cooperation

The government of Japan has cooperated with the Dominican Republic in the construction and operation of two projects at the Dr. Luís E. Aybar hospital complex: the Gastroenterology Center and CEMADOJA. Both centers benefited from the Japanese government's grant aid cooperation as well as technical cooperation through the dispatch of Japanese experts and the integration of Dominican personnel to provide clinical services and to participate in specialized training. The projects also included a supply of equipment for invasive and evasive diagnostics and training of medical doctors.

2.3 Activities and Estimated Effects of the Project

CEMADOJA has five activities:

2.3.1 Activities

a. Services, studies, and research

- Neurological-cerebral system
- Pulmonary and circulatory system
- Digestive system, liver, bile ducts, and pancreas
- Bones and soft tissue
- Urogenital and obstetric system
- Pediatric illnesses
- Mammary glands

b. Radiological studies

- CT (computerized tomography)
- MRI (magnetic resonance imaging)
- Conventional X-rays
- Sonography
- Mammography
- Fluoroscopic X-rays

c. Radiotherapy

- Percutaneous biopsy
- Percutaneous drainage

d. Promotion of activities in the fields of public health, epidemiology, and family-community medicine through research or field studies on:

- Dengue fever
- Hepatitis
- Helicobacter pylori
- Influenza virus
- West Nile virus
- Field studies related to public health and epidemiology
- Research in the field of family and community medicine

e. Specialized education for delivery of new specialists, training of resident doctors, and medical students attending CEMADOJA for the following medical residency and specialization programs:

- Residency in radiology
- Residency in family and community medicine
- Education program in the field of family and community medicine for resident doctors
- Basic radiology program for resident doctors in other specialties

- Basic public health program for resident doctors
- Basic radiology education program for medical students
- Basic public health education program for medical students
- Basic family and community medicine education program for medical students
- Training of radiology technicians
- Clinical rotation of students in X-ray technical careers
- Training of technicians in bioanalysis
- Rotation of students in bioanalysis technical careers
- Training of nurses
- Rotation of nursing students

2.3.2 Estimated effects

The main elements that have been introduced as estimated effects are the following:

- Empowerment through technology transfer, which has enabled significant improvement in the teaching capacity of the Dominican counterpart in the fields of imaging radiology, epidemiology, and family-community medicine.
- CEMADOJA is recognized as a national model of specialized and permanent medical education.
- Increase in coverage of imaging studies at CEMADOJA.
- By recommendation of the Pan-American Health Organization (PAHO) and SESPAS, a procedure is being undertaken to declare CEMADOJA's laboratory a national reference laboratory for research on illnesses like dengue fever and human influenza.

3. Objectives and Methods of Evaluation

3.1 Objective of the Evaluation

- a. To determine the level of impact and the sustainability of the project.
- b. To identify technical, financial, and environmental problems to make recommendations to CEMADOJA and to SESPAS for the purpose of taking necessary measures to be able to guarantee its sustainability; and to JICA to be able to ascertain lessons learned.
- c. To consider the lessons obtained through the activities developed by CEMADOJA in order to use them as feedback for future projects.

3.2 Method of Evaluation

The method of postevaluation consisted of an analysis of the results of the interviews and meetings with the individuals in charge of different areas of CEMADOJA, and an analysis of the results of the questionnaire surveys that were distributed, which included content suggested by Oita University. In these activities of evaluation, two criteria on the progress of the project are included: impact and sustainability.

3.3 Methodology of the Evaluation

In the first stage, an evaluation matrix was prepared in which the information required to identify impacts and sustainability were identified. In this matrix the sources and procedures to obtain the information were also identified. The evaluation matrix appears in Annex 1.

In order to obtain primary data, a survey was carried out with ambulatory patients who requested imaging study services as well as resident doctors and medical students at CEMADOJA and the Dr. Luís E. Aybar Hospital. We also conducted interviews with authorities and key individuals who handle the operations of the project according to the terms of reference established as the instruction guide for this evaluation.

In this way, a total of 200 people were interviewed in the National District, basically at CEMADOJA, the Health and Hygiene City medical complex, and the zones surrounding it. Samples were selected in the following way:

- 95 questionnaires were distributed both to patients and the general public.
- 45 questionnaires were distributed to doctors resident at CEMADOJA and the four other health centers that comprise Health and Hygiene City, namely the Dr. Luís E. Aybar Hospital, the Gastroenterology Center, the Burn Center, and the Dermatology Institute.
- 60 questionnaires were distributed to students, professors, key individuals at CEMADOJA, and authorities in the health sector and of the Dominican Medical Association (“CMD” in Spanish).

3.4 Members of the Evaluation Team and Evaluation Guide

3.4.1 Members of the evaluation team

Evaluation of the Project was carried out by Bienvenido Núñez Ramírez and Dr. William Hernández, MD, under the coordination of Dr. Abel Hernández of the consulting firm Central Environmental Studies Inc. (CEASA) and under the supervision of the Japan International Cooperation Agency (JICA).

The evaluation team visited CEMADOJA during five weeks from January 10 through February 25, 2008, developing the following activities:

- Initial visit to CEMADOJA to present the evaluation team and observe the facilities.
- Distribution of questionnaires and individual interviews with individuals in charge of all CEMADOJA departments, including doctors, laboratory technicians, administrative staff members, and others.
- Meetings with JICA project coordinators to monitor the progress of evaluation activities according to the timetable.
- Analysis of statistical data, records, and financial statements between 2000 and 2007.
- Interviews of participants in the International Diagnostic Imaging Course at CEMADOJA that was ongoing during this evaluation work.

4. Results of the Evaluation

4.1 Impact

The achievement level of the main goal of the project after its final evaluation is analyzed here, as well as economic, academic, technological, institutional, and social impacts.

4.1.1 Achievement of the main goal of the project since the final evaluation

Since last evaluation conducted in 2004, CEMADOJA has been contributing to the achievement of the main goal of the project, which refers to the establishment of a medical education system: CEMADOJA has contributed to increasing coverage of imaging studies. A total of 129,003 diagnoses were given during the period 2005–2007, with an annual average of 43,001 services representing an increase of 64% over the period 2000–2004, when the annual average was 26,242. Annex 2 shows service coverage during the period 2000–2007.

SESPAS and the CMD recognize that the educational system at CEMADOJA is a model of human resource development and imaging radiology clinical services that will be able to respond to the clinical needs of the population at the national level. With the execution of the project, continuous education for health care professionals has been strengthened in the medical education system, mainly in the field of imaging radiology.

Similarly, with the implementation of the project, family-community medicine programs, public health, and epidemiology as promoted by SESPAS have benefited on being integrated into the services of CEMADOJA. It has enabled major integration of training, research, and services to patients.

In the 2000–2007 period, 260,215 diagnostic images in different clinical pathologies were provided, of which 129,003 corresponded to the 2005–2007 period, equivalent to 50% of the services offered since the beginning.

Since the last evaluation of the project in 2004, 16 epidemiological research studies have been carried out on different pathologies related to health care services offered at the Dr. Luís E. Aybar hospital complex. Annex 3 shows the various research and training activities conducted during the 2000–2007 period and emphasizes the fact that more than 60 training activities were held at the local level, such as seminars, congresses, courses, conferences, and others. Annex 4 shows CEMADOJA's participation in scientific events.

Twenty-seven specialists in imaging radiology have graduated from CEMADOJA. Some are working at CEMADOJA, and others are distributed among different public hospitals and private clinics. At present there are nine resident doctors working in radiology. Annex 5 outlines doctors who have graduated from CEMADOJA in imaging radiology.

Due to the high quality of its personnel and equipment, CEMADOJA is utilized to carry out the International Diagnostic Imaging Course for Radiologists and Radiology Technicians in Central America and the Caribbean Region, taking advantage of triangular cooperation.

Between 2006 and 2008 this international course has been held three times, once each year, with a total participation of 12 medical doctors and 15 radiology technicians. Annex 6 lists the participants.

As a consequence of this experience, different actions have actually been taken in El Salvador by former participants. Others would like for the CEMADOJA specialists to provide them with technical support in radiology imaging.

In the teaching and investigations departments at CEMADOJA, seven theses for academic degrees written by medical students from different national universities who have been working as medical interns at CEMADOJA and the Luis E. Aybar hospital complex have been assessed. Annex 7 outlines the theses supervised and supported by CEMADOJA's Public Health Laboratory.

Additionally, 35% of the doctors interviewed expressed the idea that epidemiological activities have diffused into the private sector through seminars, conferences, and the Internet. These conferences are taken into account in monitoring morbidity and mortality caused by different kinds of pathologies in the population.

The activities of CEMADOJA have been contributing to improving the national medical education system in the Dominican Republic as a result of the integration of imaging radiology specialties and those of family-community medicine, both provided by CEMADOJA, taking advantage of CEMADOJA's equipment and facilities.

4.1.2 Social impact

a. Access to the services of CEMADOJA by the low-income population

Regarding the economic conditions of the users, 59% have a monthly income below RD\$5,000, and 29% earn between RD\$5,001 and RD\$10,000, which confirms that the beneficiaries of the CEMADOJA's services are the poorest sector of Dominican society. See Annex 8 on the monthly income levels of patients.

According to the results of the survey carried out during the period of the evaluation, 43% of the patients at CEMADOJA are housewives, 20% are merchants and students, and the remaining 37% have other careers, with an emphasis on jobs like sales, mechanics, chauffeurs, and nurses, among others professions. This indicates that CEMADOJA is offering a service that most benefits the low-income social class. Annex 9 outlines the different occupations of the patients.

Patients who visit CEMADOJA affirm that they always receive medical services no matter what their economic status. They recognize that the service is of excellent quality, which is associated with the high-level training of the doctors, their high motivation to achieve patient satisfaction, and the availability of high-quality equipment.

Obviously services are not free, and when being interviewed about CEMADOJA's service fees, 28% answered that they couldn't afford them. Nevertheless, this group of patients receives services absolutely free of charge, which is covered by the Social Welfare Department of SESPAS.

On the other hand, 16% of the patients interviewed answered that they could afford it; 24% consider that CEMADOJA's fees are lower than those of private centers; 22% think the fees are reasonable; and for the remaining 10%, the fees at CEMADOJA are higher than those of private clinics. **Figure 1** shows a percentage distribution of the assessment of CEMADOJA service fees.

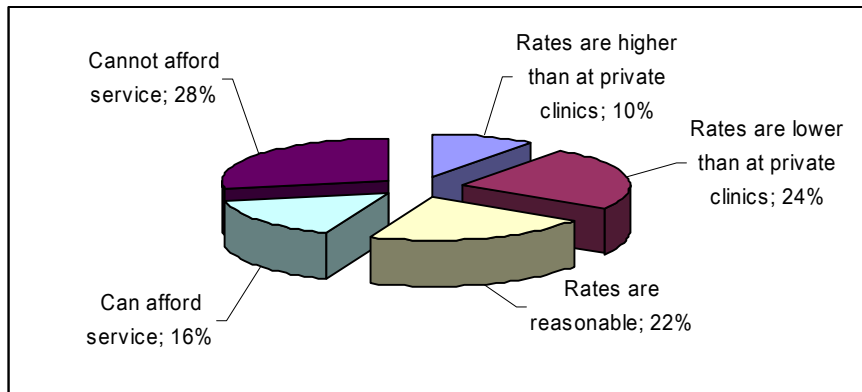


Figure 1 Assessment of Service Costs at CEMADOJA

As can be seen, this means that 62% of the users accept the current fees, although 90% of them state that the services received are satisfactory, significantly reducing health expenditure in family budgets.

b. Improvement in quality of life for CEMADOJA users

The quality of services at CEMADOJA produces a direct impact in the quality of life of its patients: 8% consider the services to be excellent; 25% qualified the imaging service as “very good,” 43% as “good,” and 19% as “regular.” Only 5% qualified it as “bad.” It means the imaging studies provided by CEMADOJA have a high level of quality and effectiveness. **Figure 2** shows a percentage distribution of the assessment of services by CEMADOJA users.

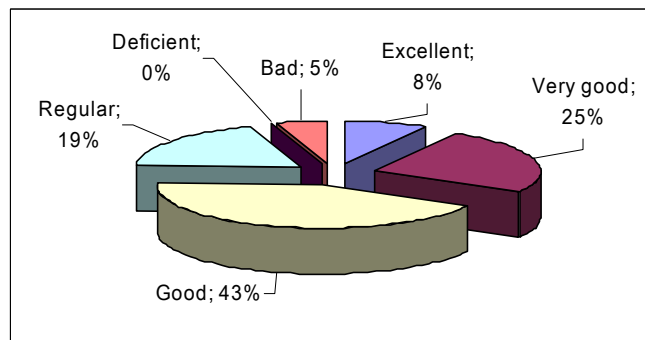


Figure 2 Assessment of CEMADOJA's Services

Similarly, 42% of the patients and the general public indicate that the greatest advantage of CEMADOJA is the effectiveness of the results in radiological studies; 17% refer to high quality of the medical staff and the physical structure; 10% refer to public health and epidemiological services; 12% to administrative service; and 13% to working efficiency. Finally, 6% consider the professional education as an advantage of CEMADOJA. **Figure 3** shows a percentage distribution of CEMADOJA's perceived advantages. It is well worth special mention that even though some equipment has not yet been updated, the quality of studies is maintained through the support of the large responsibility assumed by administrative and technical personnel.

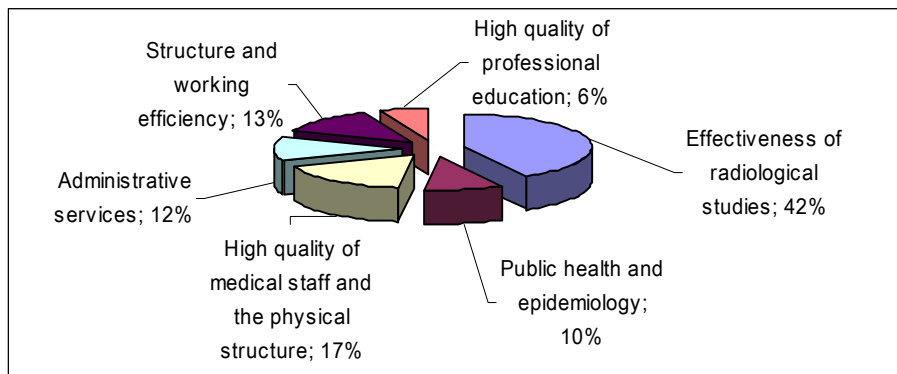


Figure 3 Advantages of CEMADOJA

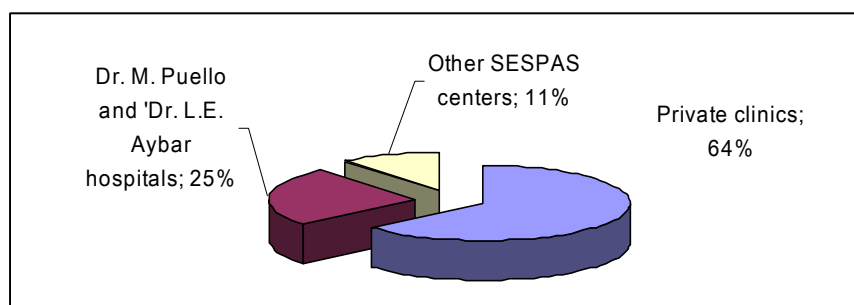


Figure 4 Institutions Referring Patients

Of the patients that come to CEMADOJA for radiological studies or radiotherapy, 64% are referred by private clinics and ambulatory doctor’s offices, while 25% are referred by the Dr. Luís E. Aybar and Dr. Moscoso Puello hospitals, and the remaining 11% are referred by other SESPAS centers. **Figure 4** outlines the institutions referring patients to CEMADOJA.

It is worth special mention that a great majority of the patient referrals from the private sector are due to the fact that CEMADOJA has made service contracts with several Health Risk Administrators (ARS), including the National Health Service (SENASA), which is a public insurance company, and other private ARS groups. This modality has contributed to increasing CEMADOJA income.

Regarding the services requested by patients, 82% are radiological studies, and the remaining 18% are related to other laboratory services. CEMADOJA has made a great contribution to medical progress in the country: Since its inception, CEMADOJA has produced a great impact for the benefit of the poorest social class, which has not had access to this kind of service before. This has enabled an improvement in the quality of life of CEMADOJA users. Additionally, being able to afford good services at a lower price translates into a major financial benefit for them.

c. Contribution of CEMADOJA to the progress of Dominican medicine

Ninety percent of the doctors and 82% of the professors and students reported that the CEMADOJA project has contributed to the development of Dominican medicine, since no programs in research nor in continuous education for radiology residency, epidemiology, or family-community medicine as being developed at CEMADOJA had existed in the country. This has strengthened national health care in the Dominican Republic.

In relation to the quality of performance of administrative and technical personnel, the survey indicated an average of 30% of patients, medical doctors, professors, and students qualified it as “very good,” 45% as “good,” 18% as “adequate,” and 4% as “deficient,” while 2% answered that they didn’t know. This means that the vast majority of CEMADOJA employees accomplish their responsibilities.

Figure 5 shows the results of the assessment of CEMADOJA administrative and technical personnel.

Technical support offered by the Japanese experts under a scheme of technical cooperation with CEMADOJA personnel is considered excellent by an average of 31% of the medical-sector people, students, professors, and CEMADOJA patients interviewed; 30% of them qualified it as “very good,” 30% as “good,” and the remaining 9% as “adequate.” **Figure 6** shows the results of the assessment on Japanese technical support.

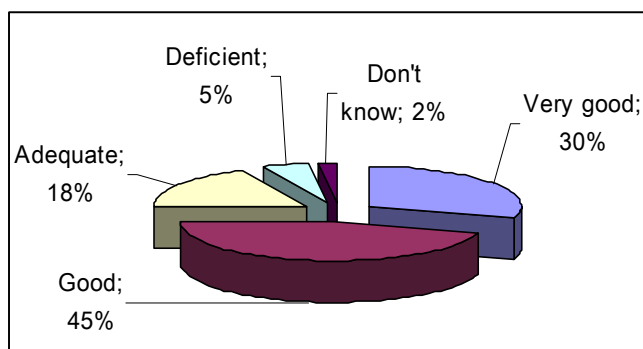


Figure 5 Evaluation of Technical and Administrative Staff

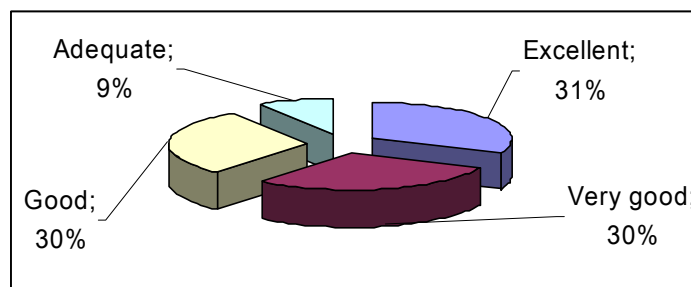


Figure 6 Evaluation of Japanese Technical Support

This means that technical transfer provided by the experts of Oita University has been beneficial for the development of technological and human resources in areas of imaging radiology, epidemiology, and family-community medicine, making a considerable contribution to improvement in clinical services at the level of public health in the Dominican Republic, specifically for those who visit the Dr. Luís E. Aybar hospital complex.

According to those interviewed, the establishment of CEMADOJA has contributed to improving the quality of diagnoses of different clinical pathologies examined at the Health and Hygiene City medical complex and other public and private medical centers in the country, since training in imaging radiology has increased delivery of medical specialists, which means better service for patients and the population in general, mainly for those who earn the lowest incomes.

4.1.3 Institutional impact

- a. Strengthening the third level of medical care at the Dr. Luís E. Aybar Health complex, hospitals, private clinics, and at the national level of the health care system

The public health care system has been strengthened by the establishment of CEMADOJA along with other medical institutions of the Dr. Luís E. Aybar hospital complex, such as the main hospital (the Dr. Luís E. Aybar Hospital), the Burn Center, the Gastroenterology Center, the Dermatology Institute, and other public centers under the regulation of SESPAS as the superintendent body.

Private medicine has been strengthened since the doctors of the CEMADOJA also work in the private sector. Additionally, CEMADOJA provides imaging studies to patients referred from the private sector.

Fully 100% of the doctors, students, nurses, and professors surveyed as well as the members of the Dominican Medical Association recognize CEMADOJA as an institution providing imaging and radiological services.

Each patient that receives high-level service from CEMADOJA becomes a primary promoter of the institution, which is the reason why the number of patients has been increasing significantly. Every day more and more patients visit CEMADOJA for imaging services, which has enabled CEMADOJA to increase its income and to improve the quality of health care services to the public.



- b. Strengthening the management and hospital administration model

The CEMADOJA hospital management system implemented through Japanese cooperation has served as a reference model for authorities in the health sector, and it has also been applied to other public hospitals, such as Marcelino Velez Hospital in Samana Prefecture, Santana Hospital in Santo Domingo Prefecture, and Dr. Simón Strider Hospital in Azua Prefecture.

Sixty-eight percent of the doctors, nurses, technicians, students, and administrative personnel of the Dr. Luís E. Aybar hospital complex know that a team of Japanese experts has been assisting the Dominican personnel continuously since 1999. In that sense, populations outside the hospital complex still think that the Japanese team remains there, which is one indicator demonstrating the level of CEMADOJA's institutional development.

- c. Strengthening the institutional relationship among the health sector, universities, and SESPAS through CEMADOJA

The radiology residency program and diagnostic imaging provided by CEMADOJA have strengthened the institutional relationship among different health care institutions and national universities, enabling doctors to carry out their specialty in the country, which was not possible before the existence of the project.

4.1.4 Academic and technological impact

a. Increase of medical services offers

Public health care has been modernized by technological improvement of imaging services through the establishment of CEMADOJA at the Dr. Luís E. Aybar hospital complex, which has also allowed people access to radiological studies no matter what their economic and social conditions; however, it is also recognized that some equipment needs to be upgraded or updated in order to provide better quality diagnostic imaging.

b. Improvement in technical skills

The permanent education and training activities at CEMADOJA for resident doctors, nurses, radiology technicians, and administrative personnel have enabled them to expand their technical skills; these effects are reflected in the quality of services offered.

CEMADOJA authorities believe that technological transfer by Japanese experts has been necessary in all components of the project, including construction and equipment at CEMADOJA and technical training for Dominican personnel both in the country and at the Oita University, under the assistance of the Japan International Cooperation Agency (JICA). In general, the authorities believe that this cooperation was very worthwhile in terms of usefulness and quality.

c. Expansion of development of medical specialists

According to the doctors interviewed, maintaining education and training programs has been one of the most important positive factors since the last evaluation of the project, because they have acquired and updated their knowledge in different fields of medicine.

In that sense, 14% of the doctors, professors, students, and nurses reported that education and research programs in the field of imaging radiology at CEMADOJA are “excellent,” 37% consider it “very good,” 45% “good,” and the remaining 4% qualified it as “adequate.” As can be seen, the education program is considered “good” or “excellent” by 96% of participants, which coincides with the opinions of the doctors interviewed. **Figure 7** shows the results of the evaluation of education and research activities in the field of diagnostic imaging.

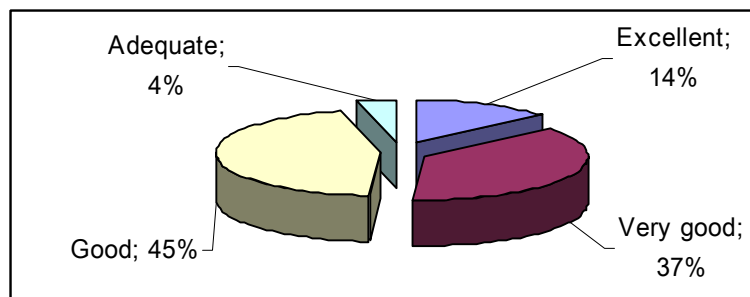


Figure 7 Specialization and Research in Diagnostic Imaging

Similarly, concerning the education and research programs in public health and epidemiology, 11% of the doctors, students, professors, and nurses consider them “excellent,” 24% qualified them as “very good” and 48% “good,” while the remaining 17% qualified them as “adequate.”

These results guarantee effectiveness in such important fields as the epidemiological surveillance of illnesses like dengue fever, leptospirosis, and others. **Figure 8** shows the results of the assessment on education activities in the fields of public health and epidemiology.

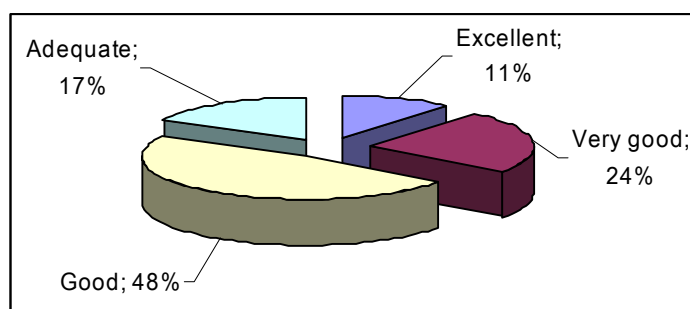


Figure 8 Training and Specialization in Public Health and Epidemiology

It is important to mention that CEMADOJA has produced a great impact at the level of health policies in the country by inclusion for the first time in the Dominican Republic of a medical residency in family-community medicine, which has been promoted by SESPAS and supported, in an indirect way, by the imaging and laboratory facilities of CEMADOJA as well as by CEMADOJA’s administrative and technical infrastructure. This program significantly benefits the population through preventive-medicine programs as established in the Social Security Act 87-01 and the National Health System Act 42-01.

Seventy-eight percent of the doctors interviewed in the hospital complex believe that CEMADOJA uses adequate equipment, although some devices have reached their maximum capacity and are currently obsolete in relation to the technological advances of recent years.



During the period since the last evaluation of the project, CEMADOJA acquired with its own funds a magnetic resonance imaging system and a fluoroscope to continue improving the quality and coverage of the services offered to patients.

Of the doctors interviewed, 67% reported that continuous education brought the main benefit and a greater impact at an individual level, also increasing CEMADOJA work opportunities and income. **Figure 9** shows the benefits perceived by doctors since the last evaluation. Thirteen percent reported their income has increased, while 20% have access to other work opportunities, since they can offer their services in other private and public health centers.

Similarly, as for the benefits obtained at CEMADOJA since the last evaluation, 41% of the doctors reported continuous education as a major benefit; 22% pointed to upgrading of some of the equipment at CEMADOJA; 17% to the continuity of research activities; 17% to an increase in personnel; 5% to institutional benefits such as assignment of personnel; 5% to the acquisition of new equipment; and finally 3% mentioned other effects not specified. **Figure 10** outlines the benefits of CEMADOJA since the last evaluation.

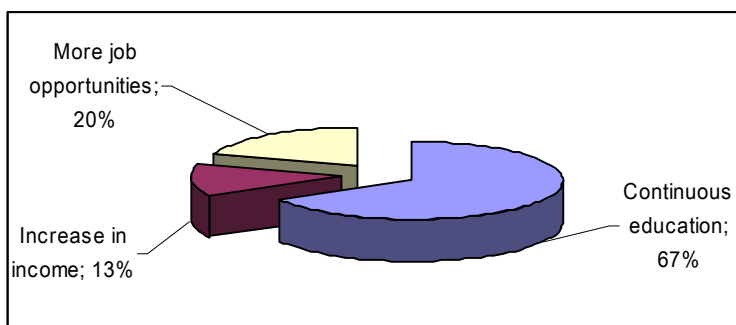


Figure 9 Benefits Perceived by Doctors Since the Last Evaluation

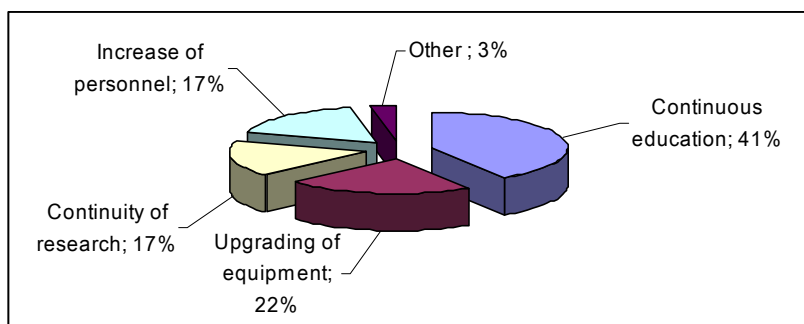


Figure 10 Benefits Perceived by CEMADOJA Since the Last Evaluation

- d. CEMADOJA is utilized as the training institution for imaging radiology within a JICA triangular cooperation scheme.

For participants in the Third International Course on Diagnostic Imaging for Radiologist and Radiology Technicians in Central America and the Caribbean, the training program is highly beneficial because they have the opportunity to improve and update their medical skills. It has been a great opportunity for them to be trained at CEMADOJA, since in their home countries some of the equipment has not yet been introduced.



4.1.5 Economic impact

Japanese cooperation in CEMADOJA has an economic impact that is reflected at the level of three main groups: SESPAS, CEMADOJA, and the doctors and users of services.

a. Economic impact on SESPAS

The economic impact at the level of SESPAS is observed as financial savings for not having to make necessary investments due to JICA assuming the cost of construction and equipment without any cost to the Dominican state, as well as saving the resources for training personnel in national health sector, together representing a savings of funds that can be invested in other fields or in necessities for development.

b. Economic impact on CEMADOJA

With investment into equipment, CEMADOJA increased its income, in spite of the fact that patients pay just a minimum rate for services, from a total revenue of RD\$1,212,287.50 (US\$67,349) in 2000 to a revenue of RD\$47,297,115.90 (US\$1,422,470) in 2007. This has enabled CEMADOJA to self-finance its activities and acquire high-quality equipment such as a magnetic resonance imaging device.

c. Economic impact on the doctors

The doctors who specialized at CEMADOJA have an economic impact that is reflected in an increase in their incomes as a consequence of the specialization received at CEMADOJA in the field of imaging radiology and the opportunity to familiarize themselves with new equipment. This has enabled CEMADOJA to increase service opportunities for other public and private centers.

d. Economic impact on families

Finally, another direct economic impact at the level of CEMADOJA is reflected in significant savings in the health care expenses of patients and their families, as the service cost is considered acceptable and is lower than in the private sector.

Summary of impacts observed during the 2005–2007 period

Impact	Main Goals of the Project
Institutional impact	<ol style="list-style-type: none"> 1 Strengthening the third level of medical care at the Dr. Luís E. Aybar Hospital, other hospitals, and private clinics and at the level of the national health system 2 Strengthening the model of hospital management 3 Strengthening the interinstitutional relationship among different agents in the health sector in cooperation with the universities and SESPAS through CEMADOJA
Technological and academic impact	<ol style="list-style-type: none"> 1 Expansion of medical services offered by CEMADOJA through laboratory analysis and diagnoses with high-quality images 2 Increase in technical knowledge of medical and teaching personnel in the field of imaging radiology 3 Effective assimilation of medical technology that has been transferred 4 Expansion of the delivery of medical specialists in imaging radiology and contribution to other specialties, such as family-community medicine and epidemiology 5 CEMADOJA is utilized as a training institution in diagnostic imaging for radiology technicians and doctors from Central America and the Caribbean under JICA triangular cooperation.
Social impact	<ol style="list-style-type: none"> 1 Access to CEMADOJA services by the low-income population 2 Contribution of CEMADOJA to the progress of Dominican medicine 3 Improvement in the quality of life of CEMADOJA patients
Economic impact	<ol style="list-style-type: none"> 1 Service costs of imaging studies and laboratory analysis are at accessible levels for CEMADOJA patients. 2 Increase in the incomes and work opportunities for doctors and technical personnel 3 Reduction in family health expenses for patients 4 Increase in CEMADOJA income levels through the concept of service rates, with which they have been able to handle the financial deficit in the budget provided by SESPAS

4.2 Sustainability

4.2.1 Perspectives on sustainability

The sustainability of CEMADOJA is measured by the probability of it supporting activities or impacts achieved after Japan's technical cooperation is finished. Sustainability is measured from organizational, financial, technical, and administrative points of view.

Whether the project objectives have been maintained has been verified since the last evaluation in 2004, when the Japanese mission completed its commitment. Whether CEMADOJA has maintained the benefits obtained as a result of the achievement of the project's purpose and main goals has also been determined.

4.2.2 Organizational aspects

a. SESPAS as supervising organization

CEMADOJA is under the supervisory functions of the Ministry of Public Health and Social Welfare (SESPAS), the executing agency of the project under the direction and administration of Japanese experts from Oita University and the local office of JICA in the Dominican Republic.

CEMADOJA administrative personnel are designated by SESPAS in coordination with CEMADOJA authorities and the board of directors of the Dr. Luís E. Aybar hospital complex. These designations are generally carried out every four years when there are changes in political parties or in the government in power. These changes cause uncertainty among personnel of all public institutions, especially those in management fields, and this affects institutional sustainability.

b. Integration into the Dr. Luís E. Aybar hospital complex

CEMADOJA is one of the medical centers of the Dr. Luís E. Aybar hospital complex, which is responsible for supervising the activities of CEMADOJA through its board of directors. The institution has executive and administrative staff as well as technical staff comprising doctors, radiology technicians, resident doctors, nurses, laboratory technicians, and diagnostic imaging specialists.

4.2.3 Financial aspects

Budget from SESPAS and proper financial resources

CEMADOJA receives an annual subsidy from the national budget through SESPAS, in an amount varying from RD\$19,952,469.16 (US\$1,108,471) in 2000 to RD\$21,674,250 (US\$651,857) in 2007. This apparent reduction itself has been due to the devaluation of the local currency in relation to the U.S. dollar.

In addition, the institution has income through providing imaging radiology services ranging from RD\$1,212,287.50 (US\$67,349) in 2000 to RD\$47,297,115.90 (US\$ 1,422,470) in 2007.

Nevertheless, according to financial reports and interviews with CEMADOJA executives, this income is not sufficient to cover administrative and general expenses: payment of salaries, purchase of materials and supplies, computers, and maintenance of medical equipment and physical facilities. Annex 10 shows the income of CEMADOJA during the 2000–2007 period.

As a consequence of financial limitations, CEMADOJA authorities have eliminated a reserve fund that was created as suggested during the period of Japanese cooperation for the purpose of upgrading and maintaining equipment. This situation affects the financial sustainability of the CEMADOJA project.

The administrative and medical authorities have negotiated an increase in the government subsidy to CEMADOJA with all of the SESPAS administrations in order to maintain a financial balance in healthy conditions, but this has not been possible. A lack of resources can be an obstacle to the growth and development of the services offered by CEMADOJA.

Similarly, epidemiological research has been discontinued, and on some occasions the International Course in Imaging Radiology has encountered difficulties because of delays in the financial incentives that must be provided by SESPAS.

The lack of an increase in the annual budget from SESPAS, despite it being revised each year, is one of the main factors that threaten the sustainability of CEMADOJA, which requires financial resources that cannot be satisfied by income from services.

4.2.4 Technical aspects

a. Maintenance of medical equipment

The equipment at CEMADOJA, in general, is in acceptable condition; nevertheless, as has been indicated, some devices require upgrading or updating to avoid deterioration in the quality and coverage of services, and to reduce the time patients wait for imaging studies. In that sense, CEMADOJA authorities have executed a good program of maintenance and management of the equipment to maintain a good quality of service, but financial difficulties have not enabled them to do such upgrading satisfactorily, which means they cannot improve nor strengthen the quality and efficiency of services.

b. Equipment upgrades

The continuous use of imaging devices as a consequence of the great demand for this kind of service has exceeded their maximum capacity. Additionally, due to progress in medical technology, there is more demand to upgrade medical imaging equipment in order to strengthen technical sustainability. Nevertheless, with its own funds CEMADOJA has acquired a magnetic resonance imaging system.

The computer system installed at CEMADOJA through Japanese cooperation has already exhausted its useful life, which has generated the need to acquire another server with major capacity to store all the reference documentation accumulated by CEMADOJA, including radiological images. CEMADOJA administration has projected making necessary arrangements for updating the computer system.

c. Technology transfer

The laboratory at CEMADOJA is in the process of being declared a national reference laboratory at the recommendation of the local office of the Pan-American Health Organization in the country (OPS/OMS) and SESPAS to analyze the prevalence and the morbidity influence of some kinds of viruses, such as dengue fever in its different variations and the human influenza virus.

Nevertheless, SESPAS authorities have not completed the necessary process of authorization and accreditation by issuing a resolution, as established in the international protocol. The lack of financial support for this verification due to the complexity of the procedure has created more difficulty.

The computerized tomography system acquired in the local market and the two electric generators have suffered maintenance problems, principally because of the delay in service compliance and obligations by local dealers or providers, consequently affecting imaging services to patients. Annex 11 outlines the imaging equipment and its current conditions of use.

The transfer of basic technology was completed through Japanese cooperation in each field of the project. Currently the doctors at CEMADOJA keep themselves updated on scientific and technological progress in their specialized fields through national and international seminars, conferences, training courses, and teaching activities, especially for resident doctors.

Epidemiological research has not continued because of a lack of resources to purchase necessary reagents, but the thesis advisory service has continued with the support of the CEMADOJA public health laboratory and imaging department for medical students and resident doctors at undergraduate and graduate academic levels, respectively.

4.2.5 Administrative aspects

Stability of human resources

Since CEMADOJA's creation, the number of employees has increased slightly, from 144 in 2000 to 150 currently; however, we can say that practically the same number of employees has been maintained during this period. It is recommended that qualified staff be kept for more than four years in order to assure the sustainability of the project.

4.2.6 Factors that have complicated sustainability of the project

The following factors were identified by this postexecution evaluation and through interviews with the doctors and other key CEMADOJA individuals:

- The budget freeze imposed by SESPAS on CEMADOJA
- A lack of stability in trained or qualified staff beyond a period of four years
- Utilization of the financial fund for maintenance and upgrading of equipment
- Lack of upgrading of imaging and computer equipment
- Research activities discontinued because of a lack of financial resources for the acquisition of reagents and for subscriptions to medical publications
- Definition of the status of employees who are not protected by the Civil Service and Administrative Career Act

Summary of Sustainability

Sustainability	Main Goals of the Project
Organizational aspects	1 SESPAS as supervising organization 2 Integration of CEMADOJA into the Dr. Luís E. Aybar hospital complex
Financial aspects	1 Budgetary allocation by SESPAS 2 Revenue generation from services
Technical aspects	1 Maintenance of equipment 2 Upgrading of equipment 3 Transfer of technology
Administrative aspects	1 Stability of human resources

¹ The exchange rate in 2000 was RD\$16 to US\$1, while in 2007 it was RD\$32 to US\$1.

5. Conclusions, Recommendations and Lessons Learned

5.1 Conclusions

Analysis of the CEMADOJA postevaluation has been focused on determining the impact and sustainability of project activities during the 2004–2007 period. Following are the findings related to the impact and sustainability of the project.

5.1.1 Impact

The establishment of CEMADOJA has reached the project's main goal to strengthen the national medical education system with the addition of imaging radiology as a medical specialty for physicians and technicians at the Dr. Luís E. Aybar hospital complex. Additionally, the provision of services in diagnostic imaging and laboratory tests has been included for patients of the complex, which has been extended to the general low-income population.

CEMADOJA's activities have had a social impact. Patients who come to CEMADOJA are among the poorest part of the population, come from different localities, and are referred there by several public and private medical centers, taking the opportunity to obtain modern imaging services that were previously almost impossible for them to afford.

From the institutional and scientific point of view, there are moves to declare and enable the CEMADOJA laboratory as a national reference laboratory for the Pan-American Health Organization, a regional agency of the World Health Organization (OPS/OMS) and SESPAS, with the purpose of investigating and analyzing the prevalence of tropical diseases like dengue fever in its different varieties as well as influenza in humans. Like CEMADOJA, the Gastroenterology Center has taken the same path as a reference for the implementation of the Basic Health Plan in the three regimes as stipulated in the Social Security Act 87-01.

CEMADOJA is also considered the hub of a JICA triangular cooperation project in coordination with Central American and Caribbean countries in medical education in the field of imaging.

The results of research in the field of epidemiology, family-community medicine, and laboratory analysis to determine the prevalence of vector-transmitted diseases and other matters have been announced both at the Health and Hygiene City hospital complex and to the national and international medical community. The research results transcend borders, which has encouraged the development of medical institutions in the country.

The 22 specialists who have graduated from CEMADOJA in the field of radiology are working in different public hospitals and private clinics, thus strengthening the national health system.

The quality, name, and status of CEMADOJA have transcended other borders as a result of the success of the project, since international training courses in diagnostic imaging have been developed at CEMADOJA for doctors and technicians from Central America and the Caribbean.

In conclusion, CEMADOJA has had an impact on the project's goals and objectives since the last assessment; it has helped to strengthen education in the national medical community. It has especially benefited people at the lowest income level in the treatment of various diseases through clinical diagnostic imaging and laboratory analysis.

5.1.2 Sustainability

CEMADOJA has maintained all its training and education programs from their inception, as well as imaging services to inpatients and outpatients of the Health and Hygiene City hospital complex, with the exception of the research activities, which have not been continued to the degree desired due to a lack of financial resources. All this means that profits have been maintained as a result of the achievement of goals since the final assessment.

The influx of patients to CEMADOJA has seen a growth trend, reaching a total of 129,003 services during 2005–2007, representing an increase of 64% in services provided over the 2000–2004 period. This increase in the coverage of services has enabled CEMADOJA to obtain additional revenue by charging for services, used for the purchase of new equipment and operational activities, over the budget allocation that so far has remained flat since 2000.

The reduction in the budget allocation from SESPAS is the main factor that puts the sustainability of the project at risk. This reduction limits the upgrading of imaging equipment to increase responsiveness to the services required by patients, which in turn ensures increased income by allowing fees to be charged to patients and thus ensuring the permanence of the project.

To strengthen the administrative and institutional sustainability of CEMADOJA, efforts should be made to keep trained and qualified personnel through changes in government.

5.2 Recommendations

The authorities of the Ministry of Public Health and Social Welfare, the governing council of the Dr. Luis E. Aybar Health and Hygiene City hospital complex, and the management and administrative sections of CEMADOJA must take the following measures.

- a. Procure a larger budget for CEMADOJA to ensure the permanence of the services offered in all areas and to maintain continuity of educational programs, research, and the upgrading and updating of medical equipment, computers, and electric generators.
- b. Establish a more effective plan for maintenance and upgrading of equipment to prevent progressive deterioration and thereby ensure a better quality of service in diagnostic imaging.
- c. Establish an integrated financial management system to keep constantly updated records in order to establish the real costs of medical services to make expenditure efficient.
- d. In coordination with the authorities, create a Support Board at CEMADOJA with the objective of procuring additional resources or funds to enable CEMADOJA to expand services to the beneficiary population and strengthen the various programs developed at the institution, without the need to increase services charges to the public.
- e. Strengthen collaboration and interdepartmental communication at CEMADOJA and the hospital complex to improve quality and service.
- f. Expand service delivery agreements with public and private centers to ensure CEMADOJA's financial sustainability, as set forth in the Social Security Act 87-01.
- g. Replenish the reserve fund that existed previously for maintenance, upgrading, and expansion of CEMADOJA's equipment.

- h. Modernize the medical records database through expansion and improvement of the system's abilities.
- i. Incorporate the employees of CEMADOJA under the Civil Service and Administrative Careers Act 14-91 to ensure the retention of qualified personnel and the strengthening of institutional sustainability.

5.3 Lessons learned from the Project for JICA

The project has impacts that greatly strengthen the national health education system as well as private-sector institutions as a result of improving the quality of human resources.

There is the possibility of making use of CEMADOJA's experience so that the doctors trained there participate in triangular cooperation programs with countries in Central America and the Caribbean.

The efforts of Japanese cooperation in CEMADOJA have a multiplier effect on the national medical education system, and CEMADOJA has become a specialized center of medical residency and of third-level medical care in the fields of diagnostic imaging and family-community medicine in coordination with universities.

CEMADOJA's investment in imaging equipment has strengthened the institutions of the health sector through the training of human resources as well as technology transfer, which has helped to improve the quality of life of patients who visit CEMADOJA.

ANNEXES

- Annex 1. Evaluation Matrix
- Annex 2. Coverage of Services, 2000–2007
- Annex 3. Research, Training, and Teaching Activities
at the CEMADOJA Laboratory, 2000–2007
- Annex 4. Participation in Scientific Events, 2000–2007
- Annex 5. Graduating Radiologists, 2005–2007
- Annex 6. Participants in the International Course on Diagnostic Imaging,
2005–2007
- Annex 7. Theses for Undergraduate and Postgraduate Degrees
Supported by the CEMADOJA Laboratory
- Annex 8. Occupation or Profession of CEMADOJA Patients
- Annex 9. Monthly Income Levels of CEMADOJA Patients (RD\$)

Image 1. Radiology technicians from Central America and the Dominican Republic participating in the Third International Course on Imaging Radiology at CEMADOJA, February 2008



Image 2. Radiologists from Central America and the Dominican Republic participating in the Third International Course on Imaging Radiology at CEMADOJA, February 2008

Annex 1. Evaluation Matrix

Criteria	Evaluation Questions		Measuring Indicators	Necessity of Data	Data Source	Method of Data Gathering	
	Main Questions	Secondary Questions					
Impact		What is the daily average number of patients who visit CEMADOJA?	Comparing reports to verify the number of the patients before and after the execution of the project	Number of patients visiting at the end of the project and currently	CEMADOJA reports, documents, records	Review of reports and available statistics	
		What type of patients benefit from the project economically? Where are those patients from? Do they come from the local area or from the entire country?	Comparing reports and data of the current period by region and social class	Number of patients by social class and hometown	CEMADOJA and SESPAS reports, documents, and records, as well as the surveys of patients	Review of reports and analysis of survey results	
		Have medical education activities been conducted for staff and resident doctors? How often?	Comparing reports and the results of interviews with and questionnaires distributed to the doctors	Number of training courses for medical doctors (radiologists) and resident doctors held at CEMADOJA or elsewhere; frequency of implementation	Number of training courses for medical doctors (radiologists) and resident doctors held at CEMADOJA or elsewhere; frequency of implementation	CEMADOJA and SESPAS reports, interviews with and questionnaires distributed to the doctors	Review of reports and analysis of the results of interviews and the survey
		Is the ratio of the number of patients visiting CEMADOJA to the number of medical doctors suitable?	Comparing reports of CEMADOJA/SESPAS and the results of interviews with the doctors and auxiliary staff	Number of patients visiting, and number of doctors working at CEMADOJA	Number of patients visiting, and number of doctors working at CEMADOJA	CEMADOJA and SESPAS reports, interviews with the doctors	Review of reports and analysis of interview results
		How many resident doctors completed their specialties after the project concluded?	Comparing reports made before and since the execution of the project	Number of resident doctors who graduated before and since the project	Number of resident doctors who graduated before and since the project	CEMADOJA and SESPAS reports	Review of reports and analysis
		How many specialized courses have been conducted since the evaluation of the project, and how often?	Comparing reports and the results of interviews with the doctors	Number of courses, workshops, and seminars by career and frequency of implementation	Number of courses, workshops, and seminars by career and frequency of implementation	CEMADOJA reports	Review of reports

	How much and what kind of research has been conducted since the final evaluation of the project, and how often?	Idem	Number of research projects by area and frequency of implementation	CEMADOJA reports and interviews with the doctors	Review of reports and analysis of interview results
	What kinds of methods have been utilized to disseminate the results of research conducted by CEMADOJA staff?	Comparing reports and the results of interviews with doctors	Number of the research reports presented or published outside CEMADOJA	Idem	Idem
	Has a balance between the research, education, and clinical service of CEMADOJA been maintained? If not, why?	Comparing reports and the results of interviews	Number of research projects by area	Idem	Idem
2. Have any positive or negative effects been observed in the project since the final evaluation, beyond those estimated initially?	What kinds of positive effects have been observed since the project evaluation?	Results of reports and interviews with doctors inside and outside CEMADOJA	Positive effects observed	Reports, results of interviews with doctors from CEMADOJA and the CMD	Review of reports and analysis of survey results
	What kinds of negative effects have been observed since the project evaluation?	Idem	Types of negative effects (ambulance noise, transit congestion, agglomeration of people, disposition of waste, etc.)	Idem	Idem
3. Has the project obstructed development of private medical establishments?	How many doctors and auxiliaries from the private sector have been trained by the project?	Comparing the results of reports, interviews with, and surveys of doctors	Number of trained doctors and auxiliaries from the private sector	Reports, results of interviews with doctors from CEMADOJA and the CMD	Review of reports and results of interviews and surveys
	How many patients have been referred to CEMADOJA from private hospitals?	Comparing reports, results of interviews with CEMADOJA doctors and others in the private sector, as well as results of surveys of patients	Number of patients referred from private hospitals	Reports, surveys of patients, interviews with doctors from CEMADOJA and the CMD	Idem
	Are the results of research known in the private sector?	Comparing reports and theresults of interviews with doctors at CEMADOJA and in the private sector	Media used to disclose the results	Idem	Idem

Impact

	Has the number of patients who go to private hospitals decreased because of the existence of CEMADOJA?	Idem	Number of the patients of CEMADOJA referred by private hospitals	Reports; results of interviews with doctors from CEMADOJA and the CMD	Idem
4. Among the positive changes, how has the implementation of the project improved the economic and social status or level of the target group?		Comparing reports and the results of interviews with and surveys of doctor inside and outside CEMADOJA	Number of trained doctors and changes in their income levels	Reports and interview results	Idem
5. Has the project contributed to improving the institutional capacity of the Dr. Luis E. Aybar Health and Hygiene City hospital complex?	Has the transfer of technology to the Health and Hygiene City hospital complex been helpful?	Comparing reports, results of interviews with and surveys of doctors and administrative staff	Quality of services, reduction of days/appointment intervals, timely provision of medical services	Reports, survey and interview results	Review of reports and analysis of survey and interview results
	Has the Health and Hygiene City hospital complex become stronger in technology, research, and training aspects through the execution of the project?	Comparing reports and results of interviews with doctors from the Health and Hygiene City hospital complex	Quantity of patients transferred by the hospital, quantity of trained doctors from the hospital by project, and utility of the research done	Idem	Idem
6. Has the project contributed negatively to the promotion of the natural environment and social development?	Does waste control for CEMADOJA follow the environmental norms of the country?	Comparing existing reports and interview and survey results of doctors and the population	Control method and garbage	Reports, survey and interviews results	Review of reports and analysis of survey and interview results
	Has the existence of CEMADOJA caused problems or difficulties for the normal development of local activities in its neighborhood?	Idem	Number of people affected, number of negative effects (ambulance noise, transit congestion, agglomeration of people, waste, etc.)	Idem	Idem
7. What are the activities of participants in CEMADOJA's medical education program?	Where are the doctors who have been trained at CEMADOJA working?	Comparing reports and the results of surveys of patients and doctors of the Health and Hygiene City hospital complex	Distribution of doctors by region	Idem	Idem

Impact

Impact	8. Is the hospital service offered to everyone, or is any population group excluded?	What kinds of patients are visiting CEMADOJA?	Comparing reports and the results of surveys of patients and doctors of the Health and Hygiene City hospital complex	Users' social class	Idem	Idem
	9. What negative changes have been caused for beneficiaries, including minorities and vulnerable groups?		Comparing reports and the results of surveys of users and doctors from the Health and Hygiene City hospital complex and from the CMD	Opinions about events or decisions taken	Idem	Idem
	10. Are there other negative factors that have affected the main objectives of the project?		Results of interviews with and surveys of doctors from CEMADOJA	Opinions about changes in health sector policies, budget assignments, administrative and executive staff assignments	Idem	Idem
Sustainability	1. Has CEMADOJA maintained the benefits obtained as a result of achieving the main purpose of the project and other goals?	Has the average daily number of patients visiting CEMADOJA been maintained at the same level as before? If not, why?	Comparing reports and interview results	Number of patients visiting (laboratory analysis, ambulatory patients, hospitalization, and others), number of studies, diagnoses, and causes by type of imaging study	Reports and interview results	Review of reports and analysis of interview results
Have the services offered by CEMADOJA been maintained in terms of coverage?		Relationships in report and interview results, and interviews with doctors	Number of patients visiting by activity	Reports, interviews, surveys	Review of reports, analysis of interview results and surveys	
Has the number of activities and services at CEMADOJA been maintained? In which ways?		Relationships in report results and results of interview with doctors	Number of studies conducted and methods used	Reports and interviews	Review of reports and analysis of interview results	
Has medical knowledge been updated since implementation of the project? Have training activities for the medical staff been continuing? How has this been done?		Idem	Number of doctors trained since conclusion of the project	Reports and interviews with doctors	Idem	

2. Has the system created by the project been expanded?	Have these activities and services been continued through the support of SESPAS in relation to annual budget allocation and human resources assignments?	Idem	Training for foreign doctors	Idem	Idem
3. In which ways have SESPAS and CEMADOJA maintained the activities and services implemented by the project?	Has SESPAS upgraded some of the equipment? How has maintenance of the equipment been conducted?	Comparing reports and results of interviews with doctors	Annual budget allocation and assignment of required personnel Equipment inventory Equipment inventory, maintenance plan, and conditions	Reports and interviews	Review of reports and analysis of interview results
4. Have the results of the project been maintained since the conclusion of cooperation?		Idem	Number of services offered, patients visiting, workshops held; budget behavior after termination of the project	Reports, surveys, and interviews with doctors	Idem
5. What are the factors that have contributed or not to the sustainability of the project?	Has the minimum number of doctors been maintained to achieve CEMADOJA's essential tasks? What difficulties are in the way of guaranteeing the project's sustainability?	Idem	Number of contracted doctors and number of vacant positions Annual budget allocation and frequency of personnel changes	Idem	Idem
6. Do you consider the results achieved during the last seven years reasonable in terms of financial investment?	Has mortality by disease been reduced? The cost-effect relationship? Number of services provided by CEMADOJA since the execution of the project	Idem	Number of patients, number of patients hospitalized and dispatched; number of patient deaths	Idem	Idem

Sustainability

Annex 2. Coverage of Services, 2000–2007

Type of Study	a	b	c	d	e	f	g=f/5	h	i	j	k	l=k/3	m=l-g	n	o=(l/f) 100
	2000	2001	2002	2003	2004	TOTAL 2000–2004	Average annual	2005	2006	2007	TOTAL 2005–2007	Average annual	Variation absolute	TOTAL 2000–2007	%
Conventional X-ray	2,512	9,338	9,658	9,107	9,414	40,029	8,006	11,753	11,117	9,480	32,350	10,783	2,778	72,379	35
Computerized tomography	772	6,003	8,932	9,757	9,940	35,404	7,081	10,357	11,249	12,171	33,777	11,259	4,178	69,181	59
Sonography	1,507	10,636	11,727	12,431	12,150	48,451	9,690	15,118	17,590	18,698	51,406	17,135	7,445	99,857	77
Mammography	33	892	1,275	1,255	1,107	4,562	912	1,584	1,661	1,877	5,122	1,707	795	9,384	87
Urography	15	307	493	537	408	1,760	352	567	579	541	1,687	562	210	3,447	60
Magnetic resonance imaging*					609	609	122	1,095	1,526	1,594	4,215	1,405	1,283	4,824	1,054
Biopsy guided by CT							0	35	66	56	157	52	52	157	
Biopsy guided by US	3	95	123	87	74	382	76	15	7	10	32	11	-66	414	-86
Drainage							0	3	7	6	16	5	5	16	
Mielo CT					15	15	3		11	6	17	6	3	32	89
Fluoroscopy										116	116	39	39	116	
Electrocardiogram										108	108	36	36	108	
Total	4,842	27,271	32,208	33,174	33,717	131,212	26,242	40,527	43,813	44,663	129,003	43,001	16,759		64

Source: CEMADOJA Statistics Department, 2008

*Acquisition of new equipment by CEMADOJA with its own resources

Annex 3. Research, Training, and Teaching Activities at the CEMADOJA Laboratory, 2000–2007

Research Activities

1. Seroprevalence of dengue IgG antibodies in poor neighborhoods of Santo Domingo, 2000 (512 samples). This study was presented at the Seminar on Gastroenterology at the Fourth Congress by Dr. Maireni Cabral, March 2001.
2. Research on dengue IgG antibodies in six provinces: San Pedro de Macoris, La Romana, Baní, La Vega, Santiago, and Samana (4,422 samples). Presented at the Second International Seminar on Medical Education by Dr. Makino Yoshihiro, August 2001. With this research an article was prepared titled “Seroepidemiology of Dengue and Assessment of Public Awareness in the Dominican Republic,” published in the journal *Tropical Medicine and Health* Vol. 32.4, 2004, pp. 305–309, copyright (c) 2004 by the Japanese Society of Tropical Medicine.
3. Research on dengue IgG antibodies in donors in different blood banks in Santo Domingo (1,008 samples), 2002, presented at the 11th Congress of Clinical Laboratory Professionals.
4. Study on seroprevalence of IgG dengue in children under age 10 (200 samples), 2002. With these investigations (3, 4) an article titled “Seroprevalence of Specific IgG for Adults and Dengue Virus Among Children in Santo Domingo, Dominican Republic,” was published in the journal *American Journal of Tropical Medicine and Hygiene*, 71 (2) 2004, pp. 138–143, copyright by the American Society of Tropical Medicine and Hygiene.
5. Study of seroprevalence of IgG-IgM of *Helicobacter pylori* in apparently healthy people in poor neighborhoods of Santo Domingo, San Pedro de Macoris, and Santiago (1,136 samples), 2001–2002.
6. Investigation of antiseptics used in the field of ophthalmology, presented at the Ophthalmology Congress at Dr. Luis E. Aybar Hospital, 2002.
7. Investigation of genotypes of hepatitis B (70 patients), 2003, presented by Dr. Sanchez Limardo at the First Science Congress at Dr. Luis E. Aybar Health and Hygiene City, 2005.
8. Research on the levels of cortisol in burn patients, conducted by the ELISA technique, 2003 (thesis in anesthesiology).
9. Determination of antibodies that neutralize different serotypes of dengue virus (103 samples), 2003.
10. Identification of dengue fever serotypes within 3 days by the PCR technique (387 samples), 2003–2004. Presented at the Fifth International Seminar on Medical Education at the Second Central American and Caribbean Congress on Infectious Diseases and the Third Dominican Congress on Infectious Diseases.
11. Antibody research LGM–*Helicobacter pylori* IgG in patients at CEMADOJA for gastroenterology (79 patients), 2002–2004.

12. Determination of different serotypes of dengue by immunofluorescence methods in pediatric patients of the Dr. Luís E. Aybar Hospital (100 samples), 2004. Thesis for doctorate of medicine, Pedro Henriquez Urena National University (UNPHU).
13. Investigation of IgM antibodies–IgG–LGA of *Helicobacter pylori* in apparently healthy children (200 samples), 2004.
14. Seroprevalence of HTLV-1 antibodies, Dominican Republic (4,007 samples), 2004, presented at the Fifth International Seminar on Medical Education at the Second Central American and Caribbean Congress on Infectious Diseases and the Third Dominican Congress on Infectious Diseases.
15. Infectious agents in acute gastroenteritis in children in the pediatric emergency unit of the Dr. Luís E. Aybar Hospital (200 samples), 2004, presented at the Fifth International Seminar on Medical Education.
16. Determination of serotypes of dengue immunofluorescence LGM in patients positive for dengue in the Dominican Republic, 2004–2006. Presented at the Scientific Conference of the Autonomous University of Santo Domingo (UASD), and prepared for publication in the UASD journal, 2006.
17. Isolation and identification of influenza virus in humans and other respiratory viruses in children in the pediatric emergency unit of Dr. Luís E. Aybar Hospital. 440 samples were analyzed by immunofluorescence techniques, cell culture, and hemagglutination from 2005 to 2007. This study is the product of the observation point in emergency pediatrics at Dr. Luís E. Aybar Hospital, selected by OPS/OMS in 2005.
18. Investigation of *Helicobacter pylori* in adults, adolescents, and children under age 15, with and without symptoms. 276 children, 400 teens, and 296 adults; total of 972 samples. This study was presented at the Seventh International Seminar on medical education at CEMADOJA, 2006. This study was prepared for publication as an article for a Japanese magazine.
19. Isolation and identification of Candidiasis and other agents that cause bacterial infections in pregnant women visiting the Gynecology Department at the Dr Luís E. Aybar Hospital (82 samples), 2005. Degree thesis for bioanalysis technician, UASD.
20. Blood cultures in pediatric patients with pneumonia in the area of the Dr. Luís E. Aybar Pediatrics Hospital (85 samples), August–October 2005. Thesis for specialization in pediatrics.
21. Isolation and identification of bacterial agents causing pharyngoamigdalitis in children in the pediatric emergency unit of the Dr. Luís E. Aybar Hospital (201 samples), 2005–2006. Thesis for specialization in pediatrics.
22. Echovirus and Coxsackie virus determination in children in the pediatric emergency unit of the Dr. Luís E. Aybar Hospital (254 samples), 2005–2006. Thesis for specialization in pediatrics, presented at the Second Congress of Dr. Luís E. Aybar Health and Hygiene City, 2007.

23. Isolation and identification of bacterial agents that cause urinary tract infections in pregnant women who visit to the Gynecology Department at the Dr. Luís E. Aybar Hospital (85 samples), 2006. Degree thesis for bioanalysis technician, UASD.
24. Investigation of seroprevalence of leptospirosis IgG antibodies by the ELISA test in apparently healthy people in different sectors of Santo Domingo (400 samples), presented at “Dengue-Leptospirosis” at the Second Congress of Dr. Luís E. Aybar Health and Hygiene City, 2007.
25. Determination of IgM antibodies–Leptospira IgG in icteric serums arriving at the CEMADOJA laboratory to test for dengue (92 samples), 2005–2006. Presented at the Second Congress of Dr. Luís E. Aybar Health City, 2007.

Samples Processed in the Laboratory, 2000–2007

1. 3,497 samples from the Dr. Luís E. Aybar Hospital, Gastroenterology Center, Moscoso Puello Hospital, and other centers in zone IV for the determining dengue IgM antibodies–IgG in febrile patients by the ELISA method.
2. 3,648 samples from the Epidemiology General Directorate (DIGEPI) for determining LGM–dengue IgG antibodies in febrile patients by the ELISA method.

Training and Participation of Laboratory Personnel in Scientific Activities, 2000–2007

1. Participation in the First Infectious Diseases Congress and the Second International Congress on Meningococcal Diseases, Dominican Republic, July 2000.
2. Participation in the seminar of Gastroenterology, Hepatology, and Nutrition with the presentation of “Dengue Antibodies in Poor Neighborhoods of Santo Domingo: A Preliminary Study,” October 2000.
3. Training in Bacteriology, Virology, and Immunology Implementation Methods and ELISA Techniques for Dengue Immunoassay with the Japanese expert Dr. Akira Shichijo for a period of nine months, 2000–2001.
4. Participation in the First Occupational Health Congress, October 2001.
5. Participation in the Second Infectious Diseases Congress sponsored by the National Tuberculosis Program and the Entomology Institute, conducted at AMD, March 2001.
6. Participation of Dr. Maireni Cabral in the Fourth Congress organized by the Dr. Luís E. Aybar Hospital, where he presented “Analysis of Dengue IgG Antibodies in Poor Neighborhoods of Santo Domingo,” March 2001.
7. Participation in the “Building the Will for Change” seminar sponsored by CERSSO and delivered by INCAT, June 2001.
8. Participation in the Second Seminar on Medical Education, “Diagnostic Imaging and Surgery in Pathologies of the Pancreas and Dengue Epidemiology,” organized by CEMADOJA, in which

- “Analysis of Dengue IgG antibodies from Different Villages in the Country: San Pedro de Macoris, La Vega, Baní, La Romana, Samana, and Santiago” was presented.
9. PCR training for laboratory technicians and epidemiologists at CEMADOJA by the Japanese expert Dr. Yoshihiro Makino during a period of four months, 2001.
 10. Training on entomological analysis techniques and extraction of DNA, RNA, PCR, and electrophoresis in mosquitoes, and entomological field surveys for three months with the Japanese expert Dr. Yuki Eshita, August–November 2001.
 11. Participation in the Sixth Dominican Congress on Infectious Diseases, November 2001.
 12. Sixth Dominican Congress on Infectious Diseases, “Diagnostic Methods in Mycology,” sponsored by the Dominican Infectious Diseases Society, November 2001.
 13. Sixth Dominican Congress on Infectious Diseases, “Schindler International Symposium on Control and Surveillance of Antimicrobial Resistance,” and the First International Symposium for Updating on HIV-AIDS Issues in the Dominican Republic, sponsored by APUA, OPS, and the Dominican Infectious Diseases Society, December 2001.
 14. Training in ELISA techniques for *Helicobacter pylori* for three months with Dr. Kazu Aoki, November 2001–March 2002.
 15. Attendance at the workshop on “Proper Handling of Samples for Disease Diagnosis in Public Health Surveillance,” sponsored by LN, Public Health, PAI, and OPS, May 2002.
 16. Participation in the workshop on the characterization of *Neisseria* sponsored by the Epidemiology Department (DIGEPI) of the National Institute of Infectious Diseases, and OPS, April 2002.
 17. Participation in the hospital epidemiology seminar sponsored by OPS and the Dominican Hospital Epidemiology Society, April 2002.
 18. Participation in the Third Seminar on Medical Education at CEMADOJA dedicated to liver pathologies, July 2002.
 19. Training in ELISA techniques for dengue for four months by the Japanese expert Dr. Tetsu Yamashiro, July–September 2002.
 20. Participation in the Eighth Seminar of the Gastroenterology Center, “Pancreatic and Biliary Tract Diseases,” September 2002.
 21. Training in preparation of publications, summaries, and statistics for dengue by the Japanese expert Dr. Aono, October–December 2002.
 22. Participation in the 11th Professional Clinical Laboratory National Congress, where “Seroprevalence of Dengue IgG in Donor Residents in the City of Santo Domingo” was presented, October 2002.

23. Workshop for the revision of the Biosecurity Rules and Procedures Handbook, sponsored by the Ministry of Public Health and Social Welfare (SESPAS) Clinical Laboratories Division, February 2003.
24. Attendance at the Training Workshop for the Diagnosis of Dengue organized by SESPAS with the Clinical Laboratories General Directorate and the Puerto Rico CDC, March 2003.
25. Attendance at the Fourth Medical Education Seminar, “Lung Pathology and Tuberculosis Epidemiology,” July 2003.
26. Five months of training in Japan on diagnostic techniques for cultivation of dengue cells and molecular biology at Oita Medical University, April–August 2003.
27. Training on viral isolation and cell culture techniques, technical hemagglutination inhibition and extraction of DNA and RNA, and PCR and gel electrophoresis in different infectious diseases by the Japanese expert and virologist Dr. Tetsuro Ono, July–December 2003.
28. Training in techniques for diagnosis of HTLV-1 antibody by immunofluorescence, September–December 2003.
29. First workshop for revision of the Bacteriology Procedures, Standards, and Techniques Handbook conducted by the SESPAS Clinical Laboratories Department, December 2003.
30. During four years of project implementation in the laboratory, coaching, training, and expert advice were provided by six Japanese experts, including two long-term (one year or more) experts, Dr. Akihisa Shichijo, 1999–2001, and Dr. Tetsuro Ono, 2003–2004. The short-term Japanese experts, who worked for four months, were Yoshihiro Makino, Yuki Eshita, Kazuo Aoki, and Tetsu Yamashiro.
31. Participation in the Influenza Surveillance, Epidemiology, and Diagnosis workshop, sponsored by OPS/OMS in Panama, 2004.
32. Training in techniques to diagnose influenza at the Malbran Institute in Argentina, sponsored by OPS/OMS, 2005.
33. “Teamwork” workshop for laboratory technicians organized by INFOTEP, July 2005.
34. Participation in the workshop for the preparation of “Influenza Pandemic Surveillance” sponsored by OPS/OMS, Atlanta, U.S., 2006.
35. Participation in more than 15 meetings organized by the National Influenza Commission to prepare a national plan for an influenza pandemic, 2005–2007.
36. Meeting with different public health authorities to deal with topics regarding the role of the CEMADOJA laboratory and its participation as a national reference center for virological surveillance of human influenza, 2005–2007.
37. Participation in the “Development and Implementation of Health, Traceability, and Retirement” training course–workshop by AgroBiotek, 2007.

38. Participation in the “Development and Implementation of an Allergens Program” training course–workshop by AgroBiotek, 2007.
39. Participation in the “Subregional Training Course on Generic Protocols for Influenza Surveillance,” San José, Costa Rica, 2007.
40. Participation in the “Cellular Culture” training course, sponsored by OPS/OMS, Argentina, 2007.
41. Participation in the workshop on identification and detection of the rubella and measles viruses by RT-PCR, Mexico, 2007.
42. Participation in the “Intrahospital Control of Infections” pregress session, Bávaro, Dominican Republic, 2007.
43. Participation in the “Control of Antibiotic Resistance” pregress session, Bávaro, Dominican Republic, 2007.
44. Participation in the 13th Pan-American Infectology Congress, Bávaro, Dominican Republic, 2007.
45. Participation in the 13th National Congress of Clinical Laboratory Professionals, where research on dengue was presented, 2007.
46. Participation in training on influenza immunofluorescence methods, supported by OPS/OMS, Panama, 2007.
47. Participation of Ms. Delfis Taveras in the National Meeting of Epidemiologists with “Official Presentation of the National Protocol for the Implementation of the Subnational System on Influenza and Other Acute Respiratory Insufficiency,” Hotel Coral Costa Caribe, Dominican Republic, 2007.
48. Participation and exposition in the “Dengue and Leptospirosis” congress held at Dr. Luís E. Aybar Health and Hygiene City hospital complex, with the presentation of three works:
 - Determination of IgM-IgG Antibodies of Dengue and Leptospirosis in Icteric Serums
 - Seroprevalence of Leptospira Antibodies IgG in Apparently Healthy Individuals
 - Determination of the Echovirus and Coxsackie Virus in Children in the Pediatric Emergency Unit of Dr. Luís E. Aybar Hospital
49. Participation in “Health and Environment Technology and Infectious Diseases Training Course,” Okinawa, Japan, 2007.
50. Practical training in the laboratory for 403 medical doctors in different specialties from different hospitals: Luís E. Aybar, Padre Billini, Moscoso Puello, Fuerzas Armadas, Hospital Central y la Vega, corresponding to 48 rotation cycles, 2000–2007, on virology, parasitology, microbiology, and diagnostic laboratory techniques.
51. Training course on the diagnosis of intestinal parasites transmitted by food with an emphasis of coccidiosis in coordination with the U.S. Centers for Disease Control and Prevention (CDC) in

- Atlanta, CEMADOJA, and UASD for 21 bioanalysis technicians from the National District, September 2000.
52. Training in PCR for Dr. Julia Vargas from the Central Veterinary Laboratory during two months, 2001.
 53. Microbiology workshop for 10 students studying to be bioanalysis technicians at the UASD Regional Center in Barahona, 2001.
 54. Visit to the laboratory and practice for 30 students of the UASD Regional Center in Santiago, 2001.
 55. Microbiological diagnosis training for 330 students attending the last semester of the course for bioanalysis technicians at UASD, 2000–2007.
 56. Training course on PCR techniques for 10 bioanalysis technicians from the Gastroenterology Center of Dr. Luís E. Aybar Hospital, 2001.
 57. Held “Discussion on Dengue” with institutions concerned with dengue fever in the Dominican Republic: DIGEPI, DIPRES, CENCET, and CEMADOJA, with the special participation of Dr. Luís Anayas, JICA Mexican expert, on the subject “Epidemiology of Dengue in Mexico,” March 2002.
 58. Held a workshop course on microbiological diagnosis at the UASD Regional Center in Barahona with the participation of 45 students in laboratory fields. The course was divided into 24 practice sections and 12 theoretical sections over three days, 28–30 July 2006.
 59. Conference on Dengue and Diagnostic Techniques for bioanalysis technicians from various national medical institutions, with 75 participants, at the Jaragua Hotel, Santo Domingo, May–July 2007.
 60. Conference on Dengue and Diagnostic Techniques for bioanalysis technicians from various national medical institutions, with 80 participants, at SESPAS, May–July 2007.
 61. Conference on Leptospirosis for bioanalysis technicians from various medical institutions, at the Dominican Association of Bioanalysis Technicians (CODOBIO), November 2007.

Source: CEMADOJA, 2008

Annex 4. Participation in Scientific Events, 2000–2007

Year	Event
2000	First Seminar on Medical Education
2001	Second International Seminar on Medical Education
2002	Third Seminar on Hepatic Pathologies and Epidemiologic Images
2003	Fourth International Seminar on Pulmonary Pathology Images
2004	Fifth International Seminar on Pediatric Radiology and Rehydration
2005	First Scientific Congress for Updating on HIV-AIDS Issues
2006	Sixth International Seminar on Progress in Family Medicine
2007	Second Scientific Congress for Updating on Dengue and Leptospirosis Issues

Source: CEMADOJA Education Department

Annex 5. Graduating Radiologists, 2005–2007

Name of Radiologist
Dr. Luciano García
Dr. Luisa Moreno
Dr. Carol Ortiz
Dr. Olga Pérez
Dr. Ramón T. Cedeno
Dr. Josué Pérez de la Cruz
Dr. Irkanya Peralta
Dr. Geila Adalgiza Ruiz
Dr. Mary Nelsy Castillo

Source: CEMADOJA Education Department

Annex 6. Participants in the International Course on Diagnostic Imaging for Radiologists and Radiology Technicians from Central America and the Caribbean

Participant	Country of Origin
1st Course: 30 January–30 March 2006	
Dr. Manuel Ortiz Mercado	El Salvador
Ana M. Ramírez Vázquez, technician	El Salvador
Dr. María Fonseca de Chacón	Guatemala
Dr. Sandra M. Caniz Milian	Guatemala
Dr. Carlos Rivera Argenal	Honduras
Wilmer A. Vásquez Méndez, technician	Honduras
Dr. Linda M. Barba Rodríguez	Nicaragua
Dr. Brenda A. Conrado Mendieta	Nicaragua
Dr. Mario Lee Escala	Panama
Nuria Mireya Batista Oda, technician	Panama
Dr. Lissette Bermúdez	Dominican Republic
Freddy Lionel Ortiz Tavarez, technician	Dominican Republic
Nurys A. de Jesús Martínez, technician	Dominican Republic
2nd Course: 29 January–2 March 2007	
Dr. Héctor A. Guido Rodríguez	El Salvador
Marta Navarro Battle, technician	El Salvador
Dr. Douglas Rafael Henry Ruiz	Guatemala
Delia Maritza Rodríguez de León, technician	Guatemala
Dr. Iris Hortensia Durán Gradiz	Honduras
Francisco José Mirena Rodríguez, technician	Honduras
Dr. Adela C. Castillo Miranda	Nicaragua
Edgar José Pérez Bermúdez, technician	Nicaragua
Dr. Sergio Andrés Landires Rojas	Panama
Cesar A. Barria del Cid, technician	Panama
Dr. Iván Amaury Piña Saldaña	Dominican Republic
Dr. Nancy Lizardo Pérez	Dominican Republic
Isramil A. Galán de la Cruz, technician	Dominican Republic
Alnerys Guzmán Mejía, technician	Dominican Republic
3rd Course: 29 January–28 February 2008	
Dr. Susi Grises Portillo Aguiar	El Salvador
Julio Cesar Rodríguez Muñoz, technician	El salvador
Dr. José Manuel Pineda Chacón	Guatemala
Nery Ernesto Acicón Torres, technician	Guatemala
Luis Rolando Delgado Velásquez, technician	Honduras
Diana Carolina Martines Montoya, technician	Honduras
Dr. Noel Francisco Cojina Obregón	Nicaragua
Carla A. Largaespada, technician	Nicaragua
Marabellys Jurado Jaén, technician	Panama
Dr. Eduardo Miguel Jacobo Cid	Dominican Republic
Dr. Luis Manuel Castillo Hernández	Dominican Republic
Luis María Aramboles, technician	Dominican Republic
Cristian Bienvenido Ramírez, technician	Dominican Republic

Source: CEMADOJA Education Department

Annex 7. Theses for Undergraduate and Postgraduate Degrees Supported by the CEMADOJA Laboratory

Year	Theses Supported
2003	Research on cortisol levels in burn patients by means of ELISA Techniques
2004	Determination of the different serotypes of dengue by immunofluorescence in patients of the Dr. Luís E. Aybar Hospital
2005	Isolation and identification of candidiasis and other agents that cause bacterial infections in pregnant women visiting the Gynecology Department at the Dr Luís E. Aybar Hospital
	Blood cultures in pediatric patients with pneumonia in the area of the Dr. Luís E. Aybar Pediatrics Hospital, August–October
2006	Isolation and identification of bacteriological agents that cause pharyngoamigdalitis in children at the pediatric emergency unit at Dr. Luís E. Aybar Hospital
	Isolation and identification of bacteriological agents that cause urinary tract infections in pregnant women visiting the Gynecology Department of Dr. Luís E. Aybar Hospital
2007	Determination of echovirus and Coxsackie virus in children at the pediatric emergency unit at Dr. Luís E. Aybar Hospital

Source: CEMADOJA Laboratory Department

Annex 8. Occupation or Profession of CEMADOJA Patients

Profession	Number	Percentage
Housekeeper	41	43%
Merchant	11	10%
Mechanic	4	4%
Sales	6	6%
Stylist	2	2%
Private employee	3	3%
Student	11	10%
Driver	2	2%
Laborer	4	4%
Nurse	3	3%
Woodworker	3	3%
Accountant	1	1%
Teacher	1	1%
Pharmaceutical	1	1%
Lawyer	1	1%
Secretary	1	1%
Total	95	100%

Annex 9. Monthly Income Levels of CEMADOJA Patients (RD\$)

Income level	Quantity	Percentage
Up to 5,000	56	59%
5,001–10,000	27	29%
10,001–15,000	4	4%
15,001–20,000	6	6%
Over 20,000	2	2%
Total	95	100%

* The exchange rate was RD\$33 to USD\$1, March 2008.

Annex 10. CEMADOJA Income, 2000–2007 (RD\$)

Year	SESPAS Budget	Income from Services
2000	19,952,469.16	1,212,287.50
2001	29,962,926.02	8,323,772.25
2002	29,955,528.34	14,510,482.48
2003	24,883,780.32	18,475,175.02
2004	21,880,156.97	26,004,320.53
Subtotal	126,634,860.81	68,526,037.78
2005	20,007,000.00	30,234,741.93
2006	23,166,510.38	36,155,623.80
2007	21,674,250.00	47,297,115.90
Subtotal	64,847,760.00	113,687,481.63
Total	191,482,621.19	182,213,519.41

Source: CEMADOJA Financial Department

Annex 11. Medical Equipment at CEMADOJA and its Condition

Device	Current Level of Usage
Weight scale	99.76%
Weight scale	59.27%
Body composition analyzer	1,337.41% ¹
Weight scale	99.78%
Body composition analyzer	48.28%
Body composition analyzer with height measurement	91.32%
Centrifuge	99.78%
Centrifuge	99.67%
Compact centrifuge	99.38%
Cooled centrifuge	99.31%
Cooled centrifuge	74.48%
Bubble-jet printer	99.85%
Bubble-jet printer	99.78%
Incubator	99.47%
Incubator	99.66%
Incubator	99.86%
CO ₂ incubator	99.48%
Microplaque incubator	98.01%
Magnetic agitator with hot plate	98.79%
Magnetic agitator with hot plate	98.72%
Magnetic agitator with hot plate	99.83%
Water bath with temperature control unit	97.61%
Biosecurity cabin	95.33%
Biosecurity cabin	96.64%
Microplaque washer	23,168.33% ²
Electrophoresis unit	98.76%
Transilluminator	97.33%
Dual-intensity transilluminator	98.66%
Water purifier	16.45%
Bacteriological-needs incinerator	61.62%
Spectrophotometer	98.13%
ELIZA reader system	98.74%
pH meter	99.76%
pH meter	99.84%
Thermocycler	99.79%
Thermocycler	99.89%
Body-fat meter	99.93%
Body-fat meter	99.93%
Body-fat meter	99.93%
Electric spirometer	99.86%
Binocular microscope	101.96%

¹This indicates the level of overuse in relation to the device's lifetime.

²Idem

Device	Current Level of Usage
Binocular microscope	99.83%
Inverted microscope	99.86%
Immunofluorescence microscope	99.86%
Stereoscopic microscope	99.90%
Stereoscopic microscope	99.90%
Binocular microscope	99.90%
Microscope for multiple discussion	97.42%
Deep freezer	97.78%
Freezer	98.34%
Icemaker	100.28%
Refrigerator	98.95%
Cooling cabinet	98.44%
Flexibility measurer	99.93%
Stretching measurer	99.93%
Jumping measurer	99.93%
Dynanometer	99.93%
Multiuse box	99.93%
Autoclave (sterilizer)	101.30%
Oven-type sterilizer	99.32%
Autoclave	99.78%
Transformer	99.93%
UPS (uninterruptible power supply)	99.86%
UPS (uninterruptible power supply)	99.85%
UPS (uninterruptible power Supply)	97.31%
Automatic voltage regulator	99.86%
Automatic voltage regulator	112.64%
Automatic voltage regulator	99.90%
Automatic voltage regulator	99.79%
Chronometer	99.93%
Chronometer	99.93%
Chronometer	99.93%
Chronometer	99.93%
Chronometer	99.84%
Photocopier	99.82%
Plastic laminator	98.72%
Weld control machine	99.82%
ECG simulator	99.77%
Air compressor	99.77%
Tachometer	99.80%
Digital thermometer	99.80%
Electrical welder	99.72%
Drilling machine with hammer	99.78%
Plot polisher	99.78%
Metal polisher (with stand)	99.78%
Portable Dremel	99.78%
DC source regulator	99.82%
Oscilloscope	99.82%

Device	Current Level of Usage
Voltage and current meter	99.82%
Logic tester	99.82%
Defibrillator analyzer	63.98%
Printer/defibrillator analyzer	99.82%
Analog multimeter	99.82%
Transformer	99.94%
Transformer	99.86%
Transformer	99.91%
UPS (uninterruptible power supply)	99.86%
UPS (uninterruptible power supply)	99.72%
UPS (uninterruptible power supply)	99.88%
Automatic voltage regulator	67.33%
VHS video recorder	99.86%
Wireless microphone set	99.85%
Television	99.86%
Slide projector	100.73%
Slide projector	100.94%
Slide projector	100.91%
Overhead projector	100.94%
Overhead projector	100.87%
Overhead projector	100.94%
Overhead projector	101.07%
High-level speaker (portable)	100.98%
High-level speaker (portable)	100.98%
High-level speaker (portable)	100.98%
LCD video projector	82.66%
Video viewer	0.00%
Video/audio distribution amplifier	99.86%
Power amplifier	99.83%
Display case	99.93%
Transformer	99.93%
Automatic voltage regulator	99.86%
Automatic voltage regulator	99.86%
Automatic voltage regulator	99.86%
Bubble jet printer	101.03%
Laser printer	101.15%
Laser printer	101.15%
Laser printer	101.15%
UPS (uninterruptible power supply)	99.82%
UPS (uninterruptible power supply)	102.09%
UPS (uninterruptible power supply)	101.01%
UPS (uninterruptible power supply)	101.19%
Photocopier	99.90%
VHS video recorder	100.94%
VHS video recorder	100.90%
VHS video recorder	100.90%
Color monitor	100.97%

Device	Current Level of Usage
Overhead projector	100.93%
Television	101.08%
A3 transparency sheet scanner	99.77%
Transparency sheet scanner	99.85%
Laser film recorder	99.79%
Bubble jet printer	99.85%
Display case	99.93%
Display case	99.93%
Display case	99.93%
Display case	99.93%
Display case	99.93%
Display case	99.93%
UPS (uninterruptible power supply)	99.84%
UPS (uninterruptible power supply)	99.75%
UPS (uninterruptible power supply)	99.75%
UPS (uninterruptible power supply)	39.54%
UPS (uninterruptible power supply)	22.35%
UPS (uninterruptible power supply)	26.20%
UPS (uninterruptible power supply)	99.73%
Automatic voltage regulator	100.93%
Laser printer	101.11%
Helical computerized tomograph	29,353.57%
Contrast agent heater	99.90%
Contrast agent injector	99.73%
Portable dehumidifier	99.77%
UPS (uninterruptible power supply)	79.6%
Video camera	99.86%
Video camera	99.90%
Digital camera	99.88%
Digital camera	99.87%
Digital camera	44.76%
Digital camera	99.89%
LCD projector	99.86%
LCD projector	99.83%
LCD projector	99.83%
S-VHS video recorder	99.82%
Bubble jet printer	99.89%
Photocopier	99.90%
Fax machine	99.90%
Color laser printer	99.88%
Film scanner	99.88%
Bubble jet printer	99.90%
Bubble jet printer	99.89%
Bubble jet printer	99.86%
Bubble jet printer	99.88%
Scanner	82.04%
Scanner	82.82%

Device	Current Level of Usage
Scanner	99.88%
MO drive	99.89%
CD-R burner	99.89%
Large-format color photocopier	99.90%
Laser printer	99.90%
Laser printer	99.89%
Electric typewriter	99.88%
CD-R/RW unit	99.90%
Electric calculator	99.90%
Color photocopier with printer	99.89%
CD-RW burner	99.72%
Bubble jet printer (portable)	99.80%
Laser printer	99.89%
Label writer	99.90%
Label writer	99.90%
UPS (uninterruptible power supply)	99.86%
UPS (uninterruptible power supply)	41.66%
UPS (uninterruptible power supply)	99.89%
UPS (uninterruptible power supply)	99.89%
UPS (uninterruptible power supply)	41.35%
UPS (uninterruptible power supply)	99.89%
UPS (uninterruptible power supply)	99.89%
UPS (uninterruptible power supply)	99.89%
UPS (uninterruptible power supply)	99.83%
Automatic voltage regulator	99.89%
Bubble jet printer	99.90%
Sonography device	99.59%
Sonography device	99.79%
Sonography device	99.31%
UPS (uninterruptible power supply)	99.85%
UPS (uninterruptible power supply)	89.50%
Automatic voltage regulator	100.97%
Automatic voltage regulator	100.97%
Conventional radiography unit	91.15%
Display case	99.93%
Automatic X-ray film processor	99.90%
Film identifier	99.90%
Automatic X-ray film processor	99.76%
Automatic X-ray film processor	74.14%
X-ray film densitometer	99.62%
X-ray film identifier camera	99.74%
X-ray film densitometer	99.81%
X-ray film sensitometer	99.81%
Mammography equipment	97.07%

Source: CEMADOJA