CALL AND INSTITUTION INFORMATION

Program – Capes/Print
Institution- Fundação Oswaldo Cruz

Call 41/2017 – Capes/Print
Institution acronym- Fiocruz

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DIAGNÓSTICS

Strengths

Title

Educational actions of Fiocruz abroad

Justification

Fiocruz promotes several international initiatives in education. As an example, we highlight the ongoing agreements for the joining PhDs programs with Portuguese Universities (Coimbra and Nova de Lisboa), both with defenses already in place. In 2015, Fiocruz issued Ordinance 581/2015, which establishes norms for the coordination of theses with foreign public and private entities, stimulating academic mobility and promoting technical and scientific exchanges aiming at the double degree of doctoral students and institutional development. It is also important to mention Fiocruz's formative role in the countries of Lusophone Africa (CPLP), particularly its cooperation with Mozambique. Since 2008, Fiocruz has offered, in partnership with the National Institute of Health of Mozambique, the strictosensu program of Health Sciences, with the training of Master's degree programs out of headquarters. The success of this initiative, which has already trained 45 Masters, stimulated the expansion of training to the doctorate level. In 2018 the 5th group of this partnership will begin with Masters and Doctoratestudents. We also concluded, with 100% achievement, the first group of the Masters in Health Systems with the National Institute of Health of Mozambique, with fourteen students supervised by researchers from Fiocruz. It is noteworthy that the dissertations were focused on topics of interest to the Ministry of Health of Mozambique and all students were able to defend their work. In addition, students had the rich experience of spending two to four months studying in Brazil and getting to know the local health system closely. Similar initiatives resulted in the training of masters in Angola, Argentina and Peru. Fiocruz began the internationalization process of its courses at the Fiocruz Virtual Campus, with the translation into Spanish and English, with support from PAHO and UNA-SUS, of the courses "Zika: Clinical Approach to Basic Care" and “Clinical management of Chikungunya ". We cite, as an example of broad access, that in Ecuador in 2017 there were 8,500 participants and of these 7,900 they obtained certificates. An agreement was reached with the Organization of Ibero-American States (OEI) for joint work that includes the translation and adaptation of educational content and training for different target audiences abroad.

Title

Scientific production of excellence with international collaborators

Justification

At the base of InCites (1980 to 2017) Fiocruz has published in co-authorship with researchers from 179 countries. Around 35% of the work produced by researchers from Fiocruz is in the top quartile (Q1) of Impact Factors of publications, with a constant and progressive increase of this percentage in recent years. In the period from 2012 to 2016, we had 42% of our publications in the Q1 statement. The selection of this period is aimed at identifying the recent collaborations and allows a minimum period of one year to evaluate the citations received (we chose to use the number of citations as criteria selection). A first approach consisted of identifying organizations with articles in co-authorship with Fiocruz researchers. The major foreign institutions with co-authored articles are: the UniversityofCalifornia System, University of London, the NationalInstitutesof Health, Harvard University, John Hopkins University, OxfordUniversity, University of Washington and the Imperial College of London. Two of Fiocruz's Journals have a broad international circulation: "Memórias do Instituto Oswaldo Cruz" (MIOC) and "Cadernos de SaúdePública". The MIOC has impact factor of 2.605 and an Index H of 72, being the most cited Latin American Journal. In the last few years, about 20% of the articles published in MIOCpresented collaborations between at least two countries, according to Scimago data (http://bit.ly/2ECg8Vy) and an important part of these do not have authors from Brazil. Cadernos has an H-index of 62 and in the last years about 10% of published articles have resulted from international collaboration (http://bit.ly/2ECqTay). This growth and qualification of scientific production corroborated the excellent performance of Fiocruz'sgraduate programs in the

last four-year evaluation carried out by the Coordination for the Improvement of Higher Education Personnel (Capes). Among the 23 academic PPGs evaluated, 1/3 promoted the gradesof excellence (6 and 7 in a scale of 1-7). This result reveals Fiocruz's ability to dialogue scientifically with other countries, since programs that achieve maximum grades of internationalization are a key indicator. This type of recognitionencourages the Institution to consolidate this issue. To these initiatives is added the strategy of the set of ten INCTs approved and led by Fiocruz, which have already been organizing international events.

Title
Foreign student support

Justification
Over the last five years, several Fiocruz graduate programs have relied on the use of videoconferencing for the selection of foreign candidates for their Masters and Doctoral courses. Those interested can present their scientific project, both written and oral, in English. Only those selected must come to Brazil to enroll.
Due to the growing number of foreign students, in 2012 the Working Group (WG) was created aiming at structuring the reception of foreign students on their arrival in the country, offering practical guidelines for daily life in the city and on campus. One of the fruits of the WG was the creation of a Center for Support to the Student - DAC, in 2017, which functions as a host for students from outside Rio de Janeiro and abroad. DAC allows a greater knowledge of the difficulties, challenges, factors that favor or disfavor adaptation and the performance of students, as well as the support in the return of students who were in internship abroad. Another highlight is the offer of free accommodation for up to 77 students, with daily transportation to the campus and infrastructure to receive students during their period in Brazil. In 2017, we started offering Portuguese courses for foreign students and foreign language courses offered to the professionals of the academic secretariats and, in an instrumental way, for students of the postgraduate courses.

Title
Well-structured international cooperation and excellence

Justification
The Center for International Health Relations (CRIS http://bit.ly/2BsXX1J) coordinates and supports the activities of Fiocruz Units in international cooperation in health, science and technology and maintains links with the International Health Advisory Group (Aisa), of the Ministry of Health, and the Brazilian Cooperation Agency (ABC) of the Ministry of Foreign Affairs. The list of current agreements can be consulted publicly (http://bit.ly/2EsXIGY), and news of international performance is disseminated by the Fiocruz International Bulletin (http://bit.ly/2HeZpp4). Fiocruz now has six areas recognized as Collaborating Centers of the Pan American Health Organization and the World Health Organization. The most recent designation (2014) was the Collaborating Center on Global Health and South-South Cooperation (http: // bit.ly/2o5DdVD). Fiocruz is a member of the International Network of Institutes Pasteur (RIIP), the Association of Portuguese Language Universities and the board of the International Association of National Institutes of Health. It also participates in bilateral programs of international cooperation with institutions from several countries, with funding from, among others, the National Institutes of Health and Medical Research (Inserm, France), the National Institutes of Health (NIH, United States), Newton Fund (England). About 750 employees (professors, researchers and analysts) of Fiocruz participate annually in international events (courses, congresses, doctorate and postdoctoral). Each year, Fiocruz receives approximately 70 research missions from renowned researchers from research and teaching institutions and about 10 diplomatic visits (consuls and ambassadors). It has hundreds of independent bilateral cooperations conducted by researchers, technologists and analysts in research activity at the Institution. Currently 1,500 of them develop research, teaching and production activities and of these, about 15% participate in some international cooperation network. In this context, there are hundreds of formal visits to pedagogical or informal activities of foreign researchers. With regard to the themes of Research, Development and Innovation, Fiocruz has a chain of knowledge aimed at developing

products for the SUS as medicines and diagnostic kits where productive development partnerships (PDPs) are established with industries and / or foreign institutions .

Weaknesses

Title
Low attraction for international teachers and students

Justification
Brazil as a whole is still a country with a low capacity for attracting researchers and international students. At Fiocruz, this also remains a weakness, and needs to be improved. In relation to international students, we noticed a small adherence to the PEC PG program, despite great institutional stimulus. Nevertheless, during the period 2011-2016, we received 120 students through this program, from Latin American and Portuguese-speaking Africa. These numbers however can and should be expanded in the coming years.

Title
Low supply of foreign language courses

Justification
There is a need for institutional stimulation so that a greater number of courses may be offered in a foreign language, thus attracting an audience of international students, although some initiatives have already taken place, both in short-term international courses and also in partnerships with foreign institutions (Exeter, Michigan, among others). In view of this scenario, we started offering English classes for Brazilian graduate students in 2017. Still, for now we have a low adherence on the part of the students. It should also be noted that in the international courses already mentioned, classes are systematically given in English. But we still need to stimulatethe process of internationalization for a larger number of disciplines regularly offered by our various Graduate Programs.

Title
Scarcity of resources for international cooperation activities

Justification
In general, the scarcity of institutional resources specifically earmarked for international cooperation should be considered a weak point. In fact, joint programs demand important resources for student sustainability throughout their stay in the country. Nevertheless, for several years, Fiocruz has allocated resources under this heading, due to the existence of bilateral programs, with calls for projects, etc. Specifically, we plan to improve this through joint graduate programs, such as the FOCEM (MercoSul Structural Convergence Fund) program and the Sorbonne University (France).

Title
Scarcity of resources for international cooperation activities

Justification
Historically, some researchers have established international partnerships on an individual basis, through their own contacts, without necessarily aligning themselves with an institutional work plan. In this sense, we will still have an important task in the sense of bringing the researchers closer to the Center for International Relations in Health (CRIS). In fact, as every request for exiting the country is necessarily processed by CRIS, we hope to be able to increasingly align our research activities with foreign institutions, with the great institutional guidelines approved by Fiocruz's senior management. In this way, in recent years, the joint work of CRIS together with the Vice Presidency of Education, Information and Communication has led to the formalization ofmore robust and productive cooperation agreements. This work also resulted in the establishment of a flux of foreign researchers and students enabling them to be followed during their stay in Brazil. However, there is still much to be improved.

Do you have a well defined institutional vocation? Yes

Describe the vocation of your institution

Fiocruz is an institution of education, research, science, technology and innovation with outstanding performance in several areas in the field of human health. In its 118 years, it has positioned itself as the leading institution in facing health issues in Latin America and the Community of Portuguese Speaking Countries.

Give other relevant information about the level of internationalization of your institution

Fiocruz has a program for promoting short international courses for Brazilian and Latin American students. Over the last 5 years, more than 40 courses have been supported, with the arrival of foreign experts for interaction with Brazilian teachers and students. Institutional support also occurs for courses and international events held by initiatives and using the resources of Fiocruz Units. About 50 of these activities take place annually; some offered regularly: the Course on Molecular Epidemiology in Emerging Infectious and Parasitary Diseases (Epimol in the 17th annual edition) conducted by Fiocruz, Yale and the University of California at Berkeley; the Workshop on Genetics and Molecular Biology of Vectors of Tropical Diseases (Entomol in the 6th edition) carried out by Fiocruz and the Society for Vector Ecology, the LymphoRioMove course and the International Course on Advanced Topics in Proteomics: Hands-on Proteomics-Bioinformatics Course (both in the 4th Edition). With the same objective, disciplines are offered by foreign teachers under international cooperation agreements. We highlight the cooperation agreement with the University of Coimbra, through which we brought several Portuguese teachers who taught and interacted with students. Fiocruz also has a publishing house with the potential to publish books in other languages (especially Spanish), as well as publishing scientific journals of international scope, including the centennial Memórias do Instituto Oswaldo Cruz and the Cadernos de SaúdePública. The structure of video production by Fiocruz is undoubtedly an important tool for scientific dissemination subtitled to other languages. Video-classes with researchers from Fiocruz were made available on Youtube and in four years have already had more than 200,000 views in more than 110 countries. Another strong point in favor of postgraduate internationalization is the existence of transverse structures called translational programs, aimed at improving the intervention and fighting the strategic nature of the country; and also supplying the Institution of technological competence as support for cutting-edge research and training of human resources to obtain answers in health. The various research and development projects are closely linked to postgraduate programs and represent a structuring basis for international cooperation, including in the field of specialized human resource training

REGISTER OF INSTITUTIONAL PROJECTS

Project Coordinator Institute
FUNDACAO OSWALDO CRUZ (FIOCRUZ)

General Objective

We intend to expand Fiocruz's international insertion in education, science, technology and the production of frontier knowledge through the creation of inclusive networking environment capable of attracting students and researchers.We aim to study with a multidisciplinary view of major global themes and that reinforce the role of Fiocruz as an institution that articulates north-south and south-south cooperation in education, science and technology for health. According to research conducted by CAPES in 2017 (http://www.capes.gov.br/sala-de-imprensa/noticias/8621-internacionalizacao-do-ensino-superior-precisa-avancar-sugere-estudo-da- capes), of which Fiocruz was one of the analyzed institutions, internationalization is a process necessary for the sharing of knowledge and can be understood as a broad and dynamic movement involving teaching, research and publichealth solutionprovision for society. Through internationalization, interaction between institutions in different countries can meet the challenges posed by a globalized society, as well as address specific issues through the exchange of experiences. Conceptually, we can categorize it into two types: a passive one, where there is mobility of teachers and students abroad; and the active one, where the flux is inverse. According to research, in most Brazilian institutions the process is strongly supported in the "passive" modality, with low rates of attraction of foreign researchers. The status of internationalization at Fiocruz reaffirms these findings andis indicated in this project as one of our weaknesses.Nevertheless, this isseis presentedin the agenda of the intramural educationcolleges, with the goal of improvingstrategies of attraction of international teachers and students. Still in dialogue with the aforementioned CAPES study, we agree that a more accurate follow-up of the Brazilian researcher trained abroad is necessary on returning to the country, so that the institution can benefit even more from the knowledge acquired abroad. Such appropriation must take into account academic aspects (consolidation of partnerships involving research, teaching actions, co-authoring publications, to the impact on society through technological development and innovation). Aiming to deepen the process of institutional internationalization, we will work with a matrix structure that includes thematic integrative networks in the major areas of health sciences of global importance and in which Fiocruz has a leading role.These networks are: Integrative Network of Science and Technology for Confronting Infectious and Re-emerging Diseases (from Portuguese, RICEI); Integrated Network of chronic diseases of non-infectious origin (RICRONI) and Integrative Network to address health inequalities (RIDES). This format advances the internal integration of the research and education efforts of the institute's various postgraduate programs (PPGs) and will promote the enhancement of international cooperation. Each Thematic Network will be established and led by PPG with grade 6 or 7 of Fiocruz and will integrate related programs with grade5. The networks will coordinate efforts with collaborators abroad, especially with those with whom we already have established productive relations. Complementarily, each network, according to the characteristics of the field of knowledge, will approach transversal axes: advance of knowledge; innovation and technological development; and scientific communication and popularization of science. Its performance will be strongly based on research activities, but will aim to advance beyond the existing commitments, as already described above. It is important to highlight the propelling role that the policy of open access to knowledge adopted by the institution since 2014 can play in relation to the three transversal axes.

The democratization and universalization of access to knowledge in the sciences and humanities is a fundamental condition for the egalitarian and sustainable development of nations. Its establishment aims to guarantee to society free access, public and open to the integral content of the intellectual production developed by Fiocruz. Politics reaches the community of researchers and also turns to society as a whole, to different sectors and movements, who need access to the production of knowledge at all levels. The sustainability of the project presented here is guaranteed through an Institutional framework.We can highlight: effort guided by the policy of international cooperation for the training of specialized personnel and by the policy of open access, both approved by the Deliberative Council of Fiocruz. Also, creation and operation of a dedicated body for international cooperation in education (CGEInt) in the Vice-Presidency of Education, Information and

Communication, monitoring and evaluating activities by the Steering Committee.Then we will forge an integrated action of PPGs and alsothe Center for International Relations in Health (CRIS), in close cooperation with the education directions and initiatives aimed at welcoming foreigners, especially the Center for Student Support (DAC). The national presence of Fiocruz is also an important aspect for the sustainability of the project, while the project, on the other hand, will strengthen the integration between the various regional units and their respective programs. We consider it relevant to give visibility to a fundamental and innovative aspect of our internationalization policy, which may benefit from the call for proposals: "structuring cooperation in health", in South-South cooperation.The Internationalization Policy of Fiocruz seeks to overcome the old"donor-recipient "model for a reorientation of the diplomatic negotiation of cooperation between institutions and/or countries, by which the"partners"jointly build their cooperation initiatives, harmonizing interests, respecting the ownership and leadership of each one, developing an integral approach to health systems and taking advantage of a network that allows the real interchange between all and the use of the reciprocity of the effort made.This strategy is intended to promote actions that aim to develop health systems in the partner countries, seeking to strengthen the institutions that support the structuring of these systems, including the Ministries of Health, the National Institutes of Health, Public Health and Health Technicians, Health Care Centers and Plant for production reactives and biologicals, among others. Fiocruz's activities in this field include: the incorporation of the analysis of factors and economic and social determinants external to the health sector; strengthening the integration of the least developed countries in the globalization process in a more equitable way; the development of international governance related to health information, regulation, and cooperation. "Finally, we briefly summarize the innovative aspects involved in ReIntEF: • Networking on major health issues and not on projects developed individually by PPGs, but with clearly defined priorities • Integration between areas of scientific advancement in the understanding of disease mechanisms and technological development • Evaluation of the Program by the Management Group every six months to indicate sub-area priorities and new trends and needs; Strengthen the concept of Structural Cooperation with the choice of preferred partners and establish planned personnel training relationships.

THEMES SPECIFIC OBJECTIVES OF THE PROJECT

Theme 1	Partner Countries
INTEGRATED NETWORK OF SCIENCE AND TECHNOLOGY FOR DEALING WITH EMERGING) AND RE-EMERGING INFECTIOUS DISEASES (RICEI)	**USA, Germany, Australia, France, South Korea, Canada, Spain Japan, Sweden, Argentina, Uruguay, Portugal**

Justification

Infectious diseases remain as a great challenge for human health. There are several aspects of these illnesses that remain with important deficits in scientific knowledge. There is a lack knowledge about the potential agents, which impede the comprehension of aspects of transmission and epidemiology, of which recent example of great importance is the zika virus. In many other illnesses, there is no advanced knowledge for the understanding of the pathogenic mechanisms involved in illness, very patented in the illness caused by the chikungunya virus, which limit the development of products for their prevention and treatment. There is also an urgent needfor global understanding of the interaction of infectious agents. This implies the understanding of relations with a) the environment; b) with the various animals which interact with man; c) with other patographs to which the host was exposed or is exposed; in addition to d) the interaction with non-infectious aggregates present in the population, as well illustrated by the interaction between tuberculosis and diabetes. Considering the multiplicity of infectious diseases and the different aspects required for the adequate counseling, we like: 1) in viral diseases, to emphasize an understanding of i. The transmission, contributing to surveillance; ii. Pathogens and iii. Diagnosis; 2) in the parasites we will have a more technological strand, with its emphasis vaccines; ii. Diagnostic and no iii. Treatment; and 3) for the integrated understanding of illnesses, we like to determine the i. Relationship vector-patogen-hospedeiro vertebrado; ii. In the

relationship between infectious diseases and chronic degenerative diseases, and iii. For the more global understanding for the phase-out of the quantitative methods through the study of phenomenas through data analysis, as a number of notified cases of aggregates and observed standards, as temporary or space trends. Some examples would be the evaluation of emerging and recurrent epidemics, analysis of the population dynamics of diseases vectors, study of microbial resistance and molecular dynamics, otherwise, using mathematical, statistical and computational models in an interdisciplinary approach.

Goal 1.

Dealing with emerging and reemerging arboviruses

Description

We will act through the integration of entomological, epidemiological and transmission modeling approaches aimed at the identification / understanding of: new viral strains by genetic modifications, transposition of the species barrier by a virus and viral dissemination from an ecological niche; alterations of vector interactions, with emphasis on Aedesaegypti in relation to the environment, with viruses and with the vertebrate host, with emphasis on man and ; alterations in the response of the vertebrate host identifying patterns of response related to clinical forms related to resistance and susceptibility. In recent decades, new clinical forms have appeared in known viruses, such as Zika (ZIKV), the resurgence of viruses such as dengue (DENV) as well as the accelerated and geographic expansion of viruses such as Chikungunya (CHKV). Changing patterns of social behavior such as heavy air traffic, importing animals, large-scale ecological modifications, and reduced resources for disease control actions. Several of these situations have been particularly serious in Brazil that suffers from the concomitance of the triple infection by DENV-ZIKV and CHKV. Fiocruz has been heavily involved in research on these diseases and with strong international cooperation and the intensification of these collaborations is strategic for the consolidation of international cooperation. We highlight the ZIKV that was responsible for a major epidemic in Brazil with an estimated 400,000 to 1.3 millions of cases.The CHKV virus, also identified in the 1950s, has caused epidemics in other areas more recently and promotes an epidemic in Brazil in 2016 with about 260,000 cases. In both ZIKV and CHKV there is a significant impairment of the nervous system in ZIKV, maternal-fetal transmission leads to severe impairment of the health of children with severe cases of microcephaly. These data illustrate that we need to reinforce the knowledge of viral evolution, transmission and pathogenesis of these and other viruses with transmission potential for humans. Diagnosis of viruses, although long established, presents special challenges, such as very ephemeral viremia with difficulties of identification before the development of a serological response.

Also as reinforcement to the need for greater emphasis on diagnosis, we emphasize that the proximity between Dengue virus and ZIKV virus with difficult distinction between them.

Goal 2.

Improvement of the preventive, diagnostic and therapeutic tools against parasitosis

Description

Our proposal to address vector-borne or non-vector-borne parasitic diseases is based on using available biotechnologies in an integrated way to address gaps in knowledge of the interaction of pathogens with their hosts, thereby providing scientific inputs for development, in medium and long term, of new diagnostic, therapeutic and vaccine approaches. This is an innovative proposal that adds new technological advances and will contribute to the generation of products for prophylaxis and disease prevention. Fiocruz hosts the National Institute of Vaccine Science and Technology (INCTV), whose main focus is research on the development of immunogens against tropical or neglected diseases. Fiocruz-Minas has opened a Vaccine and Diagnostic Technology Center at BH-Tec, which is in full operation, and today it acts in the prototyping of vaccines and diagnostic kits. This center has already generated a spinoff and is already transferring some diagnostic kits and developing vaccines with the private sector. In the identification, improvement and validation of vaccine targets against parasites we will identify new vaccine targets by genomic editing methodologies, as well as by immunoinformatics tools, including reverse vaccination; evaluate the immunogenicity of vaccine prototypes; humanized cell models to assess the allergenicity of vaccine antigen attenuated vaccines and dose-response clinical studies.This axis goes through clinical research and product generation and involves the production of attenuated parasites by genetic deletion and validation as attenuated vaccines. For the study of new drugs, we will use more rapid, efficient and efficient methods for the search and / or improvement of chemotherapeutic agents more specifically, the prospection of new therapeutic targets by genomic editing; the knockdown system for CRISPR in some parasites, such as trypanosomatids, is still unprecedented and can facilitate the study of genes with multiple copies and essential genes; functional genomics and high-content image, with selection of the phenotype of interest; screening of new bioactive molecules (pathogen-box) and drug repositioning, using delivery systems; as well as studies of resistance mechanisms of parasites by functional genomics; and lastly, as well as pharmacogenomics studies, evaluating host genetics in therapeutic failure and / or drug metabolism (sequencing technologies).

Goal 3.

Integrated understanding of the complexity of interaction in infectious diseases

Description

We will use new approaches in the study of interactions between disease transmitting insects, the pathogens they transmit and the corresponding hosts. We will study: modulation of the behavior of insect vectors and their interactions with their natural parasites; the physiological modifications induced by the infection; the microbioma and establishment of pathogen infection in transmitters aiming at the use of modified symbionts that prevent the transmission of the pathogen by the vector; the genetic editing in order to edit genes related to susceptibility; the microbiology of breeding mosquito vectors; (behavior, microbioma of the female and breeding) and the study of vectorial competence, including studies of intrinsic susceptibility of the vector to the infection, replication and transmission of the pathogens; characterization of the transmission dynamics of secondary vectors; precise identification of vectors during outbreaks and epidemics. It should be emphasized here the existing taxonomic skills, which place us in a privileged situation in the country. Fiocruz has many biological collections and these collections include one of the most complete zoological collections in Latin America.We will also address the triad "human health / animal / environment", focusing on classical zoonoses (leishmaniasis) and those considered "emerging" (human malaria infection of non-human primates).

We will characterize non-human parasites with the potential to cause human infection. The main projects involve the identification of targets and the development of diagnostic methods for the identification of zoonoses, differentiating parasites of human and animal infection, including animals in containment (zoos, conservation centers, translocations) or free-living animals in the environment. We will also combine analysis systems with computational and mathematical

models, with a systems biology approach. Collecting information on transcriptomes, genomes, microbiomes and molecule structures to describe mechanisms of action and predict the effects of changes in these systems. Analyses of the large amount of data generated from this proposal may provide subsidies for the rational development of new drugs, vaccines or diagnostic kits. It will also contribute to the understanding of the complex mechanisms involved in the interaction of pathogens with their hosts.

Theme 2.	**Partner Countries**
INTEGRATED NETWORK OF NON-INFECTIOUS CHRONIC DISEASES (RICRONI)	**Uruguay, UK, Argentina, USA, Spain, France.**

Justification

Epidemiological profile transition in Brazil shows important growth of chronic diseases of non-infectious origin. The main causes of mortality appear vascular diseases (including cerebrovascular and cardiovascular), cancer, obesity, diabetes and neurodegenerative diseases. This frame is accompanied by long-growth increase, what makes the question of aging as an important factor in the facing of these illnesses. Alarming perspectives for the next decade require the urgent development of therapeutic strategies to prevent the progression of these diseases, under a huge penalty overload in the unique health system. In fiocruz, research and development projects on metabolic diseases are associated through the fio-metabolic translational program, and various laboratories develop research and form post-graduants in this field of knowledge. Having seen this scenario of important increase in neurodegeneratives, pathological alterations of neurodevelopment and psychiatric diseases, Fiocruz triggered the translational program in neurociences (fioneuro), network, which understand research groups in various units of the institution, and still account with the association of the inct of neuroimunomodulation, coordinated by Fiocruz. One of the first fioneuro's actions will be the formation of a special class of doctorate (from 2019), in a programs consortium of fiocruz graduate programs and the neurobiology program of uff. It is estimated that there we will be 1 million new cases of cancer in Brazil between 2018 and 2019 and the perspective is that this number increases, arranging in 2020 to achieve more than 1 in each 3 individuals. Fiocruz created in 2015 the translational program

Fio-cancer, counting with research groups in areas of action that go from basic research to epidemiology, seeking to integrate the different knowledge areas to achieve its objectives by transfering technology, generation of new information / technology. Account also with partnerships of assistance institutions, as the national institute of cancer (INCA) and the federal university of Rio de Janeiro (UFRJ), hospital ac camargo and hospital fundação do câncer. In addition to generating knowledge and inputs related to oncology, the fio-cancer network proposed to subsidize human resource training initiatives. In this sense, an existing programs consortium in fiocruz will launch in 2019 special classin oncology, counting also external partnerships, among them Inca.

Goal 1.

Coping with metabolic diseases and aging

Description

Cardiovascular diseases (including myocardial infarction, stroke), obesity, diabetes, have huge impacts on the health of the Brazilian population, both from the quality of life and economic relevancepoint of view. Despite the great importance of SUS through the Popular Pharmacy program, a continuous process of coping with the Brazilian population is still necessary, with the generation of scientific knowledge aimed at understanding pathogenetic and physio-pathological mechanisms, as well as molecular design of new drugs and epidemiological monitoring. These data clearly indicate the need for strategies and programs that can provide the various services needed to support the fragilities caused by the aging process. In Brazil, this process is accelerated and, considering the 60-year limit, it is estimated that there will be 172.7 elderly people per 100 children in the year 2050. In addition, we have seen an important growth in the elderly population with more of 80 years, which implies a larger contingent of people in need of medical care. With the increase in the longevity of our population and the greater metabolic fragility of the elderly, it is absolutely essential to think about metabolic parameters analyses of Brazilian society in different age groups, in order to better address the quality of life of the elderly. Included in this chapter are studies on metabolism proper together with nutrition, but also the immune system, the nervous system, and the musculoskeletal system. To this end, the training of postgraduate students, particularly in the perspective of internationalization of their training, will undoubtedly represent a relevant contribution.

Goal 2.

Coping with diseases of an oncological nature

Description

In the perspective of complementary and even joint actions to projects under development at INCA, Fiocruz intends to advance specific actions related to this objective. One of the study models is represented by breast cancer, responsible for high mortality among women. Among the projects under development, we mention the study on the mechanisms of metastasis in breast cancer, and particularly the role of the immune system in the establishment of bone metastasis. Still with regard to solid tumors, we intend to develop masters and doctoral projects on biomarkers to aid in the clinical management of breast, prostate and ovary tumors. A second aspect related to tumor biology concerns cell migration, and for this it will be studied models of hematological cancers, particularly human lymphomas and leukemias. In the different models of analysis, the molecular interactions that may be relevant in the mechanisms of dissemination of neoplastic cells will be studied. In addition to the partnership with INCA, it is important to point out that research projects at Masters and PhD levels will be developed under the PPGs, and whenever possible in international partnerships, several of which already exist. In addition, the sustainability for the development of the respective projects and the training of young Masters and Doctors will take place in the context of the translational cancer program mentioned above, and recently launchedin Fiocruz (Fio-Cancer). This platform will further advance the internationalization of the projects to be developed in this area of knowledge.

Goal 3.

Coping with neuromuscular diseases, neurodevelopmental diseases and neurodegenerative diseases

Description

The second major goal in addressing diseases of a non-infectious origin is directed to neuromuscular diseases (eg, Duchenne Muscular Dystrophy) and diseases of the nervous system, including those affecting motor activity (such as Lateral Amyotrophic Sclerosis, for example) are typically neurodegenerative (Alzheimer's disease, Parkinson's disease), and those resulting from failures in neurodevelopment, such as autism. In addition, other diseases that occur in the first years of life may be responsible for mental and neurological disorders that will occur in adult life. For example, among

mental disorders, so-called "depression" today affects about 350 million adults. Also, drug addiction is currently a serious public health problem, arising from these disorders. In order to achieve this goal, we undoubtedly need to work in syntony and synergy in projects that together can complement the generation of knowledge through laboratory experiments using in vivo experimental models in vitro, as well as clinical follow-up, with organization of national and international cohorts. It is worth mentioning that there is already international cooperation between Fiocruz PPGs and foreign institutions in several countries, including the direct participation of the Pasteur Institute of Montevideo (Uruguay) and the Sorbonne Université (France), in addition to the University of Central Lancashire, Preston (England). Fiocruz and MercoSul countries (FOCEM / MercoSul project).

Theme 3.	**PartnerCountries:**
INTEGRATED NETWORK FOR COUNTERING INEQUALITIES IN HEALTH (RIDES).	**UK, Finland, Argentina, the USA Chile, Germany, Spain, Portugal, Italy, Sweden, Mexico, Peru, Guatemala, Canada, France, Mozambique, Colombia, Chile.**

Justification

Inequalities in health are manifested on different territorial scales, globally and within the countries. Their co-ordination requires international cooperation strategies for training in the graduation, research realization and knowledge production in two complementary areas: determination of health-disease processes (epidemiological, social, environmental dimensions); and policies, systems and health services (dimension of promotion policies and attention to the health of the population). The influence of social determination in the adequacy process part of the assumption that health is a complex, multifacted phenomenon, and must be examined through socio-cultural, biological dimensions others. Social Determinants of Health understand the social, economic, cultural, ethnic / racial, psychological and behavioral factors influencing the occurrence of health problems and their risk factors in the population (cndss, 2006). In public health, historically, biomedical explanations have modified social interpretations about the determination of the health / disease process. Although biomedicine achievements have contributed to a great measure for increased life expectation and improvement of other health indicators, their limits are not enabled before the complexity of the current health panorama. The contribution of models that incorporate the sociopolitical and environmental dimensions is fundamental for the comprehension and facing of diseases and aggressions to health in contemporaneity. In that context, the integrative network for facing social inequalities in health is based on research that addresses the following axes: epidemiological studies; studies of health determinants that investigate that the form of social conditions achieves different exposures and, therefore, different health facts; analysis of socio-space inequalities related to development models, including issues related to social vulnerability and the environment and the impact on health; public policies and health systems, considering their repercussions for the offer, the organization of the network, the conditions of access and attention to the health of the population.

Goal 1

Analyses of health inequalities related to socioeconomic development models and social dynamics.

Description

This objective highlights the complexity of the population's health problems and needs, integrating interdisciplinary approaches and participatory methodologies, in order to contribute to the construction of spaces for citizenship, justice and more equitable relationships in society. It focuses on theoretical and methodological models regarding the analysis of health vulnerabilities resulting from living, working and environmental conditions and considers the perspective of the historical and social determination of the health-disease process. It also seeks to reflect on the socio-cultural and environmental impacts of economic development models on the living and health conditions of the population, in the light of theoretical perspectives that favor relations of gender, race and ethnicity. In

the scope of this objective, challenges and central issues are evidenced: climate change, disasters, large enterprises, impacts of agrobusiness, mining and hydroelectric construction, industrial waste and exposure to toxic substances, vulnerable populations in cities and fields, disordered occupation access to basic sanitation.
It intends to produce strategic knowledge in the areas of health surveillance, evaluation of programs, promotion, prevention and health care of the population, thus strengthening citizenship and producing subsidies for public policies.

Goal 2.

Studies on social determinants of health, based on the epidemiological method, approach to complex systems and other methods, encompassing different exposures and health outcomes

Description

The design of this objective is related to the study of social determinants through the analysis of primary data, aiming to measure individual economic and psychosocial determinants and their relationship with health outcomes in a sectional and longitudinal way, employing methods that have not yet been implemented in the reality of local studies. In addition, secondary data analysis at the ecological level provides relevant information on social and racial spatial inequalities within and between cities in Brazil and allows comparisons of the impacts of such inequities on health behaviors and outcomes such as NCDs and infectious diseases. The adoption of the complex systemic modeling approach will allow a broader understanding of causal maps as to what is the role of social inequalities and the interaction between their indicators and factors that maintain stability or promote changes in systems, based on qualitative or of the intervention points. This approach is relatively new to global public health, and incipient in Brazil. Therefore, the promotion of the study of health inequities, the impact of interventions (policies, programs or isolated actions) represents an advance in the knowledge and approach of inequality, including incorporating the socio-social approach into health outcomes and behaviors.

Goal 3.

Enable Cooperation in Education and Research on Health Policies, Systems and Services

Description

Global changes over the last decades have involved economic, social, demographic and epidemiological ones, with repercussions on the population's health. In spite of the improvement of some indicators in global terms, studies have shown the persistence of marked inequalities in health between countries and within countries. Health policies and systems need to respond to old and new problems that often transcend national boundaries, requiring integrated coping strategies and cooperation between countries. The implementation of international cooperation in health policies, systems and services is strategic in two main lines. The first is the development of training strategies and studies on health policies, systems and services in a comparative perspective, to analyze the similarities and differences between Brazil and other countries, as well as to understand their repercussions and impacts on the reduction of social inequalities in health. The comparative method allows us to explain the determinants of policy advances and difficulties, to identify positive experiences in the organization and management of health systems and services, and to provide support for proposing policies aimed at reducing inequalities and improving the health situation of the population as a whole. The second is strengthening training and conducting research on the formulation and implementation of strategic health policies for the health systems of different countries, deserving prominence in terms of international cooperation. Some of these policies focus on coping with relevant and complex problems that go beyond national boundaries and have serious social effects in developing countries (eg HIV / AIDS, tuberculosis, tobacco control, children and mothers health). Others are relevant for their structuring nature of health systems, with implications for the equity and sustainability of systems (models of organization and care, training and management of human resources, public / private relations, development and access to medicines and health technologies).

POSTGRADUATE PROGRAMS LINKED TO THIS PROPOSAL

Theme 1.

INTEGRATING NETWORK OF SCIENCE AND TECHNOLOGY FOR THE COUNSEL OF INFECTIOUS AND RE-EMERGENT DISEASES (RICEI)

Postgraduate Program 1 **grade 7**

HEALTH SCIENCES

Justification

The Graduate Program in Health Sciences (PPGCS) of the René Rachou Institute began its activities in 2003, bringing together a group of professionals with extensive experience in research and training of students and with high productivity. The PPGCS's general objective is to train qualified professionals to work in research centers, S & T institutes and higher education institutions, contributing to the scientific and technological development of the country. The PPGCS Master's Degree has specific objectives - The deepening of technical and academic knowledge in Health Sciences- The training of teachers for higher education and post-graduation latosensu - The development of skills to perform scientific and technological research in the area of concentration. The PPGCS PhD has specific objectives - Deepening and integrating technical and academic knowledge in the PPGCS concentration area - Developing skills to conduct original and independent scientific and technological research in the areas of PPGCS concentration - The nucleation of new scientific and technological research groups in other teaching and research institutions in the country and abroad - The training of teachers for the teaching and postgraduate studies lato and strictosensu in higher education institutions. With a network of research laboratories and shared technology platforms, it stands out for hosting research groups with international recognition, with a great ability to attract resources abroad. The internationalization program proposed by the PPGCS should use integrative strategies to study human diseases - including basic, applied, translational research and technological development with the use of cutting-edge technologies, including functional genomics, big data management, in vivo imaging, gene editing and humanized experimental models. These tools, coupled with point-of-care technologies such as 3D printing of biotechnology and lab-on-chip instruments, may in the short and medium term result in new diagnostic methods, treatments and vaccines that prevalent in developing countries. The acquisition of these new technologies through international partnerships will allow for excellence in research. The PPGCS has presented an excellent production of publications in indexed journals, being the majority in extracts A1 to B1 of the Qualis.

Postgraduate Program 2 **grade 6**

BIOTECHNOLOGY IN HEALTH AND INVESTIGATIVE MEDICINE

Justification

The Postgraduate Program in Biotechnology in Health and Investigative Medicine (PGBSMI) of the IGM / Fiocruz Bahia hasgrade 6 andis intended for training of professionals with high qualification for academic, scientific and technological activities in their areas. The aim of the masters is to deepen the technical, scientific and ethical knowledge of the student. The PhD training has the objective of developing the capacity for original researchand to produce new innovative knowledge. PgBSMI will enable its students to be updated in their areas of training, based on problem solving and critical analysis of world scientific production in their specific areas. The focus of the course is the development of new immunobiological reagents, such as diagnostic kits, vaccines and new therapies and vector control strategies, combining basic research with the study of new biotechnological tools. Academic training in this area and the procurement of these products may stimulate, for example, the

local and national production chain, contributing to the development of the northeast region. The program has faculty members, all with a doctorate degree, in different areas of scientific knowledge. This program in the area of biosciences is composed of teachers with specialized training in the specific areas of Biological Sciences III (Parasitology, Microbiology and Immunology) and focused on the area of public health. They work on different research objects linked in a broad spectrum of regional and Brazilian public health needs and requirements. It seeks to train professionals qualified to work in teaching and research for technological development and innovation, focused on the needs generated by changes in the epidemiological framework, strengthening the science and technology system and the single health system (SUS) and reducing inequalities and local, regional and national inequities.

Postgraduate Program 3. **grade 5**

CLINICAL RESEARCH IN INFECTIOUS DISEASES

Justification

The Graduate Program in Clinical Research in Infectious Diseases (PPGPCDI / INI) of the National Institute of InfectologyEvandro Chagas (INI) of Fiocruz in Rio, grade 5 has national and international recognition, being a reference for countries of Latin America, the Caribbean and Africa, receiving students from these regions, as well as strong scientific collaboration with researchers from the United States, Europe and Asia. It aims to advance knowledge in frontier areas of science and technology, such as pathogens and emerging and reemerging infectious diseases, transferring knowledge and methods from one scientific area to another with an innovative perspective. Clinical research is understood in this program as a complex and multidisciplinary research process, involving the identification and equation of challenging scientific problems associated with the emergence, evolution and coping strategies, prevention and control of infectious diseases, with important implications for global health. The program transmits to the student a comprehensive, interdisciplinary and multiprofessional perspective, making possible the understanding of the various biological, clinical, behavioral, social and environmental aspects related to the disease process and the strategies for its confrontation with the necessary articulation between teaching, research, primary care and society. The Program uses, for this purpose, multiple research methodologies and quantitative and qualitative methods, structured in such a way as to avoid compartmental knowledge. This training strategy has favored intense scientific exchange and strong interaction among students, teachers, patient groups and the communities involved. The Program adopts a translational perspective in this training proposal and related scientific and technological activity, aiming to ensure the generation of new knowledge, processes and products in support of Brazilian public health and the Unified Health System. Scientific production of the PPGPCDI in the triennium (2010-2012) was 294 articles, while 206 papers associated in the student.Also classified in Web Qualis of the area and corresponding, therefore, the student production to 71% of the teaching production.

Postgraduate Program 4 **grade 6**

TROPICAL MEDICINE

Justification

The proposal of the Graduate Program in Tropical Medicine (PGMT) of the Oswaldo Cruz Institute, grade 6, aims to improve the training of professionals so that they can think and act on the main public health problems, mainly in Brazil, Latin America and Portuguese-speaking African countries. Among the researchers in the field of Tropical Medicine, three trends have been identified: clinicians and infectologists who aim to provide care to the patient at the hospital level. Second, parasitologists, microbiologists, immuno-pathologists which aim at the laboratory study of the etiological agents including the experimental research and the understanding of the parasite-host relationship. Third, field epidemiologists aiming the integrated study of human populations, agents, reservoirs and vectors in their environment. The Program encourages translational research projects in the areas of classical epidemiology and clinical studies in infectious and parasitic diseases using molecular epidemiology, genetic, pathogenic and immunogenetic tools. The PGMT works in subjects such as: biological, clinical and epidemiological studies of co-infections, retroviruses, enteric and respiratory viruses, zoonoses of medical importance, mycoses,human helminthiases and intestinal parasites, hepatitis,mycobacterioses,sexually transmitted and Chagas diseases. Also, emerging and re-emergent diseases are covered.

Postgraduate Program 5. **grade 7**

PARASITE BIOLOGY

Justification

The Postgraduate Program in Parasite Biology (PPGBP) (grade 7), has as its main objectives the training of researchers enabled to act with leadership in the development of basic and applied research in the area of parasitology, as well as in the teaching of Univeristies and Research Institutions, disseminating critical and innovative thinking in this field. In this context, it provides students with an environment where the different facets of the parasitism phenomenon are integrated into human society. In PPGBP, the students can investigate parasitology with a closer look at the microenviroments, studying for example the gene expression and the molecules involved in the parasite-host interaction. When looking at the macro, they can construct global maps of the risk of transmitting pathogens to the spatial distribution of vectors, hosts and climatic variables that regulate their density, for example. In addition to the conceptual issues, it provides the student with unique experiences, beyond the laboratory, applying the knowledge obtained in the field and transmitting it to the general population, to elementary school children and to public school teachers. These experiences encourage learners to leave their common place, trainingscientists, committed to the public health problems faced by Brazilians. The academic diversity of the Program enables the student body to have a broad and comprehensive education, since its teachers establish and lead important international cooperation agreements with teaching and research institutions from various countries, aiming at exchange of experiences and knowledge, support for research, technological development and training of human resources. Current international PPGBP collaborations include participation in projects with partnership from African, American, European and Asian countries.

Postgraduate Program 6 **grade 5**

PUBLIC HEALTH SURVEILLANCE

Justification

The Postgraduate Program in public Health Surveillance (PPGVS / INCQS), evaluated in the last evaluation with grade 5, aims at the training of human resources in public health Surveillance in the country. It is faced with a set of limitations that comes from the traditional isolation of public health Surveillance, which is reflected in the little production of scientific knowledge on the subject, the lack of professional training in the field and even the lack of knowledge of the population concerning the Health Surveillance function as a health action. These aspects, with others arising from the dominant paradigm in health - centered on the disease - contribute to the maintenance of some difficulty, even among sanitarians and researchers, in distinguishing the function of surveillanceactions from the model that has been in force in the country. The area has a shortage of professionals who can think about Public healthSurveillance in an integrated way, generating actions from the interaction of knowledge areas such as Quality Control, Health Policies, Epidemiology, Chemistry, Microbiology, Pharmacology, Toxicology, Immunology, Political Sociology, Law, Biosafety, Education, History and others. Therefore, the main objective of the PPGVS is the training of highly qualified postgraduates with abilities to act primarily in the Teaching and Research of public health Surveillance. Our Program is composed of two lines of research that encompass all the projects developed by our students associated with their supervisors, aiming the construction of a new thinking in Sanitary Surveillance. The research lines are: 1) Interdisciplinary development and evaluation of products, services and environments related to Sanitary Surveillance 2) Evaluation of contaminants, pollutants and residues, and their impact on the health of the population. The trainees in the PPGVS work in different regions, considering that the program is the only one in the country.

Postgraduate Program 7 **grade 7**

CELLULAR AND MOLECULAR BIOLOGY

Justification

Fiocruz's Postgraduate Program in Cellular and Molecular Biology, which follows with grade 7has a broad scope, reflected in its thirteen Research fields, subdivided into two main areas of activity: Cellular and Molecular Biology and Pharmacology and Immunology. Under the PPG-BCM theses have been developed on pathogenesis and pathophysiology of different types of cancer, metabolic diseases, neuromuscular diseases and neurodegenerative diseases**.**

Postgraduate Program 8 **grade 5**

COMPUTATIONAL BIOLOGY AND SYSTEMS

Justification

The Postgraduate Program in Computational Biology and Systems (PPG-BCS) was founded in 2007 due to a growing demand for specialized human resources in the field of bioinformatics, mainly due to the development of new technologies capable of generating large volumes of information serving the demands of academia and industry. The multidisciplinary nature and scope of the Program require partnerships and collaborations with researchers from other institutions that are being continuously expanded. PPG-BCS relies on the wide geographical distribution of FIOCRUZ (institutesin Salvador, Belo Horizonte, Recife, Manaus, Curitiba, Porto Velho, Fortaleza and Campo Grande for expanding their staff and at the same time training human resources in Computational Biology and Systems in regions of the country lacking these resources, and has potential in the therapeutic use for chronic noncommunicablediseases**.**

Postgraduate Program 9 **grade 5**

BIODIVERSITY AND HEALTH

Justification

The study of the dynamics of biodiversity in the face of environmental changes, comparing natural ecosystems with altered ones, can generate predictability models for the occurrence of emerging diseases and of displacements or replacement of native species by exotic species, which clearly explains the association of biodiversity with Health. The use of biological indicators is also a useful tool in monitoring environmental quality and zoonoses. In addition, changes in natural biodiversity patterns may also provide for the establishment of proposals for sustainable management of ecosystems without loss of biological diversity and with less impact on environmental and human health. In order to respond to the demand related to biodiversity, it is of fundamental importance to create good systems, as well as train professionals in the area of ecology and environment.

Notably there is a shortage of training aimed at taxonomy of organisms directly related to health (vectors and reservoirs of etiological agents) and professional oriented towards the study of environmental changes (biomonitoring). The Fiocruz IOC's Postgraduate Program in Biodiversity and Health (PPGBS) has its main focus in the study of the part of biodiversity that has some interface with health, be it human, animal or environmental, mainly within the specialties of zoology and ecology. The program has a multidisciplinary nature, admitting students in several areas of knowledge, as long as they present proposals to develop projects that interface with biodiversity and health. Thus, with the guidelines of the biodiversity area, the program intends to contribute strongly to: 1) improving the understanding of the organization of diversity and its response to human actions; 2) enlarging knowledge of Brazilian biodiversity; 3) contributing with conceptual and technological innovations capable of enabling the sustainable exploitation of biodiversity resources; 4) increasing elements that can support decision making at different levels of the public administration in order to preserve biodiversity and; 5) minimizing the notorious lack of professionals in the areas of biodiversity management and conservation biology.

Theme 2

INTEGRATED NETWORK OF CHRONIC DISEASES OF NON-INFECTIOUS ORIGIN (RICRONI)

Postgraduate Program 1. **grade 5**

PUBLIC HEALTH AND THE ENVIRONMENT

Justification

The Postgraduate Program in Public Health and Environment (PGSPME / ENSP) seeks to contribute to analyses of the environmental impact on all living being susing different fields of knowledge and methodological approaches. Thus, the PPGSPMA has as a frame of reference, shared by its staff and basis of training offered to its students, the conception that the process of human illness is not dissociated from the environmental impacts that affect all living beings. Within this perspective, PPGSPMA has contributed to the structuring of other similar programs in the country. The main objective of PPGSPMA is to train researchers, managers and other prefessionals in the area of publichealth with the specificity of environmental health, in an interdisciplinary, multiprofessional and interinstitutional perspective. It seeks to describe the environmental and behavioral changes that occurred in the last decades in the country and to evaluate its influences in the field of public health; to characterize the current socio-environmental scenario with emphasis on structural problems that need to be modified, such as: hazardous environmental sanitation, predatory destruction of ecosystems, reduced supply of jobs, marked growth of precarious housing in urban areas, among others. It aims to assess the magnitude of exposure to chemical agents (pesticides, solvents, heavy metals, particulate matter, etc.), physical (electromagnetic fields) and biological (new and reemerging infectious diseases such as tuberculosis, dengue, hepatitis, etc.) by populations. In this proposal, it seeks to use the occupational exposure matrix method to estimate

previous exposure; carry out an active search of the exposed ones for constitution of the cohort;to estimate mortality from cancers and the prevalence of pleural diseases related to asbestos exposure; record and report confirmed cases of diseases acquired with exposure to asbestos to the state for referral for medical treatment and follow-up and ; contribute to the collection of information about carcinogenic agents and their effects on health related to the work environment in Brazil.

Postgraduate Program 2 **grade 5**

INFORMATION AND COMMUNICATION IN HEALTH (PPGICS)

Justification

Within the scope of the Postgraduate Program in Health Information and Communication (PPG-ICS) there is an area which includes Production, Organization and Use of Health Information, and is the analysis of policies, models, processes and practices of production, organization, evaluation and use of information and knowledge in the field of publichealth. It includes, among other lines of research, the monitoring of the Brazilian health situation and its socioenvironmental determinants, in which studies on illicit drug use and its social context in Brazilare being developed.

Postgraduate Program 3. **grade 5**

COMPUTATIONAL BIOLOGY AND SYSTEMS

Justification

The Postgraduate Program in Computational Biology and Systems (PPG-BCS) was founded in 2007 due to a growing demand for specialized human resources in the field of bioinformatics, mainly due to the development of new technologies capable of generating large volumes of information serving the demands of academia and industry. The multidisciplinary nature and scope of the Program require partnerships and collaborations with researchers from other institutions that are being continuously expanded. PPG-BCS relies on the wide geographical distribution of FIOCRUZ (institutesin Salvador, Belo Horizonte, Recife, Manaus, Curitiba, Porto Velho, Fortaleza and Campo Grande for expanding their staff and at the same time training human resources in Computational Biology and Systems in regions of the country lacking these resources, and has potential in the therapeutic use for chronic noncommunicablediseases**.**

Postgraduate Program 4. **grade 6**

BIOTECHNOLOGY IN HEALTH AND INVESTIGATIVE MEDICINE

Justification

The Postgraduate Program in Biotechnology in Health and Investigative Medicine (PGBSMI) of the IGM / Fiocruz Bahia hasgrade 6 andis intended for training of professionals with high qualification for academic, scientific and technological activities in their areas. The aim of the masters is to deepen the technical, scientific and ethical knowledge of the student. The PhD training has the objective of developing the capacity for original researchand to produce new innovative knowledge. PgBSMI will enable its students to be updated in their areas of training, based on problem solving and critical analysis of world scientific production in their specific areas. The focus of the course is the development of new immunobiological reagents, such as diagnostic kits, vaccines and new therapies and vector control strategies, combining basic research with the study of new biotechnological tools. Academic training in this area and the procurement of these products may stimulate, for example, the local and national production chain, contributing to the development of the northeast region. The program has faculty members, all with a doctorate degree, in different areas of scientific knowledge. This program in the area of biosciences is composed of teachers with specialized training in the specific areas of Biological Sciences III (Parasitology, Microbiology and Immunology) and focused

on the area of public health. They work on different research objects linked in a broad spectrum of regional and Brazilian public health needs and requirements. It seeks to train professionals qualified to work in teaching and research for technological development and innovation, focused on the needs generated by changes in the epidemiological framework, strengthening the science and technology system and the single health system (SUS) and reducing inequalities and local, regional and national inequities.

Postgraduate Program 5. **grade 6**

PUBLIC HEALTH

Justification

The Public Health program (PPG-SP) is one of the oldest programs at Fiocruz and includes several lines of research associated with the theme of tackling social inequalities in health. The PPG-SP host thesis projects developed in the context of the large cohort Longitudinal Study of Adult Health (ELSA), in addition to epidemiological studies related to mental health and cancer.

Postgraduate Program 6. **grade 7**

CELLULAR AND MOLECULAR BIOLOGY

Justification

Fiocruz's Postgraduate Program in Cellular and Molecular Biology, which follows with grade 7has a broad scope, reflected in its thirteen Research fields, subdivided into two main areas of activity: Cellular and Molecular Biology and Pharmacology and Immunology. Under the PPG-BCM theses have been developed on pathogenesis and pathophysiology of different types of cancer, metabolic diseases, neuromuscular diseases and neurodegenerative diseases**.**

Postgraduate Program 7. **grade 6**

EPIDEMIOLOGY IN PUBLIC HEALTH

Justification

The PPGESP / ENSP represents a deepening of the use of the epidemiological method aimed at gathering evidence to analyze the inequities and evaluate the impact of policies and actions that aim to contribute to the reduction of social inequalities. Like the public health program, it has been inserted in several regions of Brazil and Portuguese-speaking Latin American and African countries, contributing to the formation of a critical mass for the understanding and approach to the health / disease process of populations and subsidizing planning of actions that lead to the reduction of diseases in different population groups. The objective of the PPGESP is to provide the training of specialized professionals not only in research techniques, but in what is understood as methodology in the proper sense, which includes the philosophical implications of the relation of the researcher with his object of study, besides the possibility of developing dialogues with related areas, in particular the social sciences in health. This is an important challenge for the training of epidemiologists, which is justified by the need to renew the critical traditions that marked and still mark the field within the public health. Such changes need to be considered in the training of health professionals and of professors and researchers in epidemiology, and the program supports.

Theme 3

INTEGRATED NETWORK FOR FACING INEQUALITIES IN HEALTH (RIDES)

Postgraduate Program 1 **grade 6**

EPIDEMIOLOGY IN PUBLIC HEALTH

Justification

The PPGESP / ENSP represents a deepening of the use of the epidemiological method aimed at gathering evidence to analyze the inequities and evaluate the impact of policies and actions that aim to contribute to the reduction of social inequalities. Like the public health program, it has been inserted in several regions of Brazil and Portuguese-speaking Latin American and African countries, contributing to the formation of a critical mass for the understanding and approach to the health / disease process of populations and subsidizing planning of actions that lead to the reduction of diseases in different population groups. The objective of the PPGESP is to provide the training of specialized professionals not only in research techniques, but in what is understood as methodology in the proper sense, which includes the philosophical implications of the relation of the researcher with his object of study, besides the possibility of developing dialogues with related areas, in particular the social sciences in health. This is an important challenge for the training of epidemiologists, which is justified by the need to renew the critical traditions that marked and still mark the field within the public health. Such changes need to be considered in the training of health professionals and of professors and researchers in epidemiology, and the program supports.

Postgraduate Program 2. **grade 5**

PUBLIC HEALTH AND THE ENVIRONMENT

Justification

The Postgraduate Program in Public Health and Environment (PGSPME / ENSP) seeks to contribute to analyses of the environmental impact on all living being susing different fields of knowledge and methodological approaches. Thus, the PPGSPMA has as a frame of reference, shared by its staff and basis of training offered to its students, the conception that the process of human illness is not dissociated from the environmental impacts that affect all living beings. Within this perspective, PPGSPMA has contributed to the structuring of other similar programs in the country. The main objective of PPGSPMA is to train researchers, managers and other prefessionals in the area of publichealth with the specificity of environmental health, in an interdisciplinary, multiprofessional and interinstitutional perspective. It seeks to describe the environmental and behavioral changes that occurred in the last decades in the country and to evaluate its influences in the field of public health; to characterize the current socio-environmental scenario with emphasis on structural problems that need to be modified, such as: hazardous environmental sanitation, predatory destruction of ecosystems, reduced supply of jobs, marked growth of precarious housing in urban areas, among others. It aims to assess the magnitude of exposure to chemical agents (pesticides, solvents, heavy metals, particulate matter, etc.), physical (electromagnetic fields) and biological (new and reemerging infectious diseases such as tuberculosis, dengue, hepatitis, etc.) by populations. In this proposal, it seeks to use the occupational exposure matrix method to estimate previous exposure; carry out an active search of the exposed ones for constitution of the cohort;to estimate mortality from cancers and the prevalence of pleural diseases related to asbestos exposure; record and report confirmed cases of diseases acquired with exposure to asbestos to the state for referral for medical treatment and follow-up and ; contribute to the collection of information about carcinogenic agents and their effects on health related to the work environment in Brazil.

Postgraduate Program 3. **grade 5**

CHILDEN'S AND WOMEN'S HEALTH

Justification

The link between training and research has allowed the Children and Mothers Institute to play a relevant role in its areas of work, highlighting the coordination of the Latin American Network of Human Milk Banks and the Brazilian Network of Neonatal Research (RBPN), which was created with the support of MS with the objective of constructing and implementing indicators of quality of care and of conducting multicenter and collaborative studies in the perinatal area. The Graduate Program in Child and Women's Health (PPGPASCM) aims to train professors and researchersand MDs capable of producing and critically analyzing knowledge derived from clinical and translational research to improve care for women, children and adolescents. His proposal came to fill important void left by postgraduate courses that have stopped working in recent years in our state in the areas of Pediatrics, Gynecology and Obstetrics. It seeks to train specific Masters and PhDcapable of: elaborating and conducting clinical trials in all its stages; analyzing observational studies critically; conducting health and economic technology assessment studies; carrying out diagnostic studies, prognostic and therapeutic biomarkers; doing clinical genetics studies; conducting toxicology analyses, studies of the use of medicines in pediatrics and ; carrying out studies aimed at improving clinical practice, patient surveillance and safety.

Postgraduate Program 4. **grade 5**

HISTORY OF SCIENCE

Justification

The History and Science Graduate Program (PPGHC) seeks to formulate theoretical and methodological proposals for the historical treatment of issues related to global health and to evaluate historically the developments and transformations of international trade in the South Atlantic, refers to the circulation of knowledge, people and diseases, since the eighteenth century. The PPGHCS aims to train qualified historians in the area of history of the sciences and health, with a view to their insertion in institutions of higher education and research. At the same time, it seeks to contribute to the better qualification of professionals who work (or who, after graduating, come to work) as teachers of history in basic education. The PPGHC proposes: - To produce theses and dissertations according to the parameters of quality valued by the academic community of the History area. It is hoped that such conclusions will constitute relevant contributions to the advancement in historiographical production, both in terms of the objects and thematic areas of research and in what concerns the theoretical and methodological approaches and referents in the fields of knowledge that constitute the area of concentration and the lines of research. - To generate consistent, relevant and innovative intellectual production on the part of its teachers and students, with a view to meeting the quality parameters of historical research practiced in the area. In this sense, bibliographical production is valued in periodicals classified in the upper strata of the Qualis of History and in well-reputed publishers. - To guarantee the consistency of the lines of research with regard to the epistemological, methodological and thematic parameters of the area and the articulation between such lines and research projects and intellectual production of the teachers and students. Academic teaching production and the theses and dissertations of the program demonstrate close links with issues such as epidemics, gender, race, nature and environment, internationalization of the sciences, psychiatric practices, among others. In addition, the dialogue with the recent historiography of social history and cultural history has marked the production of teachers and students, who have been researching on slavery and diseases, reading practices, biographies and science writing**.**

Postgraduate Program 5. **grade 6**

PUBLIC HEALTH

Justification

PPGSP / ENSP's mission is to teach and train professionals in the Public Health area and in Science and Technology systems. The institutional mission of Public Health School involves the production of scientific knowledge, the provision of health services and technical cooperation and specialized advice in the public sphere, aiming to contribute to the improvement of living and health conditions of the Brazilian population. The general objective of the PPGSP is to train professionals in public Health, based on interdisciplinary knowledge, to carry out research, teaching and health services activities, in order to develop a critical understanding of the following axes: a) complexity of health-disease processes and health care; b) the relationship between the State and society in the construction of public health policies and; c) organization and operation of health systems, services and practices.In the organization of the Program, the following general principles are observed: a) quality of teaching, research and technological development activities; b) a search for continuous updating in these areas of knowledge; c) curriculum flexibility that addresses the diversity of trends and areas of knowledge; d) wide circulation of the knowledge produced and innovations developed, including when applicable, the search for mechanisms of their transfer to the practices and knowledge of the health services and the decision making in healthand; e) exchange and cooperation with Fiocruz's other graduate programs. The general objective of the Program is to train professionals in collective health, based on interdisciplinary knowledge for the exercise of research activities, teaching and acting in health services. The axes that organize this training are: complexity of health-disease processes and health care; relationship between State and society in the construction of public health policies and the organization and functioning of health systems, services and practices. This configuration has made it possible to substantially increase the demand for public policies from students who work in the public sector of health, higher education and social assistance in recent years. The PGSP / ENSP has also maintained the attractiveness of the demand for youth training of health professionals.

Postgraduate Program 6. **grade 5**

INFORMATION AND COMMUNICATION IN HEALTH (PPGICS)

Justification

The Postgraduate Program in Health Information and Communication (PPGICS) is part of Fiocruz's set of Graduate Programs, and therefore has the mission of articulating research and teaching, in particular in favor of improving quality of citizenship, and the consolidation and improvement of the Unified Health System. Being part of Fiocruz also brings us the challenge of fulfilling. A strategic role in the interface between the science and technology system and health, a challenge that is addressed through our specificity, related to the fields of information and communication. Moreover, although diversified, the teaching offered by all the Institution's units is based on common principles, among which it is emphasized here multidisciplinarity and the structuring role of information and communication. This implies the recognition of these elements as fundamental for research and innovation, service delivery, teaching, planning and internal management, as well as strategies for public discussions of science &technology and health, subsidizing the processes decision-making with society and the citizen. It is in this scenario, described here in just a few of its many peculiarities, that PPGICS seeks from the outset to move towards fulfilling its proposal, which is to constitute a space for the elaboration of an academic and scientific thinking and practice interdisciplinary that brings together and articulates the fields of Information and Communication, always in its relations with the sciences and health technologies.

Postgraduate Program 7. **grade 6**

TROPICAL MEDICINE

Justification

The proposal of the Graduate Program in Tropical Medicine (PGMT) of the Oswaldo Cruz Institute, grade 6, aims to improve the training of professionals so that they can think and act on the main public health problems, mainly in Brazil, Latin America and Portuguese-speaking African countries. Among the researchers in the field of Tropical Medicine, three trends have been identified: clinicians and infectologists who aim to provide care to the patient at the hospital level. Second, parasitologists, microbiologists, immuno-pathologists which aim at the laboratory study of the etiological agents including the experimental research and the understanding of the parasite-host relationship. Third, field epidemiologists aiming the integrated study of human populations, agents, reservoirs and vectors in their environment. The Program encourages translational research projects in the areas of classical epidemiology and clinical studies in infectious and parasitic diseases using molecular epidemiology, genetic, pathogenic and immunogenetic tools. The PGMT works in subjects such as: biological, clinical and epidemiological studies of co-infections, retroviruses, enteric and respiratory viruses, zoonoses of medical importance, mycoses,human helminthiases and intestinal parasites, hepatitis,mycobacterioses,sexually transmitted and Chagas diseases. Also, emerging and re-emergent diseases are covered.

Postgraduate Program 8. **grade 6**

TEACHING IN BIOSCIENCES AND HEALTH

Justification

The Postgraduate Program in education in Biosciences and Health (PPGEBS) is one of CAPES's few education programs focused on biosciences and health, making it strategic when designing not only science education but also the understanding of this teaching for the education of citizenry. The objective of PPGEBS is to train professional researchers of higher levels who work in the social mediation of scientific knowledge in formal and non-formal education, with a special impact on Basic Education, particularly in biosciences and health education. It is committed to robustqualification and production of innovative scientific knowledge, seeking a permanent scientific update and emphasizing an intimate connection between the context of the production of scientific knowledge and those of dissemination. The PPGEBS has a function that goes through the various objectives of the Integrative Network of Science and Technology for Confronting Infectious and Re-emerging Diseases.

Postgraduate Program 9. **grade 7**

PARASITE BIOLOGY

Justification

The Postgraduate Program in Parasite Biology (PPGBP) (grade 7), has as its main objectives the training of researchers enabled to act with leadership in the development of basic and applied research in the area of parasitology, as well as in the teaching of Univeristies and Research Institutions, disseminating critical and innovative thinking in this field. In this context, it provides students with an environment where the different facets of the parasitism phenomenon are integrated into human society. In PPGBP, the students can investigate parasitology with a closer look at the microenviroments, studying for example the gene expression and the molecules involved in the parasite-host interaction. When looking at the macro, they can construct global maps of the risk of transmitting pathogens to the spatial distribution of vectors, hosts and climatic variables that regulate their density, for example. In addition to the conceptual issues, it provides the student with unique experiences, beyond the laboratory, applying the knowledge obtained in the field and transmitting it to the general population, to elementary school children and to public school teachers. These

experiences encourage learners to leave their common place, trainingscientists, committed to the public health problems faced by Brazilians. The academic diversity of the Program enables the student body to have a broad and comprehensive education, since its teachers establish and lead important international cooperation agreements with teaching and research institutions from various countries, aiming at exchange of experiences and knowledge, support for research, technological development and training of human resources. Current international PPGBP collaborations include participation in projects with partnership from African, American, European and Asian countries.

ACTIONS

Theme

INTEGRATED NETWORK OF SCIENCE AND TECHNOLOGY FOR THE COUNSEL OF INFECTIOUS AND RE-EMERGENT DISEASES (RICEI)

Objetive

Dealing with of emerging and reemerging arboviruses

Action	Start	Finish
Team training in the integrated approach of virus-vector-host-environment interaction studies and their impact on surveillance.	11/2018	07/2022

Description

In diseases caused by viruses there is a lack of knowledge about the pathogens, which compromises the understanding of aspects of transmission and epidemiology, a recent example of great importance being the Zika virus. Considering the multiplicity of viral diseases and the various aspects necessary for adequate coping, we have chosen to emphasize understanding about transmission, thus contributing to surveillance, pathogenesis, and diagnosis. We aim to emphasize global understanding of the interaction of infectious agents, which implies an understanding of the relationships with the environment and with the various animals that interact with man. In recent decades, new clinical forms have appeared in known viruses, such as the Zika virus, the reemergence of viruses that had been controlled, such as dengue fever and persistence of viruses such as influenza, as well as the accelerated and geographical expansion of viruses. The most important mechanisms involved are the emergence of new viral strains via genetic modifications, the transposition of the species barrier by a virus and viral spread from an ecological niche.Changing patterns of social behavior such as heavy air traffic, importing animals, large-scale ecological modifications, and the reduction of resources and infrastructure for disease control actions have had great impact. Several of these situations have been particularly serious in Brazil, which suffers from the concomitance of infections. Fiocruz participates in research on these diseases and with international cooperation while the strengthening of collaborations is strategic for the consolidation of internationalization. We will act by the integration of entomological, epidemiological and transmission modeling approaches aimed at identifying / understanding the problems already mentioned. Also, unknown mechanisms in the pathogenesis will be approached both for the understanding of the mechanisms and for the orientation in the search for potential prognostic markers, severity and resistance or susceptibility. To achieve this goal, we need to train personnel at various levels in the areas of virology, entomology and global health. Such training must necessarily take place in the frontier areas of knowledge and accelerate the incorporation of the modern methodologies available. In addition, it should strengthen the integrated action of professionals from different fields.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Carry out advanced integrated Studies with foreign researchers	0	2	4
Quantitative	Researcher exchanges	0	2	4
Quantitative	International seminars with Institucional Partnerships	0	1	3
Quantitative	Training students at diverse levels	0	2	4
Quantitative	Publication partnerships	0	3	6
Action			**Start**	**Finish**
			11/2018	07/2022

Training teams in an integrated approach for the evaluation of pathogens and biomarkers caused by viruses

Description

In several of the emergent and reemergentviral infections, there is a need to advance the knowledge of the mechanisms involved in its pathogenesis. The epidemic caused by the Zika virus illustrates the widespread misunderstanding of the mechanisms that lead to the vertical transmission of the virus as well as its role in the central nervous system injury. The high number of children affected with microencephalyemphasizes the need for a better understanding of the mechanisms by which viruses cause damage to host tissues. However, the harms caused by the ZIKV are no exception. The Chikungunya virus leads to severe and long-lasting manifestations of which mechanisms are unknown, such as chronic joint involvement and fluctuations in presentation with prolonged periods of remission followed by reactivation.Considering the multiplicity of viral diseases and the various aspects necessary for adequate coping, we have chosen to prioritize infections with great impact on global public health.these situations in which Brazil plays an important role either by the involvement of large population segments allowing large-scale studies, i.e. by the ecological situation as an area of import or export of viruses, as by the migration of birds or the transport network, for example. The special situation of the Amazon is also highlighted here due to its important potential for the emergence of new viral strains, as well as the rich ecological interactions arising from the great multiplicity of vectors and vertebrate species with the participation of man. Regarding the approaches, the studies will seek to characterize the complex responses of man and other vertebrates in response to the viruses involving the innate and adaptive immune response and its relation to the manifestations of the diseases. As a bridge between the integration of research on pathogenic mechanisms and the development of products for prevention, diagnosis and therapy, we will emphasize the identification of biomarkers. In this context, alterations in the response of the vertebrate host are important, identifying patterns of response related to clinical forms related to resistance and susceptibility, as well as those related to greater or lesser severity and changes related to different clinical manifestations.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Publishing partnerships	0	3	6
Quantitative	Students trained in several levels	0	2	4
Quantitative	Carrying out integrated advanced studies collaboration with foreign researchers	0	2	4
Quantitative	International seminars Institucional partners	0	1	3

Action	Start	Finish
	11/2018	06/2022

Team training in the development of advanced diagnostic methods for viral diseases

Description

Our proposal includes the integration between scientific areas of scientific advancement in understanding the pathogenesis and technological development for the development of products for the diagnosis of viral diseases. The diagnosis included in its more frequent use, the possibility of identification of infected cases, but also in the identification of those susceptible to infection or in the identification of cases withprognosis and requiring differential management. As already pointed out, this action dialogues with the previous action aimed at, among other aspects, the identification of biomarkers based on adequate clinical characterization. However, the developmental component of diagnostic methods may include development for other viruses, depending on opportunities arising from related projects. In this new phase, emphasis will be placed on methodological innovations for prospecting, production and development of new antigens and diagnostic tests against arbovirosis (Dengue, Zika and Chikungunya). To do this, we intend to work on different research axes, using cutting-edge methodologies, which go through basic research, applied and with product generation. More specifically, it is intended to (i) prospect for secreted / excreted parasite antigens based on aptamers in ultra sensitive fluorescent (ALS) assay; (ii) screen of parasite membrane proteins by proteomics (platform available at the institution) or by protein microarray techniques; (iii) create novel diagnostic methods including, antigens coupled to fluorescent microspheres (Bioassay FC-Multiplex with up to 15 types of microspheres per assay); Digital PCR (digital droplet PCR, ddPCR) and ; (iv) development of a point-of-care device, printed in 3D and controlled by cellular application for arboviruses (Dengue, Zika and ChiKungunya).

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Publishing partnerships	0	3	6
Quantitative	Students training in several levels	0	2	4
Quantitative	Number of Brazilian researchers who have carried out missions abroad	0	2	4
Quantitative	Number of Fiocruz PPG student who have trained abroad	0	2	4
Quantitative	Number of foreign researchers who Have carried out missions in Brazil	0	2	4
Quantitative	Researcher exchanges to strengthen international research networks	0	2	4
Quantitative	involvement of institutions from other countries	0	3	6
Quantitative	integrated advanced studies in collaboration with foreign researchers	0	2	4
Quantitative	International seminars with institutional Partnerships	0	1	3

Action	**Start**	**Finish**
	11/2018	06/2022

Team training in advanced approaches to the diagnosis and treatment of diseases caused by parasites

Objective

Improvement of preventive, diagnostic and therapeutic tools against parasitic diseases

Description

In the development of parasitase diagnoses, we will perform: (i) screening for secreted / excreted parasite antigens based on aptamers in an ultra sensitive fluorescent assay (ALS). Initial results with aptamers (single-stranded nucleic acids in 3D structure that recognize a high affinity target molecule) are promising and the methodology can be adapted for the diagnosis of infectious-parasitic disease differences; (ii) screening of parasite membrane proteins by proteomics (platform available in the Institution) or by microarray techniques of proteins that allow to triage large amount of proteins using minimal volume of serum (microchips, each capable of containing up to 2000 different proteins); (iii) novel diagnostic methods including, antigens coupled to fluorescent microspheres (Bioassay FC-Multiplex with up to 15 types of microspheres per assay); PCR (digital droplet PCR, ddPCR), a highly sensitive technique that allows the detection of minimal amounts of parasite DNA in less invasive samples, such as saliva and ; (iv) the development of a point-of-care device, printed in 3D and controlled by cellular application for the diagnosis of neglected diseases (Leishmaniasis and Schistosomiasis). In the field of therapeutics we will carry out experimental studies and clinical trials for the drug combination test, as in leishmaniasis, and new drugs developed in parallel studies to those presented in this proposal. We will also use more fl exible, fast and efficient methodologies in the search and / or improvement of chemotherapy, as in the prospection of new therapeutic targets by genomic editing (CRISPR and CISPRi); the knockdown system by CRISPR in trypanosomatids; functional genomics (RNAi) and high-content image with selection of phenotypes of interest; drug delivery systems in liposomes, by nanotechnology such as nanobastons and pharmacogenomics, evaluating host genetics in therapeutic failure and/or drug metabolism (sequencing technologies).

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Conduct advanced integrated studies in collaboration with foreign researchers	0	2	4
Quantitative	student training at several levels	0	2	4
Quantitative	Publication in partnership	0	3	6
Quantitative	International seminars with institutional partners	0	1	3
Quantitative	Researcher exchanges	0	2	4
Action			**Start**	**Finish**
			11/2018	06/2022

Team training in advanced approaches for the prevention and surveillance of diseases caused by parasites

Description

In parasitic diseases, we aim to include a more technological advance, with an emphasis on vaccines, surveillance, diagnostics, and treatment products. In vaccines, we will work on the identification, enhancement and validation of vaccine targets. We will identify new vaccine targets by genetic editing methodologies (CRISPR), as well as bioinformatic tools, including reverse vaccination; to evaluate the immunogenicity of vaccine prototypes in humanized cell models for evaluation and allergenicity. We will test attenuated vaccines with clinical studies to improve the dosage used. Still in the vaccine area, we will explore "vaccines against disease", which address the manifestations of the disease and not necessarily the infection, such as in leishmaniasis and malaria. Regarding surveillance, we will evaluate the behavior of insect vectors and their interactions with their natural parasites. This includes modulation of sexual communication, associated sensory functions and nerve and neuroendocrine bases; infection-induced physiological changes (in the post-infection gene expression); the microbial and the establishment of pathogen infection in transmitters aiming at the possibility of paratransgenesis (use of modified symbioses to prevent transmission and the genetic editing (CRISPR) for the editing of genes related to susceptibility. It will also include evaluation of the intrinsic susceptibility of the vector to infection, replication and transmission of pathogens, the characterization of transmission dynamics of secondary vectors, and the accurate identification of vectors during outbreaks and epidemics

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	International seminars with institutional partnerts	0	1	3
Quantitative	Researchers exchanges	0	2	4
Quantitative	Conducting of integrated advanced studies with foreign researchers	0	2	4
Quantitative	student training at several levels	0	2	4
Quantitative	Publishing partnerships	0	3	6
Action			**Start**	**Finish**
			11/2018	07/2022

Team training in advanced approaches toincreasing the understanding of infectious comorbidities and the interactions between infection agents and chronic degenerative diseases

Objective

Integrated understanding of the complexity of interaction in infectious diseases

Description

The concomitance of infection by two pathogens is comparatively little explored topic although it has important practical relevance. These interactions amplify the complexity of the interactions and may have additive and synergistic effects. Although limited studied, co-infections reach large portions of the population, with an estimated 800 million people world-wide having helminth infections. Co-infections with HIV are also well known, among them the association between HIV and tuberculosis (in some countries, about 80% of patients with tuberculosis are HIV positive), the hepatitis C virus,

in addition to frequent co-infections with opportunistic agents in the advanced stages of AIDS. In the case of parasites, there are reports of co-infections of malaria with helminths and with the hepatitis virus, for example, with changes in disease status. It is not uncommon for an infection to be the first step in the development of a chronic disease, such as the frequent involvement of the hepatitis B virus in the development of chronic liver disease and hepatocellular carcinoma.The role of infection and / or inflammation in diseases until recently unrelated to infectious causes, such as the involvement of Helicobacter pylori with gastric ulcer and the role of inflammation in atherosclerosis, is also well known. It is unnecessary to emphasize the practical possibilities of knowing these pathogen-pathogen interactions and pathogen-chronic infections in public health by the possibilities of well-directed early therapeutic measures. A topic of great relevance today is the association of the microbiome, especially those of the skin or intestine, with several diseases, including cancer, cardiovascular disease, chronic obstructive pulmonary disease, but also with autism, neuropsychiatric diseases and chronic fatigue syndrome, for example. Additionally, the relationships between the microbiome with infections are viral, bacterial, mycobacterial or parasitic are also important. Fiocruz has productive groups in the study of microbioma in the themes of co-infections, infections and chronic diseases and in the relation of microbioma with infectious diseases. This activity will be greatly increased by the structuring of internal collaborations, with coverage of all national biomes, and with the increase of international collaborations. This Action establishes RICEI (Theme 1) with RICRONI (Theme 2).

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Professor's training at several levels	0	2	4
Quantitative	Researcher exchanges	0	2	4
Quantitative	Publishing partnerships	0	3	6
Quantitative	international seminars with institutional partnerships	0	1	3
Quantitative	Advanced integrated studies in collaboration with foreign researchers	0	2	4

Action	**Start**	**Finish**
	11/2018	06/2022

Team training in the analysis of large volumes of heath data of interest for the modeling of interactions of pathogens, infirmities, and their environmental and social determinants.

Description

The area of quantitative methods in health sciences seeks the study of phenomena through data analysis, such as number of reported cases of diseases and observed patterns, such as temporal or spatial trends. Some examples would be the evaluation of emerging and recurrent epidemics, analysis of the population dynamics of disease vectors, microbial resistance study and molecular dynamics, among others, using mathematical, statistical and computational models in an interdisciplinary approach. More recently, the possibility of using large databases has opened up new perspectives. Fiocruz promotes the integration of knowledge at different levels (population, individual and sub-individual) in order to broaden the scope of the health sciences. Utilizing available knowledge and high-performance computing resources in a secure environment, it is possible to promote innovative knowledge capable of significantly increasing the understanding of the population's health problems and also of supporting decisions in public policies.Fiocruz has the Center for the Integration of Data and Knowledge for Health (CIDACS) and the Institute of Science and Technology in Health (ICICT), as well as other structures that have contributed significantly to this with strong national and international collaborations. Finally, by combining analysis systems with computational and mathematical models, we can contribute to the area of systems biology. The integration of multi-atomic data for the construction of models that represent the biological systems with information about transcritomas, genomes, microbiomas and structures of molecules to describe mechanisms of action and to predictthe effects of alterations of these systems, allows advances in the understanding of biological and health phenomonomics. This is of great importance, since analyses of the large amount of data generated from this proposal may provide the subsidies for the rational development

of new drugs, vaccines or diagnostic kits. It will also contribute to the understanding of the complex mechanisms involved in the interaction of pathogens with their hosts. Fiocruz has an essential infrastructure to support this proposal (an NGS sequencing platform with high data capacity and a bioinformatics platform capable of processing all the data) and makes them available to the scientific community through public databases.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Advanced integrated studies in collaboration with foreign researchers	0	2	4
Quantitative	Publishing partnerships	0	3	6
Quantitative	Researcher exchanges	0	2	4
Quantitative	Professor's training at several levels	0	2	4
Quantitative	international seminars with institutional partnerships	0	1	3

Action	**Start**	**Finish**
	11/2018	06/2022

Team qualification in modern approaches for the study of microbial resistance to therapeutic Agents.

Description

Antimicrobial resistance (AMR) is a global public health problem and threatens theprevention and treatment of a large number of pathogens including bacteria, parasites, viruses and fungi. There is an increased risk of returning to the pre-antibiotic era, when trivialinfections posed a threat to survival is a real. Resistance of bacteria to available treatments is increasing and widespreadworldwide. In some cases, resistance to all therapeutic optionsavailable for common infections. 700,000 people die every year from infectionscaused by resistant bacteria. Estimates suggest that in 2050 there will be 10 millionif no new approaches are introduced to cope with AMR. Among other aspects, rational use andnew strategies for infection prevention are needed, while new diagnoses andclasses of antibiotics need to be produced. Finally, it is important to understand the mechanisms of resistance.

Fiocruz participates in efforts to address antimicrobial resistance and this proposal will develop: Investigation of preventive measures throughepidemiological studies that minimize infections with resistant pathogens; evaluation byclinical trials of new classes of antibiotics or therapeutic strategies (adjuvants etc) for multi- (or totally) resistantbacteria; investigation of more effectivediagnostic methods to identify resistant agents. Also Meta-genomic strategies forsurveillance / monitoring of resistant strains; systems biology studies inantibacterial resistance based of molecular networks of host-bacterial interactionsand changes after exposure to drugs. Investigation of virulence factors in bacteria that can be neutralized without the killing to promoteselective pressur and investigation of microbial communities with possible changesecobiology of the microbiota capable of mitigating infections; Research approachesthat minimize antimicrobial resistance, andexisting drugs. Academic training and face-to-face education and distance (from institutional platforms such as the Virtual Campus and UNA-SUS) willcompose the portfolio of institutional actions in a transversal way in these themes.

Theme

INTEGRATED NETWORK OF CHRONIC DISEASES OF NON-INFECTIOUS ORIGIN (RICRONI)

Objective

Dealing with metabolic diseases and aging

Action	Start	Finish
Epidemiolgy of metabolic diseases in adults including those of the aged population	11/2018	07/2022

Description

Chronic diseases account for the highest rates of mortality and morbidity in Brazil. Its substantial increase not only has negative consequences for the quality of life of the adult population of the country, but also accounts for the higher expenses with hospital care in the Unified Health System (SUS). However, there are still important gaps in knowledge about the incidence of chronic diseases and their risk factors. Within this scenario, we will use two structures already available in Fiocruz. The Longitudinal Study of Adult Health - ELSA Brazil - emerges as an essential research for public health management in Brazil. ELSA is a multi-center cohort study of 15,000 employees from six public higher education and research institutions in the Northeast, South, and Southeast regions of Brazil. With this cohort, the incidence and risk factors for chronic diseases, including biological, behavioral, environmental, occupational and social factors, in particular, cardiovascular and diabetes, will be investigated. With Research Centers distributed in six states, the objective is also to analyze possible regional variations related to these diseases in the country. Large-scale retrospective studies on the epidemiology of metabolic diseases listed above will be carried out at the Center for Data Integration and Knowledge for Health (Cidacs, Fiocruz-Bahia) within its platforms, namely: a cohort of 100 million Brazilians, and bioinformatics and genetic epidemiology. In addition to the generation of scientific knowledge that will be of great importance for decision-making in relation to public health policies, the projects to be developed also have as a goal the qualification of professionals in the epidemiology of chronic diseases. Beyond national boundaries, it also aims to become a reference for populations of other countries with characteristics similar to Brazil.

Action Indicators

Type	Indicator	Current	Year 2	Final Goal
Quantitative	international seminars with institutional partnerships	0	2	4
Quantitative	post-doctorate scholarships	0	1	4
Quantitative	post-doctorate abroad to young researchers	0	2	6
Quantitative	Senior researches visits to Brazil	0	2	6
Quantitative	split-site PhD	0	2	4

Action	Start	Finish
	11/2018	11/2022

Studies of the mechanisms involved in the pathogenesis and physiopathology of diabetes and obesity (including associated cognitive and neuro immune alterations)

Description

In addition to the epidemiological aspects, we will study the pathophysiology of metabolic diseases, of great importance in public health, including diabetes (type-1 and type-2) and obesity. One of the important aspects whose scientific knowledge is still relatively restricted is the potential relevance of immune cells in the metabolic processes that underlie the evolution of these diseases. We will expand the studies related to this aspect, including the functional, molecular and genetic characterization of the in flammatory phenomenon that leads to central nervous system dysfunctions associated with obesity. Given that obesity is a risk factor for the development of dementia, the development of effective therapeutic strategies to prevent or prevent the progression of hypothalamic alterations and the increasing epidemic of metabolic diseases becomes urgent, under the risk of an enormous overload to the public health system. We intend to test new compounds with potential use in the fight

against obesity, applying nanotechnology strategies to increase the efficacy of certain compounds. Within the scope of this action, we will use institutional strategies aimed at the training of multidisciplinary teams with a strong background in biochemistry / molecular biology, immunology, pharmacology, cell biology, pathology, bioinformatics. To this end, our postgraduate students, postdoctoral trainees and young researchers will need to work in an integrated way among themselves and with international actors with strategies that include, among others, split-site doctorate internships, co-tutela programs with foreign institutions, from senior researchers from foreign institutions, participation in international symposia organized in Brazil and in other countries

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	senior researchers visits	0	2	6
Quantitative	students training abroad	0	1	6
Quantitative	split-site PhD	0	2	6
Quantitative	post-graduation scholarships	0	1	4
Quantitative	international seminars with institutional partnerships	0	2	4
Action			**Start**	**Finish**
			11/2018	06/2022

Cellular migration in human leukemia and lymphoma

Objective

Dealing with oncological disease

Description

In this action, the molecular interactions involved in the process of cell migration of neoplastic cells, in particular comparing leukemias and lymphomas, should be analyzed by various techniques of cell biology and molecular biology. For this, established lines of human T lymphocytes derived from lymphomas or lymphoblastic leukemiaswill be used initially and then primary cells obtained from patients. In addition to the identification of several receptors known to be related to cell migration, we will perform functional assays in order to determine the migratory responses to different stimuli. In a second step, we will try to inhibit the migratory process with specific inhibitors for certain interactions, in order to define potential therapeutic targets. These procedures should be carried out in collaboration with the Pasteur Institute in Paris, and will allow the possibility of split-site courses for Brazilian students in that institution, in addition to the visit of researchers from the Pasteur Institute to participate in international courses related to this area of knowledge. Once the patterns of expression, functional response and inhibition of migration in cell line models have been defined, we will perform (in collaboration with INCA) similar tests on cells from cancer patients. In partnership with the PPG of INCA will be formed a consortium of PPGs in Fiocruz to form special groups aiming at training human resources in oncology with a multidisciplinary and international approach. In this sense, it will be important to further strengthen international partnerships, through split-site doctoral and postdoctoral internships, in addition to the participation of students in international symposiums, as part of structuring cooperation that really strengthens the institution and, therefore, human resources in coping with diseases of an oncological nature.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	post-doctorate abroad to young researchers	0	2	6
Quantitative	international seminars with institutional partnerships	0	2	4
Quantitative	Senior researchers visits to Brazil	0	2	4
Quantitative	post-doctorate scholarships	0	1	4
Quantitative	slit-side PhD	0	4	6
Action			**Start**	**Finish**
			11/2018	07/2022

Metatastic mecanisms in solid tumors and the development of biomarkers.

Description

The molecular mechanisms that determine the establishment of tumor metastasis from solid tumors still need to be better known. On one side is the process of exiting the metastatic cell from the primary tumor site, its circulation, and entering the site where metastasis will be established. In the case of breast carcinoma, in an experimental model, works developed in our institution demonstrated the participation of T lymphocytes in the "preparation" of a certain tissue (in the case of bone tissue) to receive the tumor cell. These studies should be continued and one of the facets will be the design of potential inhibitors of metastasis installation. In a first step will be mapped the molecules expressed by the metastatic tumor cells, and that could be related to the entrance of the same in the site of metastasis. Once metastatic cells have been extracted from continuous tumor cell lines, functional assays will be performed to measure the migratory response to these cells both in vitro and in vivo using immunodeficient animals as receptors for human tumor cells. In a later stage, potential inhibitors of molecular interactions previously defined as relevant for metastasis installation will be tested. In another group of projects, large-scale molecular biology techniques will be used to detect circulating biomarkers that can predict the metastatic potential of a given tumor. These studies will be performed for breast, ovarian and stomach cancers. As mentioned previously, the Fio-Cancer translational program, is already workingat Fiocruz, will be an important engine in achieving the planned actions, which will obviously be done in the context of Fiocruz's PPGs, and in partnership with INCA. Also within this scope, we will have as strategies the strengthening of networks of international scientific cooperation, involving exchange between Brazilian researchers and foreign researchers; the holding of international seminars and courses with partner institutions; the sending of students to split-site PhD in international partner institutions.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	international symposia in partnerships	0	2	4
Quantitative	split-site PhD	0	2	4
Quantitative	post-doctorate scholarships	0	1	4
Quantitative	post-doctorate abroad to young researchers	0	2	4
Quantitative	Senior researchers visits to Brazil	0	2	4
Action			**Start**	**Finish**
			11/2018	07/2022

Pathogenesis and physiopathology of neurodegenerative diseases with identification of biomarkers and molecules with therapetic potential

Objective

Deal with neuromuscular diseases, neuro-developmental diseases, and neuro-degenerative diseases.

Description

Increased life expectations and changes in lifestyle have led to an increase in the incidence of chronic degenerative diseases such as Alzheimer's disease (AD), characterized by progressive memory loss and other cognitive functions, with aging being the main etiological factor related to the sporadic form of the disease. The long duration of AD and the compromise of fragile structures that hold the essence of who we are, exerts a huge emotional and financial burden on patients, their families and society. The pathophysiology of AD includes neuroinflammation, oxidative and endoplasmic reticulum stress, loss of synapses and degeneration of specific neural populations. Soluble oligomers of the β-amyloid peptide (AβOs) promote direct damage to synapses, in addition to triggering inflammatory response and cellular stress. Recent studies have suggested that epigenetic dysregulation may play an important role in the early stages of memory changes related to aging and to the pathogenesis of AD. It is intended to advance in the knowledge of these aspects, which will allow the design of molecules and formulations (for example, nanotechnological basis) for coping with this disease. From the structural point of view, it is once again important to point out the recent creation of the translational program in Neurosciences (Fio-Neuro), which undoubtedly will be an important engine in the structuring of the various actions related to thisobjective. Also, in this action, the partnership with the PPG in Neurosciences of the Fluminense Federal University (UFF) will play

an important role in the formation of a multidisciplinary scope, allowing an advance of the knowledge about etiopathogeny and phyiopathology, both in experimental models of disease, but also in the design of therapeutic alternatives. In addition, interactions with institutions in partner countries have been designed to send PhD students to split-site PhD stages, postdoctoral fellowships, and the organization of international symposia in the field of diseases chronic-neurodegenerative diseases.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	split-site PhD	0	2	4
Quantitative	Senior researchers visits to Brazil	0	1	3
Quantitative	international symposia in partnerships	0	2	4
Quantitative	post-doctorate abroad to young researchers	0	2	4
Quantitative	post-doctorate scholarships	0	2	4
Action			**Start**	**Finish**
			11/2018	07/2022

Pathogenesis and physiopathology of neurodevelopmental disdeases with identification of molecules with therapeutic potential

Description

Neurodevelopmental disorders such as attention deficit hyperactivity disorder, schizophrenia, and autism represent pathological changes that remain in adult life. Autism spectrum disorder (ASD) presents high prevalence, characterized by 1) deficits in communication and social interaction and 2) repetitive behaviors and restricted interests / activities. CDC data from the United States show a high incidence of autism in the United States: one inevery 59 children is identified with ASD, four times more common in boys than in girls. The etiology of ASD lies in a complex interaction between genetic and environmental risk factors.

Several immune system changes are related to ASD, such as family history of autoimmune diseases and altered levels of in flammatory cytokines. In addition, changes in neuronal migration pattern in the cerebral cortex appear to be related to the development of ASD. An analysis of the immune system in an experimental model of autism, as well as treatment with drugs potentially used in humans, such as the molecule known to have neuroprotective, anti-oxidant and anti-inflammatory effects, may be able to prevent the emergence of autistic type in animal models. The proposed analyses will provide information relevant to the advancement of knowledge about the neurobiology and neuroimmunology of autism, presenting potential for the development of therapeutic and diagnostic tools. Similar strategy will be developed in schizophrenia and depression, in experimental models already established in Fiocruz. It is important to note that there will be an important institutional effort for multidisciplinary training, which will allow an advance of knowledge about etiopathogeny and phyiopathology, both in experimental models of disease, but also in the design of therapeutic alternatives. To this end, a Translational Neuroscience Program has already been created and will participate in the PrInt. In addition, Fiocruz will partner with the Fluminense Federal University (UFF) Neuroscience program in the creation of Fiocruz-UFF special classes in neurosciences, involving some Fiocruz PPGs. With the same purpose of multidisciplinary training, it will be important for young doctoral students and postdoctoral students to undertake internships abroad, medium and longterm.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	post-doctorate scholarships	0	2	4
Quantitative	split-site PhD	0	2	4
Quantitative	post-doctorate abroad to young researchers	0	2	4
Quantitative	Senior researchers visits to Brazil	0	2	4

Quantitative	International symposia in partnerships	0	2	4

Action	Start	Finish
	11/2018	07/2022

Pathogenesis and physiopathology of neuromuscular diseases with identification of possible biomarkers and potential therapeutic molecules.

Description

One of the aspects to be studied with regard to neuromuscular diseases and diseases followed by neuronal degeneration is the role of molecular interactions mediated by ligands and relevant receptors.On the one hand, the maintenance and function of the musculoskeletal and nervous systems in normal conditions, and also of importance in the formation and maintenance of inflammatory sites that potentially cause tissue damage. In this context, molecules that are capable of modulating such interactions, either within the muscle fiber itself, in the motor plate, or in neurons of the central nervous system or dorsal root ganglia, should also be tested as therapeutic alternatives.

Considering the absolute importance of training specialized personnel to cope with such challenges, we should train PhDsand postdocs, using a multidisciplinary approach, including cellular and molecular biology, pharmacology, and molecular modeling. In terms of internationalization, undoubtedly the strategy of promoting split-site doctorate internships in laboratories of partner countries will be emphasized, as will the arrival of senior visiting professors from these countries; besides the participation of these young people in international congresses. This will promote a better structure that will be an international network on cellular interactions in neuromuscular diseases.

Action Indicators

Type	Indicator	Current	Year 2	Final Goal
Quantitative	International symposia in partnerships	0	2	4
Quantitative	post-doctorate scholarships	0	1	4
Quantitative	post-doctorate abroad to young researchers	0	2	6
Quantitative	Senior researchers visits to Brazil	0	2	4
Quantitative	split-site PhD	0	4	6

Theme

INTEGRATED NETWORK FOR DEALING WITH HEALTH INEQUITIES (RIDES)

Objective

Dealing with metabolic diseases and aging

Action	Start	Finish
Enable students and researchers in the analysis of socioeconomic development models and social dynamics and their relationship to the health-disease process.	11/2018	07/2022

Description

Networks of cooperation of institutions and researchers from different countries are the current mode of operation of science. All the complexity of the problems and challenges are, thus, faced through the sharing of research, methodologies and knowledge. The networks allow the confrontation of problems that transcend national borders or that are common to several nations, as well as the reduction of inequalities between and within countries. Thus, fostering networks is fundamental for advancing scientific knowledge, especially for analyzing health inequalities related to socioeconomic development models and social dynamics. Two aspects of studies on the analysis of health inequalities related to socioeconomic development models and social dynamics in terms of international cooperation are pointed out. The first is to carry out studies that seek to consolidate citizen epistemologies relevant to social vulnerability, climate change and sustainable livelihoods. These citizen epistemologies emerge from accumulated experiences of populations that rely on mutual aid actions and solidarity in building communities. Citizen epistemologies that promote the development of the capacity to recover and reestablish social bonds, ways of living and territories

when faced with extreme events related to climate change. The second is to carry out research on relevant and complex problems that deal with large enterprises and exposure to industrial wastes, toxic and carcinogenic substances, mineral tailings aimed at protecting the health of exposed populations. The development of research in international cooperation on these two fronts will take place through North-South or South-South partnerships and will involve different student and researcher exchange strategies (postdoctoral studies of Brazilians, short visits by foreign researchers) and such as the holding of international academic seminars. It is also important to encourage the expansion of scientific output resulting from these international partnerships.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Development of research projects in international partnerships	0	1	3
Quantitative	Short term exchanges (brazilians abroad and visits of foreigners for academic activities)	2	3	6
Quantitative	post-doctorate abroad to professors	2	4	6
Qualitative	Strengthening of the collaborating network	developing the network	Strengthening of the international collaboration network involving instituitions from different countries	developed network
Quantitative	International seminars in partnerships	2	4	6
Quantitative	Academic production in partnership	0	3	6

Action	**Start**	**Finish**
	11/2018	07/2022

Enable students and researchers in the use of theoretical and methodological models for analyses of health vulnerabilities from a historical and social perspective of the health-disease process.

Description

International cooperation in the development of health education actions is fundamental for confronting and reducing health inequalities caused by development models and understanding different social dynamics to improve and promote the health of populations. This action is aimed at strengthening partnerships and exchanges between Brazil and other developed and developing countries for health education in the area of analyses of health inequalities related to socioeconomic development models and social dynamics. Thegraduate training of qualified cadres for the generation of new knowledge and search for solutions in this scope. This type of cooperation favors the exchange of knowledge about educational experiences, different methodologies and pedagogical strategies used by different countries to address health problems for sustainable development. In this sense, it involves activities that include: - Partnerships and incentives for the exchange and mobility of students, by attracting and welcoming foreign students, and by sending Brazilian students to institutions in other countries (split-site PhD scholarships and other strategies); - Partnerships to carry out courses with international institutions and researchers, carried out in other countries (eg international master's and doctorate degrees in Latin American and Portuguese-speaking African countries) or in Brazil (ex: teachers invited to teach courses of short duration). - Investments in technological and pedagogical innovations that favor international cooperation (use of virtual campus, videoconference, distance technologies, didactic material).

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Short courses with the participation of international guests at Fiocruz	2	4	6
Quantitative	split-site PhD	2	4	6
Qualitative	distance learning technologies improvement	started	Improve the Fiocruz virtual campus technologies and promote its usage by professors and student	Fiocruz virtual Campus improved

Action	**Start**	**Finish**
	11/2018	07/2022

Exchange of students and researchers from Brazil and partner countries for the development of analysis methodologies to measure individual economic and psychosocial constraints.

Objective

Studies on social determinants of health, based on the epidemiological method, approach to complex systems and other methods, encompassing different exposures and health outcomes.

Description

The international cooperation for the development of new methodologies of data analysis of health is fundamental for strengthening the excellence of research in Brazil. Exchange programs and the resulting exchange of experiences between professors and students of several institutions, recognized for the excellence of their research, will foster the training of qualified professionals in Brazil and contribute to the development of new data analysis methodologies, including techniques from data science , mathematical models and statistics, as well as methods that are still little used in health and epidemiological research, such as the systemic approach, including simulation techniques. The generation of innovative data analysis solutions will bring new knowledge in the understanding of the relationship of social determinants with health outcomes.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	Development of research projects In partnership	0	2	4
Quantitative	split-site PhD	0	2	4
Quantitative	international seminars in partnerships	0	1	3
Quantitative	researchers exchange	0	3	6
Qualitative	Strengthening of the collaborating network	developing the network	Strengthening of the international collaboration network involving instituitions from different countries	developed network

Action	Start	Finish
	11/2018	07/2022

Enable Brazilian students and researchers to conduct research using complex modeling systems as a way to broaden the understanding of causal maps and the role of social inequalities

Description

The training of students and researchers to carry out studies using complex systemic modeling will allow broadening the understanding of social inequalities and the interaction between their indicators and the factors that maintain stability or promote changes in the Brazilian public health panorama. This approach is relatively new in global and incipient public health in Brazil, and can be leveraged through the training of Brazilian researchers and students in international institutions, recognized for the excellence of their research, thus contributing to the training of qualified cadres in Brazil.

It is hoped, therefore, the development of skills among students and researchers to approach, with innovative methodology, health inequities and the impact of interventions, contributing to better planning of actions to address inequalities, incorporating the eco-social approach health outcomes and behaviors.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	split-site PhD	2	4	6
Quantitative	Short courses with international guests at Fiocruz	2	4	6
Qualitative	distance learning technologies improvement	started	Improve the Fiocruz virtual campus technologies and promote its usage by professors and student	Fiocruz virtual Campus improved

Action	Start	Finish
	11/2018	07/2022

Students and researchers training on the formulation and implementation of health policies in systems of different countries, with emphasis on international cooperation.

Objective

Conduct cooperation activities in education and research of health policies, systems and services.

Description

The establishment and strengthening of cooperation networks involving institutions and researchers from different countries is fundamental to the advancement of scientific knowledge on health policies, systems and services that allow dealing with problems that transcend national boundaries or that are common to nations, as well as reducing inequalities between countries and within countries. Two major lines of studies on strategic health policies, systems and services are identified in terms of

international cooperation. The first is to conduct studies on health policies, systems and services in a comparative perspective, to analyze the similarities and differences between Brazil and other countries, as well as to understand their repercussions and impacts on the health situation and reduction of social inequalities in health. The comparative method allows us to explain the determinants of policy advances and difficulties, to identify positive experiences in the organization and management of health systems and services, and to provide support for proposing policies aimed at reducing inequalities and improving the health situation of the population as a whole. The second is to carry out research on the formulation and implementation of strategic health policies for the health systems of different countries, deserving prominence in terms of international cooperation.Some of these policies focus on coping with relevant and complex problems that go beyond national boundaries and have serious social effects in developing countries (eg HIV / AIDS, tuberculosis, tobacco control, in children). Others are relevant for their structuring nature of health systems, with implications for equity and sustainability of systems (models of organization and health care, training and management of human resources, public / private relations in health, development and access to medicines and technologies). The development of research in international cooperation on these two fronts will take place through North-South or South-South partnerships and will involve different teacher exchange strategies (postdoctoral studies of Brazilians, short visits by foreign researchers) and such as the holding of international academic seminars. It is also important to encourage the expansion of scientific output resulting from these international partnerships.

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Qualitative	academic production in partnership - adoption of publication incentives with international partners	publications with current partners	increase in publications partnership	increase in publications partnership
Quantitative	Short students exchange (visits to foreign research institutions)	2	4	6
Quantitative	post-doctorate abroad to researchers	2	4	6
Quantitative	international seminars in partnership	2	4	6
Action			**Start**	**Finish**
			11/2018	07/2022

Enable Brazilian students and researchers to analyze policies, systems and services from a comparative perspective, including repercussions on the reduction of of social inequalities in health

Description

International cooperation in the development of health education actions is fundamental for the strengthening of public health systems in order to deal with problems and to respond to the health needs of the different groups, contributing to the reduction of inequalities and improvement of the health situation of populations. In this sense, international cooperation in education assumes a structuring character for public health systems. The strictosensu post-graduate level in master's and doctoral level is relevant for the training of qualified cadres for the generation of new knowledge and search for solutions within the scope of health policies, systems and services, aimed at reducing inequalities. The number of masters and doctors in public health is still scarce, especially in developing countries such as Brazil. In addition to this quantitative scarcity, there is much to be done to establish partnerships and exchanges between Brazil and other countries, developed or under development, to prepare researchers, teachers and managers to critically re flect, produce knowledge and solutions to the complex problems faced by health systems.This action is aimed at strengthening partnerships and exchanges between Brazil and other developed and developing countries for health education in the area of Health Policies, Systems and Services. This type of cooperation favors the exchange of knowledge about experiences educational systems and health systems in different countries to address health problems. In this sense, it involves activities that include: - Partnerships

and incentives for the exchange and mobility of students, by attracting and welcoming foreign students, and by sending Brazilian students to institutions in other countries (split-site PhD scholarships and other strategies) ; - Partnerships to carry out courses in partnership with international institutions and researchers, carried out in other countries (eg: international masters and doctorates in Latin American and Portuguese-speaking African countries) or in Brazil (eg: short courses). - Investments in technological and pedagogical innovations that favor international cooperation (use of virtual campus, videoconference, distance technologies, didactic material).

Action Indicators				
Type	**Indicator**	**Current**	**Year 2**	**Final Goal**
Quantitative	split-site PhD	2	4	6
Quantitative	Short courses with international participants	2	4	6
Qualitative	distance learning technologies improvement	started	Improve the Fiocruz virtual campus technologies and promote its usage by professors and student	Fiocruz virtual Campus improved
Quantitative	International Master and PhD courses abroad.	0	1	2
Action			**Start**	**Finish**
			11/2018	07/2022

STRATEGIES

1. Strategy for the consolidation of existing international partnerships, as well as the construction of new partnerships and cooperation projects to increase the relationship between the Brazilian institution and research groups abroad

International partnerships will be consolidated through the scientific projects and the search for joint resources for their development. The Steering Committee will monitor the development of the partnerships and will advise on the need for additional institutional support to arrange research group colaborationsinto institutional agreements. Through the analysis of scientific production on Fiocruz's priority themes with a low international cooperation density, we will identify potential partners to stimulate the construction of new partnerships through the interaction between Fiocruz groups and institutions abroad. In order to increase the attractiveness of the cooperation, we will enhance the competitive advantages of Fiocruz by using it institutionally: The facilities in the scope of projects: Fiocruz has a wide system of technological facilities, imaging, genomics and bioinformatics, for example, and a clinical research platform. Fiocruz operates in all fields of health research, which allows the combination of public health, biomedical, medical and human sciences approaches and also has hospitals and outpatient health centers. The drug production units (Farmanguinhos) and biological products (Biomanguinhos) enhance the action of its technological research and allow to advance to proofs of concept and pilot development. The national distribution of Fiocruz, presented in 11 states allows the cooperation with Brazilian groups in all biomes of the country. We will repeat the successful formation of Associated International Laboratories, which allow the association of scientific development and international training of human resources by fostering co-orientations. Recently we have developed Inserm, the CNRS and the Institut Pasteur de Paris. We have stimulated partnerships with prediction of shared disciplines and joint production of articles. Two recent examples were the Doctorate in Human Rights, Global Health and Life Policies, joint PhD with the University of Coimbra with compulsory subjects co-offered by professors of both institutions; and the partnership with the University of Michigan with teaching and research activities. The course was offered in a double enrollment regime for Fiocruz's PPGHCS and the Postgraduate Program in History of UFMG and counted on simultaneous transmission to UFMG, through the web conferencing platform of the National Research Network.

2. Strategies for attracting foreign students to Brazil

Our strategy is based on two pillars: visibility of the offerof the high quality education and the reception and support to the student during their stay at Fiocruz. Fiocruz has postgraduate programs (PPGs) that are very well evaluated by CAPES and with an international level and these courses cover several fields of health. Mostprogramssites have translations into English and Spanish. To increase the visibility of this offer, we began an effort with the PPGs to: prepare and disseminate texts with information aimed at students from outside the country; give visibility to the scientific production of PPGs; better dissemination of the strong themes of the PPG with capacity to attract students; facilitate access to information and communication with potential advisors. Expand the mechanisms of directed dissemination of opportunities: participation in international education fairs; expansion of participation in networks of educational institutions for students, teachers and technical staff to discuss topics on the global agenda, for foreign partners. Fiocruz participates in international networks, such as the National Institutes of Health and the Organization of Ibero-American States, which can disseminate opportunities to their audience. The pillar of the reception and support intends toincrease of the possibilities the selection of the foreign candidate’s usingat distance technologies. Increaseoffer of courses and academic activities in foreign languages, with emphasis on English and Spanish. We emphasize the existence of the Center for Support to the Student, whose purpose is to accompany the students during their stay in the institution, favoring the integration and the equation of individual and collective situations that may influence well-being, academic performance and in the professional development of students. Offerof free accommodation and transportation for up to 77 students, at Fiocruz'shostel; Offer of Portuguese courses for foreign students. This offer already occurs on the Rio campus, through an agreement with State University in Rio (UERJ) and in some of

the Institutes in other states, such as Bahia, in association with the Federal Univeristy there. Offer of Imporve the offter of English courses, also in agreement with UERJ, for professionals of Academic Secretariats: with the objective of facilitating the interaction between these professionals and the foreign students.

3. Strategy to attract faculty and researchers with international experience

Fiocruz already attracts international visiting professors to its activities and planning as part of its internationalization policy activity to increase existing activities and increase others. The Presidency of Fiocruz annually supports, through internal call up to 12 short international courses, already in place for some years. The initiative aims to encourage and consolidate cooperation and exchange of Fiocruz's Postgraduate Programs internally and with foreign institutions especially considering priority courses for more than one PPG. In general, the courses are offered during winter or summer to facilitate the access of the students, who receive credits for their attendance and fulfillment of the pre-established requirements. The courses have been onsite, but we have already had some successful experiences usingweb or videoconference. To date, some 140 courses have been supported, which implies the students' interaction to professors from the most diverse international institutions and allows foreigners to provide in-depth knowledge to Brazilian students, thus increasing opportunities for exchange. We have also stimulated partnerships with an established work plan, in which there are predictions of educational activities such as shared disciplines, holding seminars and co-authoringpapers. Two recent examples were the PhDin Human Rights, Global Health and Life Policies, a joint PhDwith the University of Coimbra, for which three compulsory courses were offered jointly by professors of the two institutions and the agreement with the University of Michigan, a partnership that predicted teaching and research activities. In addition, we will give support to the 10 INCTs coordinated by Fiocruz researchers during the visits of the foreign collaborators to promote seminars and courses. Foreign researchers participating in INCTs, because they already have collaborators in Brazil, more easily disseminate the opportunities available in Fiocruz to their groups and contacts abroad. For this initiative, we take into account multiple previous experiences during exchanges, such as those carried out under the Science without Borders Program, from which we have received, in several Institutes, postdoctoral candidates.

4. Strategyto prepare the scholarship holders for the period abroad as well as for their return, especially in order to increase the knowledge appropriation by the institution.

Preparation for going abroad includes the offer of English qualification being made available to all researchers and students. Language mastery is a critical factor for success in overseas experience and The Center for Student Support will promote periodic sessions introducing daily life of different countries. In these sessions, there will be researchers and students who have had the experience of residing in the country, as well as diplomatic personnel from the subject country, where they will mainly deal with issues related to academic life. For the return, our strategy includes that researchers returning from periods of more than one year may apply for re-entry grant support to facilitate the continuity of the research line or their adaptation to questions linked to the local group. The reentry grant will include the possibility of periodic visits for collaboration purposes to the institution abroad, as well as the invitation to members of the group abroad for collaboration in Fiocruz.Researchers with less than 7 years after obtaining a PhD degree may join the mentoring program, which allows for constant and direct contact with experienced researchers. Those who are not researchersof PG courses can benefit from the program of support for the inclusion of employees in the courses, which offers scholarships for the student to be supervised.It is also worth mentioning the encouragement and support to researchers and students to participate in the internationalization calls, offered by the FAPs, CAPES and CNPq. The International Education Advisory Board is a member of the Technical committee of International Cooperation, encourage and supporteducational actions in cooperation in South America and Africacountries.THe Board will oversee andsupport all international affair activitiesconceringtrainingin the differentmodalities, promotion of courses short-term international programs, follow-up of join PhD programs and encourage the mobility of students and teachers. They will be invited to pass on their experience both either using academic seminars or in pre-departure preparation sessions abroad. In the case of the return of students (with no employment relationship

with Fiocruz), we will promote the granting of Post-Doctorate scholarships, where appropriate, to work together with the local group. The coordinators of the local group that are servers may also request the support to maintain the collaboration with the group abroad; Students will be invited to present academic seminars and pre-departure sessions abroad.

5. Describe innovative strategies that will be used by the institution that were not mentioned above.

Fiocruz has been active in South-South cooperation with emphasis on Latin America and Portuguese speaking Africa. Thus, we promote actions aimed at developing the health systems with partner countries, seeking to strengthen the institutions that support the structuring of these systems, including the Ministries of Health, the National Institutes of Health, Public Health Training Centers and Health, Health Care Centers and Complexes of Production of Inputs, among others. Fiocruz has as its axis of international policy "structuring cooperation in health", in South-South cooperation, which seeks to overcome the old model of "donor-recipient" for a reorientation of the diplomatic negotiation of cooperation between institutions and / or countries, by which the "partners" jointly construct their cooperation initiatives, harmonizing interests, respecting the appropriation and leadership of each one, developing an integral approach to the health systems and taking advantage of a network that allows the real interchange between all and the use of the reciprocity of effort.In the last 10 years, we createda Masters program of Health Sciences in Mozambique through an agreement signed with the National Institute of Health. At this stage, Brazilian researchers went to teach classes in Maputo adapting the disciplines and the training of students to the demands and local infrastructure. Several postgraduate programs of FIOCRUZ participate in the course. The course began in 2008 and in 2017 the dissertations of the 4th class were completed and defended. In total, 45 masters were awarded. In addition, 5 students completed master's degree in Fiocruz in virology during this period, which results in the formation of 50 master’s diplomas. One aspect that we intend to expand Fiocruz's internationalization, in addition to North-South cooperation, is to consolidate and expand our South-South collaboration. The following actions will be carried out: in Mozambique, we will open the 5th class of the Masters in Health Sciences and prepare the offer of a PhD course.Along with the Mercosur countries, create a masters and PhD program in Health Sciences, in association with Universities of the countries of the group; Expand our offer of distance education, through the Virtual Campus Fiocruz (campusvirtual. fiocruz.br) and UNA-SUS (www.una-sus.gov.br), teaching in the field of health in Portuguese, Spanish and English.

POLICIES

1. Policy for selection of foreign partners, considering that 70% (at least) of the resources should be earmarked for partnerships with institutions based on countries that Capes maintains effective cooperation (listed in Annex I of the call).

Definition of priority areas is aligned with the institutional mission and great national demands and health emergencies. This process involves assessing the social context and health from the continuous monitoring of indicators. A relevant aspect is the traditional conclusion of cooperation agreements with these institutions that favor the exchange of students and researchers while maintaining the mobility and visibility of FIOCRUZ with partners of recognized international reputation in the areas defined as priorities. In this context, the recent consultation of the InCites database showed that the main areas of publication of Fiocruz (both by number of published works and by numbers and citations received) are: infectious diseases; parasitology; tropical medicine; public, environmental and occupational health; immunology; microbiology; cell biology; biochemistry and molecular biology; pharmacology andpharmacy and virology. It is important to note that Fiocruz itself appears among the top 10 institutions worldwide with the highest number of citations received in two of the 10 areas. In the area of tropical medicine, Fiocruz is the second and in parasitology it is the fifth institution suggesting that the policy for choosing partners has been successful.In each of these areas, we used co-authorship data with Fiocruz's participation in order to identify the institutions with which we collaborated most in each of the 10 areas indicated above, identifying mainly institutions located

among the 20 institutions with the highest number of citations. As an example, in Infectious Diseases Fiocruz collaborates intensively with the University of California System, Johns Hopkins, Yale University, NIAID-US, University of London, CDC-US and the Pasteur Institute International Network. In parasitology its main collaborators are: System of the University of California; the CNRS; the London School of Hygiene and Tropical Medicine (LSHTM), in addition to the Pasteur Network, CDC-US and O NIAID-US. In public, environmental and occupational health we have intensive collaborations with the University of California Los Angeles, the University of London with emphasis on LSHTM, Harvard University, Yale, and Johns Hopkins as well as the Universities of Porto and Nova de Lisboa. Based on the works of co-authorship, we identify the authors of Fiocruz who collaborate more with each of the institutions with which we publish articles that received more quotations

2. Grant policy and internal selection process for specific actions, within the funding lines of the Capes-PrInt program. In the case of cooperation projects with foreign institutions, the proposer should specify the application of funds, the plan of activities, reciprocal funding, academic mobility, technical - scientific production, counterparts in the partner institutions, among others.

The Vice-Presidency of Education Information and Communication creates, rules and presentsinternal selection calls for specific programs in different modalities, such as scholarships fornew PG programs, travel funding for student training, and financial support for shortinternational courses , for example. Publication of internal calls for structuring actions underthe CAPES-PrInt Program will be carried out for each specific funding item (split-site PhD scholarships, visiting researcher, etc). The PrInt will serve to structure harmoniously with thePG programs participation, internal calls with the creation of priority demands. These internalcalls will list the items that will aid the selection of the beneficiaries respecting criteria of thePrInt call granting of scholarships associated to proficiency in the language. According to thearea (history or medicine for example), the calls will also respect specificities to facilitate thecomparison among candidates. The evaluation and selection of calls will be carried out by aninternal committee set up for this purpose, where the steering committee will be following thedecision-making process. With a view to the sustainability of the program will be selected fromthe merit, meeting the criteria of each call and presenting prioritization of internationalizationwith institutions in the countries with which we have stronger cooperation.

In this context, cooperation agreements with specific universities with a well-defined actionplan aligned with the actions of the project will provide broader training strategies awardingdiplomas bilaterally. Training in the priority topics envisaged in PrInt will be defined, with theprediction of training activities establishing deadlines and goals. Also, agreements must beconcluded respecting open access institutional policies and with the forecast of jointpublication of scientific articles and possible joined PhD training. These actions should also beplanned in accordance with the guidelines set forth in the Institutional Development Projectand Fiocruz's Political Pedagogical Project.

3. Policy for hiring faculty with recognized scientific performance at an international level.

The competitions carried out by Fiocruz already value scientific performance and there is no restriction on the participation of foreigners. However, federal government regulations limit career entry to the highest levels. In order to mitigate this problem, Fiocruz created a "specialist" position that open posts to hire of experts in areas critical to the Institution. This is clearly an unmistakable sign of Fiocruz's policy for absorbing advanced cadres with scientific and technological performance of an international standard. We currently have more than 40 specialists in various areas in various units of the country. In addition, as a plan to attract foreigners (juniors), Fiocruz has international professional recruitment programs and has recently expanded visibility actions for foreign doctors to join the institution. Over the last 10 years, FIOCRUZ, with the support of CAPES, has launched induction programs for the recruitment of human resources abroad especially those Institutes created by FIOCRUZ (Centro de DesenvolvimentoTecnológico em Saúde or CDTS) with advertisement in

media and specialized Journals. Professionals were attracted to Brazil initially with postdoctoral fellowships, and theywere hired after a few years in Fiocruz where a national exam is also necessary. The formalization of these postdoctoral fellowship programs with the possibility of hiring will be carried out especially in programs that provide scholarships for young (foreign) doctors will be created with the support of PrInt and edicts with international calling will be published in priority areas that should, have negotiated positions with Minsitry of management and planning

4. Policy to increase proficiency in foreign languages for students, postgraduate faculty and technical staff that have a direct relationship with the proposed Internationalization Project.

Fiocruz now offers Portuguese language courses for foreigners, English for students (scientific writing) and English for the researchers and administrative staff. As an institutional counterpart to PrInt, Fiocruz will increase its offer of these courses by 100% by 2020, including a course in other languages. In 2017, demand for all language courses exceeded the number of vacancies and, therefore, a strong adherence to the offered courses is expected. The language program provided for in the internationalization policy is an action that strengthens the qualification of human resources for the institution and for the country, as well as making it possible to expand the offer of courses in English, which is a proposed institutional priority in its policy.

5. **Policy for recognition of academic and scientific activities performed by faculty and students abroad.**

The institutional policy is to encourage the recognition of credits in academic activities carried out in other programs or institutions, respecting ancorrespondence attributed by the coordination of each program. The programs that are submitting the proposal have in their regulations specific criteria that recognize credits to the activities developed abroad (courses, workshops and oral presentation in international congresses). In the scope of the project, the participation of students in regular courses offered by Fiocruz's own programs (including short international courses) and / or partner institutions will be encouraged. It will also stimulate the participation of teachers in courses offered in cooperation with other universities. Agreements with other institutions and disciplinary plans must be written in such a way as to present all required information: how will the participation of students and students, the timetable, the type of offer and the sustainability of the actions take place

6. Policy for hosting and support of foreign faculty, researchers and students.

Fiocruz hosts meetings annually for new foreign students and students from other states. Periodic workshopsare being created with follow-up by a coordinating group, with the participation of senior students who must accompany those who arrive and help them in understanding the institutional routines as well as the integration with the local culture. Fiocruz also offers vacancies for accommodation in the main campus and advanced campus in Rio de Janeiro and with PrInt we will increase the number of vacancies (77) by 20% over the next 2 years. We will still have the possibility of investing in the development of cultural programs based on activities coordinated by the students with the participation of researchers and students who arrive at the institution and need to be integrated into the culture of the country and the institution. A system together with FIOCRUZ's International Relations Center registers all foreigners in the campuses and a series of initiatives linked to the virtual campus for solidarity housing are being created where vacancies will be offered. Still an institutional app of carpooling was made available to the employeersand students where foreignershave access. All this information is systematized in a paper-based and electronically available flyer. Foreign language booklets are available and the pages of the postgraduate programs participating in this proposal for English and Spanish will also be updated

7. Policy for the appropriation of knowledge and experience acquired abroad by the beneficiaries of the actions of the Institutional Internationalization Project.

FIOCRUZ has historically used the "train the trainer", which is a way to train thepersonnel replicate

locally the concepts and knowledge acquired abroad. In this context, the FIOCRUZ multiplication workshopswith theresearchers that were trained abroad as well as the expansion of the workshops with the presence of foreign guests and the Brazilian researchers in the specific themes associated in this project. Some of the initiatives involved the offer of shared disciplines (with the use of web conferencing tools) to attend the different Institutes in the 11 states where FIOCRUZ is located. It is important to emphasize that mobility aimed at training and professional training is a reality in Fiocruz and the result of networks and integration of researchers and students who go abroad for training. Investment in research and education platforms is also an important institutional strategy for the integration of international experiences, as well as internal networks for the dissemination of information and knowledge acquired abroad, especially with courses on the FIOCRUZ Virtual Campus platform. Print features will help expand structured networks, and education platforms for greater ownership of knowledge by faculty, students, and community through systems developed by public calls.

8. Policy for management and operationalization of the Institutional Internationalization Project.

As a plan to strengthen and consolidate internationalization, a new internal structure will be created with the Vice-Presidency of Education, Information and Communication (VPEIC) for the planning and follow-up of policies approved and in operation in the ambit of Internacalization. This new structure, called the General Coordination of International Education (CGeInt), will support the Steering Committee in providing information and data and will interact with the Committee to organize the actions from the construction of internal calls with the formation of a group of analysts who will make also the monitoring and evaluation of actions and planned activities with clear goals and products that can be measured as presented in this proposal.The CGeInt will be composed of researchers and analysts from the current general coordination of Education (Postgraduate Dean) and also from the Center for International Relations in Health (CRIS), which will have a role in structuring CGeInt and subsequently an entire action plan and organization of activities within the scope of PrInt and other international cooperation project linked to the training of human resources.

9. Policy for monitoring and internal evaluation of the goals of the Institutional Internationalization Project.

The internationalization policy, with strategies and indicators that are part of our evaluation of institutional performance for the next 3 years (2018-2021) was created in 2017. Currently, PrIntis being built according to the planned priority targets for the next few years in the Institutional policy and should be consolidated to monitor internationalization, valuing PrInt's sustainability and innovation actions. Formal continuous evaluation are planned following upsemester reports of the impact of PrInt actions and areas using conventional metrics (published articles, number of subjects, number of foreign students, teachers in training activities), alternativemetrics (media visibility, co-authorship networks, and other information science strata) and new forms of social impact assessment as internalization of global actions aligned with WHO's plans. For example, the actions foreseen in the PrInt of FIOCRUZ can help in the effort to organize plans of the Ministry of Health to confront health emergencies or even priority issues (chronic-degenerative diseases or antimicrobial resistance). Therefore, a comprehensive evaluation system for monitoring the scope of activities carried out by PrInt's beneficiaries will be used. In this context, the Steering Committee will evaluate the progress of the various projects every six months, with data provided by CGeInt and will make recommendations as well as the progress of the projects and the prioritization and eventual realignment of the financing.

10. Policy for the conciliation of national development programs supported by Capes to the internationalization effort.

National development programs supported by CAPES, such as international training actions such as split-site PhD scholarships, visiting senior feloowships, as well as bilateral cooperation programs for

mobility and training such as summer/winter schools summits will be prioritized at FIOCRUZ for the orientation of these initiatives to the themes defined in PrInt. FIOCRUZ's research and education structure is supported by specific programs that strengthen the institutional mission and are articulated with the three structuring themes foreseen in this project.
Together with the Vice-Presidency of Research there are research programs in priority areas (eg FIO-TB, FIO-Neuro, FIO-Cancer, Arboviroses, etc.) where initiatives organize scientific cooperation networks for collaborative work and fundraising. Therefore, in the present proposal, the themes are organized as a way of articulating the institutional priorities of the FIOCRUZ programs with a view to strengthening the training of highly qualified human resources at an international level in these areas. For this, integrated calls for research in the institutional programs associated with the training of human resources supported by PrIntare foreseen. The internal programs of academic excellence and reduction of regional inequalities interact with the priority themes of this project. Some of FIOCRUZ's own actions promote convergence with actions that strengthen the training of researchers and students, such as short international courses, language courses and other initiatives. The PrInt will serve as a catalyst from the integration of the actions of the program with the policy of internationalization of education of FIOCRUZ expanding actions and the commitment of the units with the reception of teachers, students and researchers; programs of coomunications and diffusion of knowledge and science; Integrated training programs and research platforms.

11. Describe here other innovative policies that will be adopted by the institution that were not addressed in the above items.

The communication policy of Fiocruz will expand actions aiming at the institutional visibility to attract young students and researchers. To this end, increasing communication infrastructure for countries using social networks (professional or general) and advertisements on sites of scientific societies and specialized Journals. Therefore, at this point, the development of a communication project is planned to present the benefits of studying at FIOCRUZ using modern research, teaching and production platforms. Also, international student travel courses are planned for students with participation and wide dissemination to attract foreign students. Incentive policies (such as the granting of scholarships) for attracting foreign students will be adopted as counterparts of the FIOCRUZ presidency to the PPG that i) allocate quotas in their selective processes for foreign students; ii) offer 30% of the subjects in English; iii) have foreign members on the theses boards and encourage defenses (increasing to 30% in 3 years) in English. Therefore, we have transversely the programs of PrInt involved fully participating in the processes of attraction of foreigners, which will increase the reach due to specifications of each PG Program linked to the themes. Finally, a program of integration of foreign researchers and students into community life is in the development phase, which should contemplate different dimensions and scope depending on the different natures of exchange and types of stay of the foreigner favoring the interest and replicating personal experiences

FURTHER INFORMATION

1. Number of courses taught in foreign languages in post-graduate studies between 2013 and 2016	34
2. Number of graduate programs strictosensucotutela between 2013 and 2016	10
3. Number of strictosensu graduate programs with double degree between 2013 and 2016	2
4. Number of bilateral strictosensu graduate programs between 2013 and 2016	0
5. Number of contributions to derived products and database of international research projects	52
6. Number of CAPES development programs from which the institution benefited between 2013 and 2016	20
7. Number of Capes international cooperation projects from which the institution benefited between 2013 and 2016	4

8. Insertion of materials, themes and subjects in foreign language in the postgraduate program curricular structure

The curriculum of the courses ischanging annually, increasing the number ofreferences in English,

according to the themes. This incorporation takes place through textbooks or scientific papers. The short-term international courses, given primarily in the English language, are initiatives of the programs supported by the of the Vice Presidency of Education, Information and Communication call. It is a requirement of the call that the proposals benefit more than one Masters/PhD program, thus providing integration and interaction between researchers and students. The experience with the international courses has contributed to its incorporation as elective courses, to be offered regularly by the programs, with the possibility of offering to the group of students of the institution. With regard to the recruitment of foreign students, grade 6 and 7programs present their student selection calls in Portuguese, English and Spanish, increasing the participation of foreign candidates. Some programs with a higher level of internationalization have been, since 2016, conducting selective processes in English, by web conference. In this way, the candidate does not need to go to Brazil during the selection process, coming to the country only when approved. Programs already indicates for the next years the offer of regular courses in the English taught by Brazilians. The provision of English courses for Brazilians and Portuguese to foreign student has the objective of making the best use of the content by the students. Fiocruz also has aPublisher, which prints books in other languages (especially Spanish), as well as publishing scientific journals of international scope, including the centennial Memórias do Instituto Oswaldo Cruz and the Cadernos de SaúdePública. Most of these titles are used as bibliographical references in the various programs of the institution. Also, Fiocruz's video production structure will undoubtedly be an important tool for scientific dissemination subtitled in other languages. Video-lessons with Fiocruz researchers on mosquito vectors were made available on Youtube and in four years have already had more than 200,000 views in more than 110 countries. This is one of the initiatives that has taken place within the scope of the policy of open access to knowledge, one of the great guidelines of education in the institution.

BENEFITS ENVISAGED

THEME

INTEGRATED NETWORK OF SCIENCE AND TECHNOLOGY FOR THE COUNSEL OF INFECTIOUS AND RE-EMERGENT DISEASES (RICEI)

INTERNATIONAL COOPERATION PROJECTS

Project name **Start 11/2018** **Finish 07/2022**

Dealing with emerging and reemerging arboviruses

Description

We will act by the integration of entomological, epidemiological and transmission modeling approaches aimed at the identification / understanding of: new viral strains by genetic modifications, transposition of the species barrier by a virus and viral dissemination from an ecological niche. Also, alterations of vector interactions, with emphasis on Aedesaegypti in relation to the environment, with viruses and with the vertebrate host, with emphasis on man; alterations in the response of the vertebrate host identifying patterns of response related to clinical forms related to resistance and susceptibility and; markers of potential use in diagnosis. In recent decades, new clinical forms have appeared in known viruses such as Zika (ZIKV), the reemergence of viruses such as dengue (DENV) as well as the accelerated geographic expansion of viruses such as Chikungunya (CHKV). Changing patterns of social behavior such as heavy air traffic, importing animals and large-scale ecological modifications, and reduced resources for disease control actions. Several of these situations have been particularly serious in Brazil that suffers from the concomitance of the triple infection by DENV-ZIKV and CHKV. Fiocruz has been heavily involved in research on these diseases and with strong international cooperation and the intensification of these collaborations is strategic for the consolidation of international cooperation. We highlight the ZIKV that was responsible for a major epidemic in Brazil with an estimated 400,000 to 1.3 million cases. The CHKV virus, also identified in the 1950s, has caused epidemics in other areas more recently and promotes an epidemic in Brazil in 2016 with about 260,000 cases. In both ZIKV and CHKV there is a significant impairment of the nervous system in ZIKV, maternal-fetal transmission leads to severe impairment of the health of children with severe cases of microcephaly. These data illustrate that we need to reinforce the knowledge of viral evolution, transmission and pathogenesis of these and other viruses with potential for transmission to humans. Diagnosis of viruses, although long established, presents special challenges, such as very ephemeral viremia with dif fi culty of identification before the development of serological response. Also as a reinforcement to the need for greater emphasis on diagnosis, we emphasize that the proximity between the Dengue virus and the ZIKV virus with difficult distinction between them.

Missions Related to the Research Project

Year	Quantity	Value
2019	1	30,000.00
2021	1	30,000.00
2022	1	30,000.00
2020	1	30,000.00

Project Maintenance Resources

Year	Value
2022	10,000.00
2021	10,000.00
2020	10,000.00
2019	10,000.00

Grants linked to the Research Project

Year	Modality	Quantity	Total amount
2021	Training (3months)	2	50,932.80
2022	Training (1month)	2	30,916.80
2019	Split-site PhD (6months)	9	364,305.60
2021	Split-site PhD (6months)	9	364,305.60
2020	Visiting Professor (1month)	2	46,310.58
2021	Senior professor visiting abroad (3 months)	3	119,599.20
2022	Post Doctorate (6months)	1	35,755.29
2022	Visiting Professor (1month)	1	23,155.29
2021	Visiting Professor (1month)	2	46,310.58
2021	Post Doctorate (3months)	3	107,265.87
2019	Senior professor visiting abroad (3months)	3	119,599.20
2022	Junior professor visiting abroad (3months)	2	73,972.80
2019	Junior professor visiting abroad (3months)	3	110,959.20
2018	Senior professor visiting abroad (3months)	1	39,866.40
2020	Junior professor visiting abroad (3months)	4	147,945.60
2020	Senior professor visiting abroad (3months)	4	159,465.60
2019	Training (1month)	2	30,916.80
2022	Split-site PhD (6months)	9	364,305.60
2022	Senior professor visiting abroad (3months)	1	39,866.40
2021	Young Talent (6months)	3	177,465.87
2020	Split-site PhD (6months)	9	364,305.60
2021	Junior professor visiting abroad (3months)	3	110,959.20
2020	Young Talent (6months)	3	177,465.87
2020	Training (1month)	3	46,375.20
2019	Young Talent (6months)	4	236,621.16
2020	Post Doctorate (6months)	4	143,021.16
2018	Split-site PhD (6months)	9	364,305.60
2022	Young Talent (6months)	3	177,465.87
2019	Visiting Professor (1month)	2	46,310.58

Project name **Start 11/2018** **Finish 30/06/2022**

Integrated understanding of the complexity of the interaction of infectious diseases

Description

We will use new approaches in the study of interactions between disease transmitting insects, the pathogens they transmit and the corresponding hosts. We will study the modulation of the behavior of insect vectors and their interactions with their natural parasites. In addition, the physiological modifications induced by the infection; the microbioma and establishment of pathogen infection in transmitters aiming at the use of modified symbionts that prevent the transmission of the pathogen by the vector. Then, the genetic editing in order to edit genes related to susceptibility; the microbiology of breeding mosquito vectors; (behavior, microbioma of the female and breeding) and the study of vectorial competence, including studies of intrinsic susceptibility of the vector to the infection, replication and transmission of the pathogens; characterization of the transmission dynamics of secondary vectors.Lastly in this topic, precise identification of vectors during outbreaks and epidemics. It should be emphasized here the existing taxonomic skills, which put us in a privileged situation in the country. Fiocruz has numerous biological collections and the collections include one of the most complete zoological collections in Latin America. We will also address the triad "human health / animal / environment", focusing on classical zoonoses (leishmaniasis) and those considered "emerging" (human malaria infection of non-human primates).

We will characterize non-human parasites with the potential to cause human infection. The main projects involve the identification of targets and the development of diagnostic methods for the identification of zoonoses, differentiating parasites of human and animal infection, including animals in containment (zoos, conservation centers, and transpositions) or free-living animals in the environment. We will also combine analysis systems with computational and mathematical models, with a systems biology approach. Information on transcriptomes, genomes, microbiomes and molecule structures to describe mechanisms of action and predict effects of changes in these systems. Analyzes of the large amount of data generated from this proposal may provide subsidies for the rational development of new drugs, vaccines or diagnostic kits. It will also contribute to the understanding of the complex mechanisms involved in the interaction of pathogens with their hosts.

Missions Related to the Research Project

Year	Quantity	Value
2022	1	30,000.00
2020	1	30,000.00
2019	1	30,000.00
2021	1	30,000.00

Project Maintenance Resources

Year	Value
2019	10,000.00
2022	10,000.00
2020	10,000.00
2021	10,000.00

Grants linked to the Research Project

Year	Modality	Quantity	Total Amount
2021	Post Doctorate (6months)	1	35,755.29
2019	Training (1month)	1	15,458.40
2022	Junior professor visiting abroad (3months)	1	36,986.40
2019	Visiting Professor(1month)	1	23,155.29
2020	Training(1month)	2	30,916.80
2022	Training(1month)	1	15,458.40
2022	Split-site PhD (6months)	6	242,870.40
2018	Training (1month)	2	30,916.80
2020	Junior professor visiting abroad (3month)	2	73,972.80
2019	Young Talent (6months)	1	59,155.29
2018	Young Talent (6months)	2	118,310.58
2020	Split-site PhD (6months)	6	242,870.40
2021	Training (1month)	2	30,916.80
2022	Post Doctorate (6months)	1	35,755.29
2020	Young Talent (6months)	1	59,155.29

2020	Post Doctorate (6months)	1	35,755.29
2019	Junior professor visiting abroad (3months)	1	36,986.40
2020	Junior professor visiting abroad (3months)	1	39,866.40
2019	Post Doctorate (6months)	1	35,755.29
2021	Visiting Professor (1month)	2	46,310.58
2022	Visiting Professor (1month)	2	46,310.58
2021	Young Talent (6months)	2	118,310.58
2021	Junior professor visiting abroad (3months)	2	73,972.80
2019	Split-site PhD (6months)	6	242.870,40
2019	Senior professor visiting abroad (3months)	1	39.866.40
2020	Young Talent (6months)	1	59,155.29
2020	Visiting Professor (1month)	1	23,155.29
2021	Split-site PhD (6 months)	6	242,870.40

Project name **Start 01/11/2018** **Finish 30/06/2022**

Improvement of tools for the prevention, diagnosis, and treatment of parasitc diseases

Description

Our proposal to address vector-borne or non-vector-borne parasitic diseases is based on using available biotechnologies in an integrated way to address gaps in knowledge of the interaction of pathogens with their hosts, thereby providing scientific inputs for development, in medium and long term, of new diagnostic, therapeutic and vaccine approaches. This is an innovative proposal that adds new technological advances and will contribute to the generation of products for prophylaxis and disease prevention. Fiocruz hosts the National Institute of Vaccine Science and Technology (INCTV), whose main focus is research on the development of immunogens against tropical or neglected diseases. Fiocruz-Minas has opened a Vaccine and Diagnostic Technology Center at BH-Tec, which is in full operation, and today it acts in the prototyping of vaccines and diagnostic kits. This center has already generated a spinoff and is already transferring some diagnostic kits and developing vaccines with the private sector. In the identification, improvement and validation of vaccine targets against parasites we will identify new vaccine targets by genomic editing methodologies, as well as by immunoinformatics tools, including reverse vaccination; evaluate the immunogenicity of vaccine prototypes; humanized cell models to assess the allergenicity of vaccine antigen attenuated vaccines and dose-response clinical studies. This axis goes through clinical research and product generation and involves the production of attenuated parasites by genetic deletion and validation as attenuated vaccines. For the study of new drugs, we will use more rapid, efficient and efficient methods for the search and / or improvement of chemotherapeutic agents more speci fi cally, the prospection of new therapeutic targets by genomic editing; the knockdown system for CRISPR in some parasites, such as trypanosomatids, is still unprecedented and can facilitate the study of genes with multiple copies and essential genes; functional genomics and high-content image, with selection of the phenotype of interest; screening of new bioactive molecules (pathogen-box) and drug repositioning, using delivery systems; as well as studies of resistance mechanisms of parasites by functional genomics; and lastly, as well as pharmacogenomics studies, evaluating host genetics in therapeutic failure and / or drug metabolism (sequencing technologies)

Missions Related to the Research Project

Year	Quantity	Value
2019	1	30,000.00
2020	1	30,000.00
2022	1	30,000.00
2021	1	30,000.00

Project Maintenance Resources

Year	Value
2020	10,000.00
2021	10,000.00
2019	10,000.00
2022	10,000.00

Grants linked to the Research Project

Year	Modality	Quantity	Total amount
2021	Senior professor visiting abroad (3months)	2	79,732.80
2021	Training(1month)	2	30,916.80
2019	Young Talent (6months)	1	59,155.29

2019	Junior professor visiting abroad (3months)	4	147,945.60
2020	Senior professor visiting abroad (3months)	4	159,465.60
2020	Post Doctorate (6months)	4	143,021.16
2019	Visiting Professor (1month)	4	92,621.16
2022	YoungTalent (6months)	4	236,621.16
2021	Split-site PhD (6months)	9	364,305.60
2020	Split-site PhD (6months)	9	364,305.60
2019	Training(1month)	3	46,375.20
2021	Junior professor visiting abroad (3months)	4	147,945.60
2021	Visiting Professor (1month)	4	92,621.16
2019	Split-site PhD (6months)	9	364,305.60
2019	Senior professor visiting abroad (3months)	3	119,599.20
2021	Visiting Professor (1month)	1	23,155.29
2018	Training(1month)	2	30,916.80
2020	Young Talent (6months)	4	236,621.16
2022	Visiting Professor (1month)	4	92,621.16
2020	Training (1month)	3	46,375.20
2022	Split-site PhD (6months)	9	364,305.60
2020	Visiting Professor (1month)	4	92,621.16
2021	Senior professor visiting abroad (3months)	4	159,465.60
2021	Post Doctorate(6months)	4	143,021.16
2020	Junior professor visiting abroad (3months)	4	147,945.60

MISSIONS

Mission year	Number of missions	Mission value
2019	1	200,000.00
2021	1	200,000.00

Grants not related to research projects

Year	Modality	Quantity	Value
2019	split-site PhD (6months)	2	80,956.80
2021	split-site PhD (6months)	2	80,956.80
2022	split-site PhD (6months)	2	80,956.80
2020	split-site PhD (6months)	2	80,956.80

Other Actions

Year	Action	Description	Value
2019	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00
2020	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00
2021	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00

THEME

INTEGRATED NETWORK OF NON-INFECTIOUS CHRONIC DISEASES (RICRONI)

INTERNATIONAL COOPERATION PROJECTS

Project name **Start 11/2018** **Finish 06/2022**

Coping with chronic metabolic diseases and aging

Description

Chronic diseases account for the highest rates of mortality and morbidity in Brazil. Their substantial increase not only have negative consequences for the quality of life of the adult population of the country, but also account for higher expenses for hospital care in the Unified Health System (SUS). However, there are still important gaps in knowledge about the incidence of chronic diseases and their risk factors. Within this scenario we will use two structures already available in Fiocruz. The Longitudinal Study of Adult Health - ELSA Brazil - emerges as an essential research for public

health management in Brazil. ELSA is a multi-center cohort study of 15,000 employees from six public higher education and research institutions in the Northeast, South and Southeast regions of Brazil. With this cohort, the incidence and risk factors for chronic diseases, including biological, behavioral, environmental, occupational and social factors, in particular, cardiovascular and diabetes, will be investigated. With Research Centers distributed in six states, the objective is also to analyze possible regional variations related to these diseases in the country. Large-scale retrospective studies on the epidemiology of metabolic diseases listed above will be carried out at the Center for Data Integration and Knowledge for Health (Cidacs, Fiocruz-Bahia) within its platforms, namely: Cohort of 100 Million Brazilians, and Bioinformatics and Genetic Epidemiology. In addition to the generation of scientific knowledge that will be of great importance for decision-making in relation to public health policies, the projects to be developed also have as a goal the quali fi cation of professionals in the epidemiology of chronic diseases. Beyond national boundaries, it also aims to become a reference for populations of other countries with characteristics similar to Brazil.

Missions Related to the Research Project

Year	Quantity	Value
2022	1	30,000.00
2021	1	30,000.00
2019	1	30,000.00
2020	1	30,000.00

Project Maintenance Resources

Year	Value
2019	10,000.00
2020	10,000.00
2022	10,000.00
2021	10,000.00

Grants linked to the Research Project

Year	Modalidity	Quantity	Total Amount
2018	Visiting Professor (1month)	1	23,155.29
2020	Visiting Professor (1month)	1	23,155.29
2019	Junior professor visiting abroad (3months)	1	36,986.40
2021	Post-Doctorate(6months)	1	35,755.29
2021	Junior professor visiting abroad (3months)	1	36,986.40
2021	Visiting Professor (1month)	1	23,155.29
2021	Junior professor visiting abroad (3months)	1	39,866.40
2020	Post-Doctorate (6month)	1	35,755.29
2021	Young Talent (6months)	1	59,155.29
2021	Training (1month)	1	15,458.40
2019	split-site PhD (6months)	4	161,913.60
2020	split-site PhD (6months)	4	161,913.60
2020	YoungTalent (6months)	1	59,155.29
2020	Senior professor visiting abroad (3months)	1	39,866.40
2019	split-site PhD (6months)	4	161,913.60
2020	Training (1month)	2	30,916.80
2022	Training (1month)	2	30,916.80
2022	split-site PhD (6months)	4	161,913.60
2021	split-site PhD (6months)	4	161,913.60
2018	split-site PhD (6months)	4	161,913.60
2019	Post-Doctorate (6months)	2	71,510.58
2020	Junior professor visiting abroad (3months)	2	73,972.80
2019	Young Talent (6months)	1	59,155.29
2019	Senior professor visiting abroad (3months)	1	39,866.40
2019	Visiting Professor (1month)	1	23,155.29

Project name **Start 01/11/2018** **Finish 30/06/2022**

Coping with diseases of an oncological nature

Description

From the perspective of complementary and even joint actions to projects under development at INCA, Fiocruz intends to advance specific actions related to this objective. One of the study models is represented by breast cancer, responsible for high mortality among women. Among the projects under development we mention the study on the mechanisms of metastasis in breast cancer, and particularly the role of the immune system in the establishment of bone metastasis. Still with regard to solid tumors, we intend to develop masters and doctoral projects on biomarkers to aid in the clinical management of breast, prostate and ovary tumors. A second aspect related to tumor biology concerns cell migration, and for this will be studied models of hematological neoplasms, particularly human lymphomas and leukemias. In the different models of analysis, the molecular interactions that may be relevant in the mechanisms of dissemination of neoplastic cells will be studied. In addition to the natural partnership with INCA, it is important to point out that research projects at Masters and PhD levels will be developed under the PPGs, and whenever possible in international partnerships, several of which already exist. In addition, the sustainability for the development of the respective projects and the training of young masters and doctors will take place in the context of the translational cancer program mentioned above, and recently installed in Fiocruz (FioCâncer). This platform will further advance the internationalization of the projects to be developed in this area of knowledge.

Missions Related to the Research Project

Year	Quantity	Value
2021	1	30,000.00
2019	1	30,000.00
2022	1	30,000.00
2020	1	30,000.00

Project Maintenance Resources

Year	Value
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	10,000.00

Grants linked to the Research Project

Year	Modality	Quantity	Total amount
2021	Training (1month)	1	15,458.40
2021	Young Talent (6months)	1	59,155.29
2018	Training (1month)	1	15,458.40
2019	Young Talent (6months)	1	59,155.29
2020	YoungTalent (6months)	1	59,155.29
2021	Senior professor visiting abroad (3months)	1	39,866.40
2021	Junior professor visiting abroad (3months)	1	36,986.40
2020	Senior professor visiting abroad (3months)	1	39,866.40
2020	Training (1month)	1	15,458.40
2020	Split-site PhD (6months)	4	161,913.60
2018	Split-site PhD (6months)	4	161,913.60
2019	Visiting Professor (1month)	2	46,310.58
2019	Junior professor visiting abroad (3months)	1	36,986.40
2022	Split-site PhD (6months)	4	161,913.60
2019	Split-site PhD (6months)	4	161,913.60
2020	Junior professor visiting abroad (3months)	1	36,986.40
2021	Senior professor visiting abroad (3months)	1	39,866.40
2020	Visiting Professor (1month)	2	46,310.58
2021	Visiting Professor (1month)	2	46,310.58
2021	Split-site PhD (6months)	4	161,913.60

2022	Visiting Professor (1month)	2	46,310.58

Project name **Start 01/11/2018** **Finish 30/06/2022**

Coping with neuromuscular diseases, neurodevelopmental diseases and neurodegenerative diseases

Description

The second major goal in addressing diseases of non-infectious origin is in neuromuscular diseases (eg, Duchenne Muscular Dystrophy) and diseases of the nervous system, including those affecting motor activity (such as Lateral Amyotrophic Sclerosis, for example). Are typically neurodegenerative (Alzheimer's disease, Parkinson's disease), and those resulting from failures in neurodevelopment, such as autism. In addition, other diseases that occur in the first years of life may be responsible for mental and neurological disorders that will occur in adult life. For example, among the mental disorders, the so-called "depression" today reaches about 350 million adults. Also drug addiction is currently a serious public health problem, arising from the disorders. In order to achieve this goal, we undoubtedly need to work in syntony and synergy in projects that together can complement the generation of knowledge through laboratory experiments using in vivo experimental models in vitro, as well as clinical follow-up, with organization of national and international cohorts. It is worth mentioning that there is already international cooperation between Guidance of Fiocruz PPGs and foreign institutions in several countries, including the direct participation of the Pasteur Institute of Montevideo (Uruguay) and the Sorbonne Université (France) and Fiocruz-Sorbonne Université; in addition to the University of Central Lancashire, Preston (England). On the other hand, these projects also fit into joint doctoral programs respectively of the PhD programs between Fiocruz and MercoSul countries (FOCEM / MercoSul project), and Fiocruz-Sorbonne Université.

Grants linked to the Research Project

Year	Modality	Quantity	Value
2022	Training (1month)	2	40,924.80
2019	Young Talent (6 months)	1	59,155.29
2019	junior professor visiting abroad (3 months)	1	39,986.40
2021	Post-Doctorate (6 months)	1	35,755.29
2020	Split-site PhD (6 months)	2	80,956.80
2030	Young Talent (6 months)	2	118,310.58
2022	Visiting Professor (1 month)	2	46,310.58
2019	Training (1 month)	1	15,458.50
2021	Senior professor visiting abroad (3 months)	1	39.866.40
2022	Split-site PhD (6 months)	1	40,478.40
2019	Senior professor visiting abroad (3 months)	1	39,866.40
2019	Post-Doctorate (6 months)	1	35,755.29
2020	Post-Doctorate (6 months)	1	35,755.29
2021	Split-site PhD (6 months)	2	80,956.80
2021	Visiting Professor (1month)	1	23,155.29
2021	junior Professor visiting abroad (3 months)	1	39,986.40
2020	junior professor visiting abroad (3 months)	2	73,972.89
2020	Senior professor visiting abroad (3 months)	1	39,866.40
2019	Split-site PhD (6 months)	2	80,956.80
2021	Training (1 months)	2	30,916.80
2021	Young Talent (6 months)	1	55,155.29
2019	Visiting Professor (1 month)	1	23,155.29
2020	Visiting Professor (1 month)	1	23,155.29
2020	Senior Professor visiting abroad (3 months)	1	39.866.40
2020	Training (1 month)	2	30,916.80

Missions Related to the Research Project

Year	Modality	Quantity	Value
2020	Split-site PhD (6months)	2	80,956.80
2019	Split-site PhD (6months)	2	80,956.80
2021	Split-site PhD (6months)	2	80,956.80
2022	Split-site PhD (6months)	2	80,956.80

Other Actions

Year	Action	Description	Value
2019	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00
2020	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00
2021	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00

THEME

INTEGRATED NETWORK FOR DEALING WITH INEQUALITIES IN HEALTH (RIDES)

Project name: **Start 01/11/2018** **Finish 30/06/2022**

Studies on social determinants of health, based on the epidemiological method, on complex systems and in other methods, encompassing the different exposures and outcomes of cheers.

Description

The design of this objective is related to the study of social determinants through the analysis of primary data, aiming to measure individual economic and psychosocial determinants and its relationship with health outcomes in a sectional and longitudinal way, employing methods that have not yet been implemented in the reality of local studies. In addition, secondary data analysis at the ecological level provides relevant information on social and racial spatial inequalities within and between cities in Brazil and allows comparisons of the impacts of such inequities on health behaviors and outcomes such as NCDs and infectious diseases. The adoption of the complex systemic modeling approach will allow a broader understanding of causal maps as to what is the role of social inequalities and the interaction between their indicators and factors that maintain stability or promote changes in systems, based on qualitative or of the intervention points. This approach is relatively new to global public health, and incipient in Brazil. Therefore, the promotion of the study of health inequities, the impact of interventions (policies, programs or isolated actions) represents an advance in the knowledge and approach of inequality, including incorporating the socio-social approach into health outcomes and behaviors.

Grants linked to the Research Project

Year	Modality	Quantity	Total Amount
2021	Post-Doctorate (6months)	2	71,510.58
2021	Split-site PhD (6 months)	6	242,870.40
2022	Split-site PhD (6 months)	6	242,870.40
2020	Training (1month)	2	30,916.80
2020	junior professor visiting abroad (3months)	2	73,972.80
2019	Training(1month)	2	30,916.80
2019	junior professor visiting abroad (3months)	2	73,972.80
2021	junior professor visiting abroad (3months)	2	73,972.80
2019	Young Talent- (6months)	2	118,310.58
2021	Visiting Professor (1month)	1	23,155.29
2022	junior professor visiting abroad (3months)	1	36,986.40
2020	Post-Doctorate (6months)	2	71,510.58
2022	Young Talent-(6months)	1	59,155.29
2019	Split-site PhD (6 months)	6	242,870.40
2022	Post-Doctorate(6months)	1	35,755.29
2020	Senior professor visiting abroad (3months)	2	79,732.80
2022	Training(1month)	1	15,458.40
2018	Training(1month)	2	30,916.80
2020	Split-site PhD (6 months)	6	242,870.40
2019	Visiting Professor (1month)	1	23,155.29
2019	Senior professor visiting abroad (3months)	2	79,732.80
2022	Visiting Professor (1month)	1	23,155.29
2022	Split-site PhD (6months)	1	40,478.40
2022	Senior professor visiting abroad (3months)	1	39,866.40

2020	Young Talent (6months)	2	118,310.58
2019	Post-Doctorate (6months)	2	71,510.58
2020	Visiting Professor (1month)	1	23,155.29
2018	Split-site PhD (6months)	6	242,870.40
2021	Training (1month)	2	30,916.80
2021	Young Talent-(6months)	2	118,310.58

Project name **Start 01/11/2018** **Finish 30/06/2022**

Analyses of related health inequalities and models of socioeconomic development and social dynamics

Description

This objective highlights the complexity of the population's health problems and needs, integrating interdisciplinary approaches and participatory methodologies, in order to contribute to the construction of spaces for citizenship, justice and more equitable relationships in society. It focuses on theoretical and methodological models regarding the analysis of health vulnerabilities resulting from living, working and environmental conditions and considers the perspective of the historical and social determination of the health-disease process. It also seeks to reflect on the socio-cultural and environmental impacts of economic development models on the living and health conditions of the population, in the light of theoretical perspectives that favor relations of gender, race and ethnicity. In the scope of this objective, challenges and central issues are evidenced: climate change, disasters, large enterprises, impacts of agribusiness, mining and hydroelectric construction, industrial waste and exposure to toxic substances, vulnerable populations in cities and fields, disordered occupation access to basic sanitation. It intends to produce strategic knowledge in the areas of health surveillance, evaluation of programs, promotion, prevention and health care of the population, thus strengthening citizenship and producing subsidies for public policies.

Missions Related to the Research Project

Year	Quantity	Value
2019	1	30,000.00
2021	1	30,000.00
2020	1	30,000.00
2022	1	30,000.00

Project Maintenance Resources

Ano	Valor
2022	10,000.00
2021	10,000.00
2019	10,000.00
2020	10,000.00

Grants linked to the Research Project

Year	Modality	Quantity	Total Amount
2019	Visiting Professor (1month)	2	46,310.58
2019	junior Professor visiting abroad (3months)	2	73,972.80
2019	senior Professor visiting abroad (3months)	2	79,732.80
2022	Training (1month)	2	30,916.80
2018	Training (1month)	1	15,458.40
2021	Post-Doctorate (6months)	2	71,510.58
2021	Split-site PhD (6months)	6	242,870.40
2020	Post-Doctorate(6months)	2	71,510.58
2021	Training(1month)	2	30,916.80
2018	Split-site PhD (6months)	6	242,870.40
2021	Junior professor visiting abroad (3months)	2	73,972.80
2021	Senior professor visiting abroad (3monthss)	2	79,732.80
2021	Young Talent (6months)	2	118,310.58
2020	Senior professor visiting abroad (3months)	2	79,732.80
2022	Senior professor visiting abroad (3months)	2	79,732.80

2021	Visiting Professor (1month)	1	23,155.29
2022	Senior professor visiting abroad (3months)	2	73,972.80
2021	Post-Doctorate(6months)	2	71,510.58
2020	Split-site PhD (6months)	6	242,870.40
2020	Junior professor visiting abroad (3months)	2	73,972.80
2022	YoungTalent (6months)	2	118,310.58
2022	Post-Doctorate (6months)	2	71,510.58
2022	Split-site PhD (6months)	6	242,870.40
2019	Split-site PhD (6months)	6	242,870.40
2022	Visiting Professor (1month)	2	46,310.58
2021	Visiting Professor (1month)	2	46,310.58
2020	Visiting Professor (1month)	2	46,310.58

Project name **Start 01/11/2018** **Finish 30/06/2022**

Carry out research in Cooperation in Education and Research in Health Policies, Systems and Services

Description

Global changes in the last decades have involved economic, social, demographic and epidemiological changes, with repercussions on population health. In spite of the improvement of some indicators in global terms, studies have shown the persistence of marked inequalities in health between countries and within countries. Health policies and systems need to respond to old and new problems that often transcend national boundaries, requiring integrated coping strategies and cooperation between countries. The implementation of international cooperation in health policies, systems and services is strategic in two main lines. The first is the development of training strategies and studies on health policies, systems and services in a comparative perspective, to analyze the similarities and differences between Brazil and other countries, as well as to understand their repercussions and impacts on the reduction of social inequalities in Cheers. The comparative method allows us to explain the determinants of policy advances and difficulties, to identify positive experiences in the organization and management of health systems and services, and to provide support for proposing policies aimed at reducing inequalities and improving the health situation of the population as a whole. The second is strengthening training and conducting research on the formulation and implementation of strategic health policies for the health systems of different countries, deserving prominence in terms of international cooperation. Some of these policies focus on coping with relevant and complex problems that go beyond national boundaries and have serious social effects in developing countries (eg HIV / AIDS, tuberculosis, tobacco control, of child). Others are relevant for their structuring nature of health systems, with implications for the equity and sustainability of systems (models of organization and care, training and management of human resources, public / private relations, development and access to medicines and health technologies).

Missions Related to the Research Project

Year	Quantity	Value
2020	1	30,000.00
2022	1	30,000.00
2021	1	30,000.00
2019	1	30,000.00

Project Maintenance Resources

Year	Value
2020	10,000.00
2021	10,000.00
2019	10,000.00
2022	10,000.00

Grants linked to the Research Project

Year	Modalility	Quantity	Total Value
2020	Visiting Professor (1month)	1	23,155.29
2020	Training (1month)	2	30,916.80
2021	Young Talent (6month)	1	59,155.29
2021	Visiting Professor (1month)	1	23,155.29
2022	Visiting Professor (1month)	1	23,155.29
2021	Junior professor visiting abroad (3months)	1	36,986.40

2019	Senior professor visiting abroad (3months)	1	36,986.40
2020	Post-Doctorate (6months)	1	35,755.29
2022	Training (1month)	1	15,458.40
2020	Young Talent (6monthss)	1	59,155.29
2021	Post-Doctorate (6months)	1	35,755.29
2022	Young Talents (6months)	1	59,155.29
2019	Training (1month)	1	15,458.40
2020	YoungTalents (6months)	1	59,155.29
2019	Senior professor visiting abroad (3months)	1	39,866.40
2020	Junior professor visiting abroad (3months)	1	36,986.40
2018	Training(1months)	1	15,458.40
2019	Split-site PhD (6months)	6	242,870.40
2021	Split-site PhD (6months)	6	242,870.40
2021	Training (1month)	1	15,458.40
2018	Split-site PhD (6months)	6	242,870.40
2021	Senior professor visiting abroad (3months)	1	39,866.40
2019	Post-Doctorate (6months)	1	35,755.29
2020	Split-site PhD (6monthss)	6	242,870.40
2020	Senior professor visiting abroad (3months)	1	39,866.40
2019	Visiting Professor (1month)	1	23,155.29
2021	Young Talent (6months)	1	59,155.29
2019	Split-site PhD (6months)	6	242,870.40

MISSIONS

Year of Missions	Quantity per Year	Value
2019	1	200,000.00
2021	1	200,000.00

GRANTS NOT RELATED TO RESEARCH PROJECTS

Year	Modality	Quantity	Value
2021	Split-site PhD (6months)	2	80,956.80
2022	Split-site PhD (6months)	2	80,956.80
2019	Split-site PhD (6months)	2	80,956.80
2020	Split-site PhD (6monthss)	2	80,956.80

Other Actions

Year	Action	Description	Value
2019	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00
2020	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00
2021	payment for publishing fees in open access journals	Coauthored international research has better visibilty when published in open access journals	100,000.00

COUNTERPART

1. Internationalization of the curriculum - Incorporation of international themes in postgraduate classes.

Fiocruz is a research institute and does not offer undergraduate courses. In the scope of post-graduation, Fiocruz is now a Ministry of Education accredited governmental school for training demands in poscertificate level. The masters and PhD graduate programs are associated with the training of human resources in several areas aligned with the institutional mission in the fields of public health, biological sciences, medicine, history, pharmacy and others. Many topics of global scope are treated in the Institution, such as health emergencies of international interest, in the case of Zika and other arboviruses, Ebola, antimicrobial resistance, social determinants of health, sustainable development objectives and agenda 2030, chronic, inflammatory and neurodegenerative diseases , among other topics. Fiocruz supports the development of courses, symposia, workshops, seminars, and post-graduation courses that are interdisciplinary and open to employees of various levels and students. Many of these activities, with the participation of foreign researchers, have validated credits as disciplines and are generally organized in association with other entities, such as Brazilian Academy of Sciences, Brazilian academy of medicine, Brazilian Society for the Progression of Science among others. Many of these activities are supported with resources from the Vice Presidency of Education, Information and Communication, and are transmitted via web conferencing to regional institutes, expanding their scope. Another meritorious initiative is the courses and videoclasses of these international themes available in Portuguese and some are also translated or subtitled and are accessible on Fiocruz's virtual campus, which now hosts more than 100 documents for consultation.

2. Production of international publicity materialin other languages, including course websites.

Fiocruz has a number of structures that are directly associated with the promotion ofvisibility of the Institution in other languages such as the Fiocruz publisher, the ARCA Institutional repository, the Journal portal that hosts all 7 Fiocruz Journal and the Fiocruz virtual campus. The publisher prints paper and electronic books in Portuguese (most titles) but also in English and Spanish. It is part of Scielolivros and offers its titles on digital platforms such as Google or Amazon. In Google, based on the last report issued inApril11253 downloads were posted from 66 countries outside Brazil. In Brazil there were 160,893 downloads (2012-March.2018). Amazon does not specify the country of the download, but it makes a distinction of currencies: there were 4,532 downloads in foreigner currencies. These numbers refer to what is in commercial access and in open access. The FIOCRUZ publisher does not printsonly books from researchers of the Institution, although many of the titles are the result of theses elaborated in Fiocruz's PPGs. The Institutional electronic archive (IEA) presents in its portfolio the collection of theses, dissertations and papers, with abstracts in Portuguese and English that are mandatoryby the open access policy of Fiocruz.The IEAalso host the collection of electronicJournals and bulletins of the Institute of Communication in S & T of Fiocruz and other units of the institution. In 2017, IEA had 18,337 documents, 80% of which were academic (articles, theses and dissertations), and had more than 15,000 accesses from countries such as Portugal, USA, Mozambique, Angola, India and several Latin American countries. The Portal of Journalsfrom Fiocruz giving visibility to the publications of the Institution. All seven journals have scientific papers published in a peer review system and more recently with IEA, pre-prints are also available. As an example, the journal Memórias do Instituto Oswaldo Cruz, open access published in English in the area of tropical medicine with 2.6 impact factor. In addition, the virtual campus organizes, as a platform, all the training initiatives (courses) of Fiocruz including the disciplines. It is highlighted that the grade 6 and 7 programs of the Institution already have (or are in the process of being translated) in English. The virtual campus has open educational resources (video courses or courses) also in English and Spanish (or with subtitles) that increase the reach of the institution.

3. Training and qualification of staff for institutionalinternationalization.

Since 2017, with the approval of Fiocruz's internationalization policy, training and capacity building

initiatives have been carried out: language courses for employees who are employees of academic secretariats, as well as regular English courses or scientific writing for researchers, technologists and analysts are being offered regularly. Other strategic activities such as workshops and seminars are continually offered on a global basis with the participation of foreign researchers and lecturers where classes / lectures are in English (egZika, Yellow Fever, Antimicrobial Resistance, etc.) and servers are invited to participate in accordance with the area of activity. The Vice-Presidency of Education, Information and Communication, through calls for proposalsencourages short-term international courses. In the scope of the summer/winter Schools summits of CAPES, short-term courses have been held, with the participation of students from the masters/PhD programs, which are also open to the employees. In all of the activities described above, membership is high and guarantees continuous training for employees at different levels. Fiocruz participates in actions that follow the "train the trainer" concept with TDR. In this context, the training in science management and implementation research are online initiatives in moodle system geared to the training of servers that perform activities of evaluation and monitoring of research projects. These courses were developed by the WHO TDR and are in the implementation phase for Fiocruz

4. Counterparts offered by foreign partnership institutions, when applicable.

Fiocruz has long-term partners and some initiatives are traditional, such as the formalization of cooperation agreements with the provision of financial resources for the mobility of researchers and students, as is the case with the Pasteur Institute in France. In addition, other institutional partnerships for joined PhDprograms were established with Portuguese Universities (Coimbra and Nova de Lisboa), which offer Brazilian doctoral students training at no cost or academic and scientific fees. In more extensive agreements, Fiocruz has projects with the Newton Fund, funded by the British Institutions, which supports research and academic mobility on global issues such as Zika. By the end of bilateral cooperation agreements between Fiocruz-Inserm; Fiocruz-CNRS, multilateral cooperation between Fiocruz-European Union, through the Zikalliance and ZikAction consortia are important counterparts with resources for mobility, and research grantsthat guarantee internationalization.

5. Othercounterparts, whenapplicable.

None at this moment.