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ALVES, Sandra Mara Campos et al. International cooperation and shortage of doctors: an analysis of the interaction between Brazil, Angola and Cuba. **Ciência & Saúde Coletiva**, Rio de Janeiro, v. 22, n. 7, p. 2223-2235, jul. 2017. Disponível em: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232017002702223&lng=pt&nrm=iso>. Acesso em: 29 jan. 2018. doi: <http://dx.doi.org/10.1590/1413-81232017227.03512017>.

International cooperation and shortage of doctors: an analysis of the interaction between Brazil, Angola and Cuba

Sandra Mara Campos Alves ¹
Felipe Proença de Oliveira ¹
Mateus Falcão Martins Matos ²
Leonor Maria Pacheco Santos ¹
Maria Celia Delduque ¹

Abstract *The shortage of doctors, especially in remote areas, is a critical issue for the development of national health systems and has thus been the focus of a number of international cooperation projects. An exploratory and qualitative study was conducted to examine cooperation between Brazil, Angola and Cuba. A nonsystematic literature review was conducted of selected open access articles and official documents addressing relevant health cooperation initiatives. Previously selected characteristics of actions designed to redress the shortage of doctors were compared. It was concluded that the interactions between the three countries were fruitful and potentially beneficial for the health of the population of these countries. South-South cooperation between these countries showed positive results in the educational and regulatory dimensions and adopted a non-dependence perspective that seeks to strengthen endogenous capacity, which are important factors for evaluating the structural components of health systems.*

Key words *International cooperation, Human resources for health, Brazil, Angola, Cuba*

¹ Departamento de Saúde Coletiva, Faculdade de Ciências da Saúde, Universidade de Brasília. Campus Universitário Darcy Ribeiro, Asa Norte. 70510-900. Brasília DF Brasil. smcalves@gmail.com

² Departamento de Saúde Global e Sustentabilidade, Faculdade de Saúde Pública, Universidade de São Paulo. São Paulo SP Brasil.

Introduction

Human resources for health are a critical component for achieving standards of excellence in health care provision. However, a number of countries face shortages of medical professionals and ensuring the availability of sufficient numbers of well-trained professionals in certain regions represents a major challenge.

World Health Organization (WHO) data shows that the number of doctors per 1,000 inhabitants varies widely across countries that have universal health care systems: 1.8 in Brazil, 2.0 in Canada, 2.7 in the United Kingdom, 3.9 in Portugal, and 4.0 in Spain¹. Gaps can also be observed in the distribution of doctors between urban and rural areas, given that the one half of the world's population living in rural areas has access to less than 25% of the world's doctors².

The shortage of primary care doctors can result in the disruption of health services, since the primary care system is the front door of the health care system and key to ensuring equitable access to healthcare services³.

To overcome shortages and geographic maldistribution of doctors, countries often resort to international recruitment, which can have potential negative impacts for countries that supply doctors, including shortages of qualified health professionals and recruitment malpractice by private employment agencies⁴⁻⁶.

Researchers have proposed that strategies to increase attraction and retention of doctors in remote areas include at least four dimensions: 1. Educational, such as curricula reform and restructuring of residency programs, and encouraging students to undertake specialized training; 2. Regulatory, such as compulsory service in underserved areas and rurally-located medical schools that encourage enrollment of students from these areas; 3. Financial, such as scholarships and attractive salaries; 4. Nonmonetary, such as extending permanent visas for overseas health workers and peer support supervision⁷⁻⁹.

Within this context, international cooperation is an important tool for addressing this problem, not only through technology transfer and provision of human resources, but also, and primarily, through building leadership capacity and promoting autonomy, thus strengthening the structures that constitute a country's health system. According to a report produced by a group of experts published in *The Lancet*, international cooperation should also include the prospect of transforming medical education to strengthen national health systems¹⁰⁻¹¹.

The dominant model of international health cooperation (North-South) has long ceased to reflect the current global geopolitical context, leading to a shift in paradigm towards the South-South model of cooperation based on the principles of mutuality, horizontality and autonomy. Southern Hemisphere countries facing similar difficulties are able to share strategies to tackle their problems and receive support without entailing subordination¹².

This new paradigm counterpoises the vertical imposition of cooperation priorities and objectives by donor countries in disregard of specificities and projects already undertaken by the benefitting country, which leads to overlapping activities and waste of resources due to poor financial planning¹³. As such, the South-South model of cooperation has taken on a key role in the health field^{11,12}.

This article aims to determine the availability of doctors in the national health systems of Angola, Brazil and Cuba, and examine international cooperation initiatives between these countries designed to increase attraction and retention of doctors in remote and rural areas. These countries were selected, despite marked differences in socio-economic and epidemiological characteristics, because they engage in South-South cooperation.

Methodology

An exploratory case study was conducted using a research question that encompassed the international cooperation strategies adopted between the countries, principally within the context of South-South cooperation to strengthen the provision and retention of doctors and redress inequalities.

A nonsystematic literature review was conducted using the Scientific Electronic Library On-line (SciELO) and PubMed databases over the period January 2010 and August 2016 and based on the following search arguments: "country" and "medical education"; "public health", "health cooperation", "human resources for health", and their respective translations into Portuguese and Spanish. The search resulted in 73 articles, some of which were outside the scope of this study.

Thirty open access articles were selected that were directly related to the study objective and addressed health cooperation in these countries related to the provision, retention, and education and training of doctors. We also examined

relevant official government documents from the three countries, including technical reports, cooperation agreements, and health, demographic and social indicators. In addition, we also carried out a search of books, dissertations and theses that addressed this theme.

The results of the reading and analysis were organized to enable a comparison between previously selected characteristics of actions designed to redress the shortage of doctors.

This study was conducted in accordance with National Health Council resolutions 466/2012 and 510/2016, which lay down guidelines for research involving human beings. Given the nature of the research (exploratory study involving a literature review and use of secondary data) it was not necessary to submit the research proposal for review by the Research Ethics Committee/National Research Ethics Commission (CEP/ CONEP, acronym in Portuguese).

Results

Health systems, medical education, and cooperation between Angola, Brazil and Cuba

The data on life expectancy, maternal and infant mortality rates, physician-to-population ratio, and health expenditure reveal a number of peculiarities and differences between the three countries in terms of their capacity to tackle public health challenges (Table 1).

Brazil

Brazil's national health system is built upon the principles of universality, comprehensiveness, and equity. The main legal framework governing the Unified Health System (*Sistema Único de Saúde* - SUS) comprises the 1988 Federal Constitution, Law 8080/1990, and Law 8142/90. This is a challenging goal for a country with about 200 million inhabitants; SUS undergoes constant political, social and economic confrontations¹⁴.

Health service provision is decentralized through a network of health centers, hospitals and other facilities and contracts with private and nonprofit institutions. The private health sector comprises a supplementary health system financed by companies, families, medical cooperatives, individual health plans and insurance and direct payment by users to service providers¹⁵.

The country has undergone rapid epidemiological transition as a result of sociodemographic changes, which has in turn altered mortality profiles. The country suffers from a triple burden of disease, where infectious, parasitic and chronic diseases and their respective risk factors coexist. More recently, external causes (accidents and violence) have rapidly emerged as important factors for morbidity and mortality. The main causes of death in the country are cardiovascular diseases, lower respiratory tract infections, and neoplasias²¹.

Although the number of doctors in Brazil has increased, distribution between the public and private health sector and across regions is deeply inequitable. Evidence shows striking inequalities

Table 1. Key aspects of the regulatory and legal frameworks governing the health systems, health conditions and medical schools in Brazil, Angola and Cuba.

National Health System (regulatory and legal framework)	Brazil	Angola	Cuba
	Federal Constitution/1988 Law 8080/1990 Law 8142/1990	Law 21-B/1992 Federal Constitution /1992	Federal Constitution /1976 (revised in 1992) Law 41/1983
Life expectancy*	75.0	52.4	79.1
Rate of maternal mortality (per 100,000 population)*	44	477	39
Rate of infant mortality (per 1,000 newborns)*	16.4	156.9	5.5
Doctors per 1,000 population	1.8 ¹	0.17 ²⁵	7.7 ³²
% of GDP spent on health	6.7 ¹⁴	3.8 ²⁶	9.7 ³²
Number of medical schools (2015)	341 ²²	8 ³¹	15 ³²

Source: authors' elaboration.

¹Data taken from reference 14.

in access to primary care across regions, particularly in the North and Northeast regions that are most affected by the severe shortage of doctors^{22,23}.

Medical education is currently being reshaped to ensure the centrality of the SUS in guiding the education and training of human resources for health based on a review of the 2001 curriculum guidelines undertaken in 2014. These changes signal a shift in the current biomedical paradigm that prioritizes technology to the detriment of clinical examination²⁴.

These changes have been driven by the *Programa Mais Médicos* (More Doctors Program) created in 2013 by Law 12.871/2013, which seeks to enhance medical training and increase the number of places offered on graduate and residence programs, particularly for people from rural areas²⁵. The goal of the program is to increase the number of doctors per 1,000 inhabitants from 1.8 (in 2003) to 2.7 (by 2016)²⁶. By the end of 2015, Brazil had 341 medical schools, 200 of which were public and 141 private, and the presence of medical education programs in rural areas has increased as a result of the *Programa Mais Médicos*¹⁹.

Brazilian South-South cooperation seeks to uphold the “principles of respect for national sovereignty and nonintervention in the internal affairs of other nations”²⁷, is nonprofit making and devoid of commercial interests. Brazil’s horizontal technical cooperation is aimed at sharing successes and best practices in the areas of cooperation requested by partner countries, without the imposition of conditions²⁷.

As from 2003, with the first mandate of President Lula, the Brazilian government sought to play a more active role in international discussions and forums. International cooperation, notably South-South cooperation, gained greater emphasis on the government’s foreign policy agenda²⁸.

Institute of Applied Economic Research (IPEA, acronym in Portuguese) data²⁷ show that Brazilian Cooperation for International Development in the areas of humanitarian aid, scholarships, technical cooperation, and contributions for international agencies practically doubled between 2005 and 2009. Health, agriculture and education are priority areas for Brazilian international cooperation. With specific regard to health, geographical priorities are South America, Haiti, and Africa, particularly Portuguese-speaking African countries²⁸.

Angola

The situation in Angola is rather different, given its recent independence in 1975 followed by a drawn-out civil war that went on up to 2002. Swaths of the country remain littered with land mines, especially in rural areas and “its social, political and economic institutions are basically nonfunctional”¹⁶. Despite the end of the civil war and increased political stability, the country’s performance against health and socioeconomic development indicators is well below the global average.

The country’s epidemiological profile is characterized by the prevalence of communicable diseases, especially malaria, and acute respiratory and diarrheal diseases, which together account for 86.1% of all notified diseases¹⁸.

The development of the health system in Angola has seen a number of significant legal milestones. In 1975, the government created the National Health Service with the goal of providing universal health coverage. However, the already inadequate health system inherited from the colonial period was in large part destroyed by the civil war¹⁸.

In 1992, the Basic Law of the National Health System restructured the national health service, marking a significant shift in funding rationale by providing for user participation in financing health care through the imposition of moderate user charges and the establishment of public-private health care partnerships²⁹. Article 21 of the Angolan Constitution, promulgated in 2010, provides that state shall “promote policies that enable universal primary health care coverage”³⁰.

In regards to human resources for health, Angola faces a number of difficulties in relation to capacity building at both the institutional and human resource levels, also a consequence of the prolonged period of civil war. In addition to the shortage of health workers, the country has a limited number of health training institutions and insufficient qualified staff to oversee the training and development of recently qualified professionals^{16,31}. Despite the Angolan government’s efforts to tackle these problems, “curricula and teacher training are inadequate and the lack of funding for teaching material and support constitute obstacles to qualified training”¹⁶.

The geographic distribution of doctors in Angola is uneven, with a concentration in the country’s capital. Data from 2009 shows that there were 2,956 professionals working in the public health sector, which is equivalent to a mere 0.17 doctors per 1,000 population¹⁶. Data

showing the number of doctors working in the private health sector does not exist. To address this situation, the government entered into an international cooperation agreement with Cuba for the provision of 1,500 doctors.

Measures were taken to adapt medical education to the changes in the health system. Up to 2005, there were only two medical schools in the capital, one public and the other private. Recently, efforts were made to adapt medical curricula to incorporate the government's new vision of the health system, in which other social partners emerge as health care service and training providers. Within this context, between 2008 and 2009, six new medical schools were created outside Luanda, where there is also a private medical school^{20,32} (Chart 1).

Faced with an evident shortage of qualified professionals, over recent years, the Angolan government has entered into a number of cooperation agreements aimed at expanding human resources for health policy horizons.

Cuba

Cuba has a unified comprehensive national health system that was created in the 1960s adopting the following guiding principles: the state and social character of public health; free and universal access to health services; a preventative approach to healthcare, incorporating scientific and technical advances; community participation; and an intersectoral, universal, and regionalized approach, oriented towards international cooperation and solidarity¹⁷.

Cuba's constitution, adopted in 1976 and revised in 1992, states that everyone has the right to health protection and care and that the state shall guarantee this right by providing free medical and hospital care³³. The Public Health Law

(Law No. 41), created in 1983, defines the National Health System as a set of administrative units and services, including education and research, responsible for providing health care to the population³⁴.

The National Health System adopts a primary health care approach based on the family medicine model and is organized into levels of care. Front door services consist of family doctors and nurses surgeries in direct contact with polyclinics, which organize comprehensive care and seek to enhance the problem-solving capacity of primary health care services¹⁷.

Education and training is guaranteed under the National Health System through 13 universities offering medicine courses and two independent medical schools, the Latin American School of Medicine (*Escuela Latinoamericana de Medicina - ELAM*) and National School of Public Health (*Escuela Nacional de Salud Pública*). Higher education in Cuba is a public right and its provision in line with the demands of the needed workforce is the duty of the state³⁵.

In the 2014-2015 academic year 69,760 students were enrolled into health-related undergraduate courses, 60,247 of whom were Cuban, 9,513 foreign students, and 52,235 medical students. Cuba has produced around 39,000 doctors from 121 different countries, including over 24,400 from the 10 undergraduate courses offered by the ELAM¹⁷.

The number of doctors per 1,000 population in 2015 was 7.7, which is equivalent to one doctor for every 130 inhabitants. There is also one dentist and one nurse for every 671 and 123 inhabitants, respectively. This health worker/population ratio meant that it was possible to guarantee an average of 7.4 medical appointments per inhabitant in 2014¹⁷.

Chart 1. Medicine courses in Angola by province, year of creation and type of institution

University	Province	Date of creation	Public/Private Organization
Agostinho Neto	Luanda	1963	Public
Jean Piaget	Luanda	2000	Private
Instituto Superior Técnico Militar	Luanda	2008	Public
Katiavala Bwila	Benguela	2008	Public
11 de Novembro	Cabinda	2008	Public
Lueji A'Nkonde	Malange	2009	Public
José Eduardo dos Santos	Huambo	2009	Public
Mandume ya Ndemufayo	Lubango	2009	Public

Source: Adapted from reference 31.

The main causes of mortality in Cuba are neoplasia, followed by cardiovascular disease, respiratory problems, and external causes. In 2015, the WHO recognized that Cuba had eliminated mother-to-child transmission of HIV and syphilis¹⁷.

The Public Health Law establishes guiding principles for the provision of public health services and the organization of public health, giving special prominence to international collaboration. Since the 1960s, Cuba has promoted international cooperation involving over 325,000 professionals in 158 countries³⁶.

Cuba promotes the following modes of international cooperation:

Compensated Technical Assistance (*Asistencia Técnica Compensada* - ATC) – this is the oldest among the existing forms of cooperation, dating back to the *Período Especial*, which coincided with the end of the Soviet Union and a major economic crisis in Cuba. In this mode, developed with Angola, doctors receive remuneration, part of which is reinvested into the country's National Health System to help maintain other collaboration activities.

The Integrated Health Program (*Programa Integral de Salud* - PIS) – created in the wake of a number of natural disasters that affected Central America in the 1990s, this program consists of the deployment of professionals to remote areas with human resource shortages. These professionals receive subsistence allowances and the participating government provides logistical support. This is the most common mode of cooperation and is currently promoted in 32 different countries.

Cuban Medical Services (*Servicios Médicos Cubanos* - SMC) – this form of cooperation receives funding from the country benefitting from the medical services, which is the case with Brazil and the *Programa Mais Médicos*, and is increasingly common in Middle East countries.

Operation Miracle (*Operação Milagro* - OM) – focusing on eye surgery, this program has performed 2,667,005 surgeries since 2004.

Cuba also promoted a special cooperation program with Venezuela called *Misión Barrio Adentro* (Mission Inside the Neighborhood), which consisted of providing a large number of doctors and nurses to work in the country, particularly in primary health care.

In 2014 Cuba promoted cooperation programs with 67 different countries: 31 in Africa (46.27%), 25 in Latin America and the Caribbean (37.31%), 10 in Asia, the Pacific and Middle East (14.93%), and one in Europe (1.49%). Ven-

ezuela, Brazil and Angola were the countries that received the largest number of professionals³⁶ (Table 2).

Cuban international cooperation has also helped to create medical schools in 11 different countries: Angola, Bolivia, Eritrea, Gambia, Guiana, Equatorial Guinea, Guinea-Bissau, Nicaragua, Tanzania, East Timor, and Venezuela³⁶.

South-South cooperation between Brazil, Angola and Cuba

South-South cooperation between these countries occurs through the Brazilian Cooperation Agency (*Agência Brasileira de Cooperação* - ABC) in the case of Brazil and Angola, and the Pan American Health Organization (PAHO) and the Central Unit for Medical Cooperation (*Unidad Central de Cooperación Médica* - UCCM) in the case of Brazil and Cuba. This section outlines three initiatives developed by these countries involving the education and training of human resources, focusing on the field of medicine.

Between 2006 and 2016, the ABC, a government agency linked to the Ministry of Foreign Affairs, promoted South-South cooperation with the Angolan government aimed at capacity building, health promotion, and combating endemic diseases. With respect to the education and training of human resources, it is worth highlighting a cooperation agreement designed to help increase the capacity of Angola's health system³⁷.

This cooperation initiative aimed to build capacities in public health training by creating the National School of Public Health and strengthening Technical Health Schools (*Escolas Técnicas de Saúde*) and the Angolan National Institute of Public Health. These actions were overseen by the Oswaldo Cruz Foundation, which is linked

Table 2. Modes of cooperation developed by Cuba and number by country.

Mode of cooperation	Country	Percentage (%)
PIS	32	46.80
OM	3	4.40
ATC	17	24.80
SMC	16	22.60
Venezuela	1	1.4
Total	67	100

Source: Data taken from reference 36.

to Brazil's Ministry of Health and has extensive expertise in the field of public health.

As part of the cooperation programs, the Brazilian government provided training and short-term internships for Angolan government staff. The program also fostered the development of local technical capacity in the area of public health education by creating the Masters of Public Health program at the National School of Public Health with the support of the Oswaldo Cruz Foundation. The main objective of this initiative, apart from strengthening technical capacity, was to support the development of the National School of Public Health. The first class of 15 students graduated in May 2012²⁸.

Cooperation between Brazil and Cuba began in the 1990s through the ATC, with the deployment of Cuban doctors to the country's most underserved states, such as Tocantins. However, this cooperation was conducted on a much smaller scale than the *Programa Mais Médicos*, which was later made possible by the PAHO through cooperation agreements signed with Brazil (No. 80/20139) and the UCCM.

After two years of implementation, *Programa Mais Médicos* was regarded by the Brazilian government to be the largest initiative ever undertaken to tackle the country's shortage of doctors. The cooperation between Brazil, PAHO and Cuba was vital to ensuring the size of the immediate response to the shortage of doctors provided by the program through the deployment of doctors to primary health services in the most underserved and vulnerable areas^{26,38}.

The *Programa Mais Médicos* filled 11,400 vacancies across all states, including Special Indigenous Health Districts (*Distritos Sanitários Especiais Indígenas*), with Cuban doctors who undertook specialized training in family health to understand the organization of the SUS and local epidemiological characteristics²⁶. Prerequisites included having at least 10 years post graduate experience and previous experience of working overseas. According to an assessment undertaken by the UCCM, 29.8% of doctors had experience of working in more than one country³⁶.

Cooperation between Cuba and Brazil under the *Programa Mais Médicos* is regarded as an unprecedented initiative, since it involves a series of measures provided by Law No. 12,871/2013, including the emergency provision of overseas doctors and an increase in the number of doctors trained in Brazil in the medium and long term³⁹.

The program is also recognized by the PAHO as an innovative initiative, given the significant

amount of financial resources invested in the recruitment of 11,400 doctors, the mobilization of doctors from a country like Cuba, which has a greater number of doctors per capita than Brazil, and the integration of these professionals into the SUS⁴⁰.

Recent assessments of the program show the following: 94.6% of the people attended under the program gave a good or very good satisfaction rating⁴¹; the number of municipalities with a shortage of doctors decreased⁴²; there was an expansion in access to health care services in the most vulnerable regions⁴³ and a reduction in admissions for ambulatory care sensitive conditions in the Northeast Region⁴⁴; and a generally positive impact on admissions and access⁴⁵.

However, it is important to note that, given the recent creation of the program, academic evaluations and assessments by independent bodies are still underway. In this respect, the Primary Health Care Research Network of the Brazilian Association of Collective Health (*Rede de Atenção Primária à Saúde/ABRASCO*) in collaboration with the PAHO act as the main interface for monitoring research related to this theme. Important aspects of the *Programa Mais Médicos* remain to be resolved, such as the need for a SUS staffing policy and form of remuneration⁴⁶.

Cuba and Angola have been engaging in cooperation since 1975, most recently through an ATC program that in 2014 involved 1,893 Cuban professionals. This program encompasses care provision and human resources training, both at the secondary and higher education levels, and health management. Training is provided through seven technical courses and nine undergraduate courses in the areas of medicine and nursing³⁶. Cuba also supports the organization of the health system, through initiative such as the Municipal Health System project (*projeto Sistema Municipal de Salud*), which seeks to strengthen local government management and primary care across Angola's provinces³⁶.

The Angolan government recognizes the important role cooperation plays in medical training and its decisive role in the creation and implementation of medical training programs in rural areas. The program, developed over a period of six years and based on a model tried and tested by the ELAM, is implemented mainly by Cuban professors⁴⁷.

Angola continues to collaborate with health education institutions in Cuba, including an incentives program that provides scholarships for Angolan students to study medicine in Cuba.

Discussion

The strategies adopted by the international cooperation programs to increase the recruitment and retention of doctors in remote and rural areas show a number of similarities.

By engaging in technical cooperation with Cuba, Angola and Brazil have been able to recruit doctors from a country that has become internationally recognized for its human resources for health education and training policy, particularly in the field of general comprehensive medicine.

Over the years, Cuba's human resources for health education and training policy has led to significant social changes, whereby current health indicators compare with those of developed countries. The curricula of Cuban medical schools are not restricted to technological dependence, but rather give special emphasis to health promotion, prevention and rehabilitation. Furthermore, the focus of medical training lies in the health of whole communities, rather than the illness of a particular individual^{48,49}.

The approach to medical education in Cuba differs from that adopted until recently by Brazil, which is based on the biomedical paradigm, the expansion of medical technology, and the use of modern equipment, techniques and medications, replacing a comprehensive physical examination, and the proliferation of medical specialties. The dominance of the biomedical model also ends up becoming a determining factor for the low interest in primary care among doctors⁵⁰.

With respect to international collaboration in the field of health, for over 50 years Cuba has been offering medical relief and assistance to countries affected by natural disasters and military conflict and developing countries, as well as offering compensated technical assistance and training of human resources⁵¹.

Cuban cooperation follows a number of basic principles: cooperation is a core component of Cuba's foreign policy; it is directed towards central and local governments; efforts should be made to promote cooperation in a sustainable manner; it should be promoted based on the sum of potential of the countries involved, non-profit making, and consider existing differences; it should involve primary health care professionals, who should not express their opinion on matters concerning domestic policy or local costumes; and it should seek to benefit the maximum number of people, with emphasis on remote areas⁵². It is also worth highlighting that the principle of international solidarity is a decisive element of Cuban cooperation⁵³.

In this respect, it can be observed that Cuban cooperation in the field of health is not limited to the transfer of human resources to fill gaps in care, but rather also comprises actions designed to strengthen health systems, as is the case in Angola.

According to the government, since its beginnings in the 1960s, Cuban cooperation has evolved from initial medical-care based actions to programs that increasingly prioritize human resources training, an element viewed as being important for sustainability and local development⁵².

In addition to the points raised above, Cuban cooperation has reached the milestone proposed by Akerman⁵⁴, where cooperation is concerned with local development, thereby increasing the effectiveness of the strategies of the host country and strengthening processes through integrated participatory planning and the dissemination of information by enabling support networks.

Our analysis shows that the PAHO played a vital role in the development of cooperation between Brazil and Cuba, helping to optimize the use of resources, enabling knowledge, experience and technology sharing, and creating an enabling environment for dialogue to better understand the reality of the respective countries⁵⁵.

It is evident that the *Programa Mais Médicos* represents a milestone for the PAHO, since it has added strategic value by closing the health equity gap and at the same time enhanced the unique experience of South-South cooperation between Cuba and Brazil made possible by the organization⁴⁰.

The focus of Angola/Cuba cooperation was medical training as an element of restructuring of human resources for health, which, notably, is the most common model of technical international cooperation between these two countries. The creation of universities in rural areas, importing Cuban medical professors and exchanges between graduate students constitute the main long-term health system strengthening mechanisms used to tackle the shortage of doctors.

Reports produced by the WHO and Joint Learning Initiative show that Angola is among a number of African countries that have a critical shortage of doctors^{56,57}. This shortage is linked to years of civil war, the limited number of medical schools, and undermined the potential of these schools. As a result, the system does not ensure the availability of health workers in sufficient quantity and quality to meet the country's needs²⁰.

The substantial increase in the number of medical schools in Angola in the 2000s is part of the national policy to strengthen human resour-

es for health, which is a positive point, given that, according to WHO data⁵⁶, 24 of the 46 African countries do not have a specific policy in this area.

Furthermore, given that medical training in Angola is based on the Cuban model, which provides a grounding in general comprehensive medicine and emphasizes the clinical model over the biomedical approach, it is more likely to produce professionals able to deal with specific health conditions and contribute towards improving the socioeconomic conditions and epidemiological situation of the country. Further research should be undertaken to evaluate local skills and competencies, given that these actions have a long-term impact.

In turn, the capacity building activities developed by Brazil since 2007 have helped strengthen the Angolan health system, build endogenous capacity in education and research, and structure key institutions for stabilizing the Angolan healthcare system.

Brazil/Angola cooperation falls within the concept of structural health cooperation, based on an alternative paradigm of cooperation whose cornerstone is capacity development⁵⁸. By building on endogenous capacities and resources, this new and innovative model of cooperation brings about concrete interventions, establishing dialogue, strengthening the role of relevant actors and fostering autonomy, thus reinforcing the structures that make up a country's health system⁵⁸.

Therefore, by taking into account the pillars of human resources and organizational development, and institutional strengthening, the concept of structural cooperation goes beyond the passive transfer of knowledge and technology that is common to the traditional model of cooperation.

This model of technical cooperation helps bring Brazil and Portuguese-speaking countries closer together and demonstrates Brazil's expertise in the process of strengthening national health systems. Brazil's cooperation experience with Portuguese-speaking countries such as Angola is highlighted by the Lancet Commission on medical education, who emphasizes the role played by the Osvaldo Cruz Foundation in the network of projects among various countries to strengthen institutional capacity and training of human resources for health¹⁰.

The same commission raises concerns about global inequality and the need for competency-based educational reforms, rather than the adoption of models from other contexts that might not be relevant¹⁰.

It is evident that Cuban/Angolan cooperation shares this perspective, given that the active participation of Cuban professors in the creation of six new medical schools is integrated with other programs such as the development of local health systems, showing commitment to local development and education and training tailored to Angolan reality.

Thus, the cooperation promoted by these countries points toward what is understood as third-generation reforms of medical education, evolving from the first generation, which is strongly influenced by the Flexner report where curricula are based on the scientific paradigm, through to the second generation, where schools adopted a problem-based approach, eventually arriving at the current model, where health education systems are integrated into health systems, emphasizing the importance of incorporating global perspectives into competencies of their graduates¹⁰.

With respect to the key dimensions of interventions to increase attraction and retention of doctors in remote areas mentioned above⁷⁻⁹, the initiatives examined by this study seem to converge towards the political and regulatory dimensions, given that the South-South cooperation projects had clearly defined objectives in these areas.

In this respect, our findings disagree in part with those of Carvalho et al.⁵⁹, who assessed the *Programa Mais Médicos* against WHO recommendations and concluded that the program was successful in only 37.5% of the 16 recommendations. It should be noted, however, that a number of these recommendations, such as improvements in rural infrastructure, were outside the scope of the initiative, thus affecting its performance. Our findings suggest that cooperation was successful in the dimensions encompassed by the initiatives and that in certain cases actions span across more than one dimension.

With respect to cooperation between Cuba and Angola, the educational and regulatory dimensions are visible in the expansion in the number of medical schools, the types of curricula used, and in the regulation of access, given that the expansion policy adopted by the Angolan government enabled the creation of courses in areas that previously did not have access to medical training.

In the case of Brazil and Cuba, the regulatory dimension is visible in the condition imposed by the *Programa Mais Médicos* that states that overseas doctors should be deployed to the most vulnerable areas, guaranteeing the availability of

doctors in underserved areas such as Special Indigenous Health Districts.

Finally, with respect to cooperation between Brazil and Angola, there is a visible overlap between the education and regulatory dimensions in initiatives designed to improve the technical training of health care workers, since preference was given to the *stricto sensu* model of postgraduate training. This reflects the option taken by the Angolan government to invest on two fronts: expansion of undergraduate courses with specific curricula formats (cooperation between Angola and Cuba); and continuing training and development at different levels designed to strengthen and structure key institutions for the Angolan health system.

Now that we have examined the above initiatives from a perspective that underlines the importance of South-South cooperation and the dimensions of strategies to address shortages of doctors put forward by the international literature, it is important to assess this cooperation in the context of practices for international recruitment of health care personnel, given that it involves the deployment of Cuban doctors to Angola and Brazil.

An important milestone in this respect is the WHO Global Code of Practice on the International Recruitment of Health Personnel, approved in 2010 at the Sixty-third World Health Assembly. The code establishes voluntary principles and practices for the international recruitment of health care workers, considering the rights, obligations and expectations of the countries involved⁶⁰.

One of the guiding principles is that states should strive to create a sustainable health workforce and establish health workforce education and training and retention strategies to reduce the need for overseas recruitment⁶⁰.

Another recommendation relevant to the topic under consideration is that source and destination countries should derive mutual benefits, either through fostering health human resource development and training or by discouraging the recruitment of health personnel from develop-

ing countries facing critical shortages of health workers⁶⁰.

In this respect, cooperation between Brazil, Angola and Cuba upholds the guiding principles in the following ways: it does not result in the loss of health workers from countries facing a shortage to other countries (as is the case in Brazil and Angola); it involves the provision of doctors by a country that has a relatively large number of doctors per 1,000 population (Cuba, which has 7.7 doctors per 1,000 population); and it strives to create a sustainable health workforce in each country.

Conclusion

The shortage of doctors is a sensitive issue that requires an orchestrated approach involving measures and actions at national and international level. In this respect, South-South cooperation presents itself as a possible path, particularly because it adopts a non-dependence perspective that seeks to strengthen internal capacity for managing domestic problems.

Short, medium and long term actions are necessary and should be constantly assessed in order to monitor changes and not lose sight of the horizon. Initiatives that seek to transform medical education are vital in order to ensure that education and training is health system-based and contributes towards local development.

The interaction between the three countries was fruitful and potentially beneficial for the health of the population of these countries. This study has a number of limitations that are common to eminently descriptive research, particularly in relation to the selection of the countries and international cooperation experiences whose scope included strengthening the provision and retention of doctors.

As such, future research should be undertaken to enable the monitoring and comparison of relevant initiatives and obtain a greater understanding of this important international health problem.

Collaborations

SMC Alves and FP Oliveira participated in study conception and design, data analysis and interpretation, and in drafting this article. MFM Matos participated in data analysis and interpretation and in drafting this article. LMP Santos and MC Delduque participated in the revision of this article and in the final approval of the version to be published.

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Article submitted 15/08/2016

Approved 28/11/2016

Final version submitted 13/02/2017

