



Gaps in health research in the Dominican Republic

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ABSTRACT

Objective. To provide a basic profile of health research in the Dominican Republic by identifying health problems or diseases that have been addressed by studies implemented during the period 2009–2013 and to determine how well that research correlates with the burden of disease in the Dominican population.

Methods. This was a descriptive study that searched for primary and secondary data sources to identify health research implemented in the Dominican Republic in the years 2009 to 2013. Data about these projects were collected from the registries of *clinicaltrials.gov* and the Consejo Nacional de Bioética en Salud, as well as from a questionnaire directed to researchers and managers. Disability-adjusted life years (DALYs) were derived from the Global Burden of Disease Study 2013 for males and females of all ages in the Dominican Republic and then compared with the number of research studies conducted on each specific health condition.

Results. This study identified 313 health research projects conducted in the Dominican Republic during the years 2009–2013. HIV/AIDS and lower respiratory infections were the two main topics researched; however, they accounted for a relatively small percentage of total DALYs in males and females of all ages in the Dominican Republic in 2013.

Conclusions. Limited research is directed toward addressing the health needs of Dominicans. The ongoing process of setting priorities for health research in the Dominican Republic should direct its efforts toward fixing this imbalance.

Key words

Health priorities; research; clinical trials as topic; Latin America; Dominican Republic.

Health research (HR) is the generation of new knowledge using the scientific method to identify and deal with health problems (1). The knowledge gained through research is considered a global public good, and it “must be used well to be useful for development” (2). A conceptual framework has been proposed for HR systems as a way to construct the knowledge that health systems need in order to contribute to improvements in health and health equity (3). Priority setting is part of the stewardship function of HR systems, which should respond to basic health needs of the population. However, current reports show that in

several countries resource allocation for research activities does not correspond with the burden of disease, potentially increasing current health inequities (4–8).

Since the report of the Commission for Health Research and Development (1990) identified the so-called “10/90 gap” in health research (9), various organizations and international forums have attempted to articulate an agenda that would lower the overall disease burden by addressing health equity issues and decreasing health inequalities. It has been advocated that priority setting should take into account which diseases cause the highest burden but receive low investment in research and the possibility of developing cost-effective interventions, among other considerations (10, 11). Low- and middle-income countries face diverse barriers and challenges in their

attempt to establish national HR systems. The development of a priority research agenda should be an evidence-based activity, although the lack of quality data and weak national capacity to collect and analyze relevant information, particularly about HR systems, is a recognized problem (12, 13). In the Latin American and Caribbean (LAC) region, 8 of 13 countries surveyed by Becerra-Posada et al. have set their national research priorities (14).

Socioeconomic context and health policies

The Dominican Republic occupies two-thirds of the island of Hispaniola, which it shares with the Republic of Haiti. In 2010 the total population was 9.9 million inhabitants (15), and in 2014 the World Bank

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categorized the Dominican Republic as an upper-middle income country with a gross domestic product (GDP) of US\$ 61.16 billion and a gross national income (GNI) per capita of US\$ 5 770 (16). In the past two decades, the Dominican Republic has been one of the fastest growing economies in its region, but in spite of this extraordinary growth, poverty was still higher than the LAC average of 41% in 2013 (16).

Over the past two decades, local researchers have proposed setting an agenda and allocating public funds for HR, since current funds allocated to support it are limited (17, 18). In 2015, the Dominican government took the first steps towards developing a national research agenda. The National Office for Health Research (DINISA), founded in 2008 as an office within the Ministry of Health, is in charge of setting priorities.

This study aims to provide basic information on the HR profile in the Dominican Republic. It identifies the health problems or diseases that have been addressed by studies implemented during the period from 2009 to 2013 and compares them to the burden of disease in the Dominican population in the hope that the results will inform decision-makers. Information on a similar analysis conducted in the LAC region is also provided.

MATERIALS AND METHODS

Study design and data collection strategy

Using primary and secondary data sources, this observational and descriptive study identified the HR projects implemented in the Dominican Republic from 2009 to 2013. Any study that investigated a health topic was eligible, regardless of the research design, funding source, or institutional affiliation of the researchers. Studies documented for the purpose of obtaining an academic degree were excluded. We compiled a list of national and international institutions that had conducted research projects in the Dominican Republic using the National Census on Health Research 2010 as a guide. Members of the research team asked participating researchers and research managers to sign an agreement that documented the terms and conditions of the study. Upon acceptance, a self-administered questionnaire was made available to the participants in printed or online format, along with an instruction manual. The research team was available to clarify the study procedures and to assure

quality control. The Research Ethics Committee of the Centro Nacional de Investigaciones en Salud Materno Infantil Dr. Hugo Mendoza and the Consejo Nacional de Bioética en Salud (CONABIOS)³ gave their approval of the study protocol.

In September 2014, we conducted an internet search in Clinicaltrials.gov, a global registry of clinical studies maintained by the United States government, to identify health research projects that had been implemented in the Dominican Republic during the 2009–2013 timeframe. Similarly, we asked CONABIOS to provide a digital file containing the list of approved projects in this period. After compiling a list of all the eligible studies, we excluded those research projects that were duplicated in more than one source, so that only one record of each study was included in our final dataset. At times, we combined information on the same study from different sources to obtain a better description of the project.

A total of 313 HR projects were identified in the Dominican Republic during the years from 2009 to 2013. Most of the studies (85%, $n = 266$) were identified through institutional registries, with CONABIOS being the main source of information on the studies (55%, $n = 172$), followed by clinicaltrials.gov and CONABIOS (13%, $n = 41$), clinicaltrials.gov (10%, $n = 30$), Fondo Nacional de Innovación, Desarrollo, Ciencia y Tecnología (FONDOCyT) (5%, $n = 17$), and FONDOCyT and CONABIOS (2%, $n = 6$). We identified 15% ($n = 47$) of the research projects through the survey of researchers/research managers. The response rate to the survey was about 45%. Those who did not respond to the survey worked in private institutions: clinical researchers and one researcher from a private university.

Data coding and classification

For each identified study, the institution responsible of conducting the project was classified as public, private, nongovernmental organization, or international agency. The area of research was classified as biomedical, clinical, or public health. Clinical research was defined as patient-oriented research in which an investigator interacts with human subjects. Biomedical research provides an understanding of the biological nature of diseases and creates products to prevent or treat disease states. Group thematic objectives were classified

as social determinants, health conditions, or interventions, as was done by Martínez-Martínez (19). In addition, we asked researchers about their research methodology, funding sources, and other data not available in the online registry or institutional websites. The type of study was coded as either observational or experimental. For experimental studies, we identified the type of intervention (drug, biological, behavioral), the primary purpose of clinical trials (prevention, treatment, or other), the model of intervention (one group, parallel groups, crossover, factorial, or other), the clinical phase (I, II, III, IV), the masking (open-label, blind, double-blind, or other), and the endpoint classification (pharmacokinetic, safety, efficacy, safety-efficacy, or other). Observational studies were classified in terms of their time perspective (cross-sectional, retrospective, or prospective).

In each study, when possible the disease or health problem under investigation was identified and classified into one of three categories: communicable, maternal, neonatal, and nutritional diseases; noncommunicable diseases (NCDs); or injuries. The disease or health problem was coded according to the causes and risk factors used for the country-level analysis of the Global Burden of Disease (GBD) Study 2013 (20). Disability-adjusted life years (DALYs) were used as a measure of burden of disease in the Dominican Republic, for males and females, all ages. According to WHO:

One DALY can be thought of as one lost year of “healthy” life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability. DALYs for a disease or health condition are calculated as the sum of the Years of Life Lost (YLL) due to premature mortality in the population and the Years Lost due to Disability (YLD) for people living with the health condition or its consequences (21).

Two researchers coded and reviewed the data in conjunction with the whole team.

Analysis

The main characteristics of the studies were tabulated and the frequencies and

³ CONABIOS is the governmental institution in the Dominican Republic that is responsible for ethical review of research protocols.

percentages of each characteristic were calculated. A ranking of the top causes of DALYs (by sex, all ages) was compared against the most commonly studied health conditions to reveal the discrepancies between research topics and the actual burden of disease. For each condition, the number of studies identified and the corresponding percentage of DALYs is presented, as well as the rate of DALYs per 100 000 population by sex. The total number of studies was divided by the corresponding burden of disease to provide an estimate of the total number of studies per 100 000 DALYs by sex for each health condition. A similar analysis was presented by Viergever et al. (22). The numbers of studies on the top risk factors for DALYs are also reported. The data on the burden of disease is presented only for those health conditions with an available estimate of DALYs. SPSS version 20.0 and Microsoft Excel spreadsheet were used to tabulate and organize the data.

RESULTS

The vast majority of the studies conducted (71.6%) were clinical research aimed at developing and testing new interventions, as shown in Table 1. Public health and biomedical research projects were less common. A little more than half of the studies (55.9%) pertained to NCDs, followed by communicable, maternal, and perinatal disorders (40.3%); no research on injuries was identified. Group thematic objectives were typically classified as interventions (81.5%). Data on the number of participants were not available in the majority of the studies. Public hospitals were the main site of recruitment of participants. Study participants were not typically recruited from the community or schools, although in over half of the studies the research setting was not specified. Most studies looked at both genders; however, in those that focused on one sex, females were recruited more frequently. Adults and the elderly were the most common age group categories participating in these studies. Industry (specifically, pharmaceuticals) was the most frequent primary sponsor, and public institutions were the most common research setting. Research funded and implemented by international universities (8.9%) and cooperation agencies (7.3%) also constituted significant proportions of the identified studies. However, public-private partnerships between different institutions were not very common. The institution

TABLE 1. General characteristics of health research conducted in the Dominican Republic (n = 313), 2009–2013.

Category	No. (%)
Area of research	
Clinical research	224 (71.6)
Public health	74 (23.6)
Biomedical	15 (4.8)
Causes of disease	
Communicable, maternal, perinatal	126 (40.3)
Noncommunicable diseases	118 (55.9)
Injuries	0 (0.0)
Not classifiable	69 (22.0)
Group thematic objectives	
Interventions	255 (81.5)
Health conditions	43 (13.7)
Determinants of health	15 (4.8)
Number of participants	
1 – 99	26 (8.0)
100 – 199	21 (7.0)
200 – 299	17 (5.0)
300 or more	36 (12.0)
Not specified/not applicable	213 (68.0)
Research setting	
Hospital	113 (36.1)
Community	13 (4.2)
General population	6 (1.9)
School	4 (1.3)
Other	2 (0.6)
Not specified/not applicable	175 (56.0)
Gender of participants	
Both	147 (47.0)
Female	50 (16.0)
Male	5 (1.6)
Not specified	111 (35.5)
Age group of participants	
Infant	54 (17.3)
Adolescent	42 (13.4)
Adults	128 (40.9)
Elderly	65 (20.8)
Primary sponsor	
Pharmaceutical industry	176 (56.2)
Government	37 (11.8)
Government/other	5 (1.6)
Industry/other	1 (0.3)
University abroad	28 (8.9)
International donor agency	23 (7.3)
International NGO	23 (7.3)
Government abroad	13 (3.8)
Government abroad/NGO	2 (0.6)
National NGO	3 (1.0)
Local university	8 (2.6)
Not specified	1 (0.3)
Implementing institution	
Public	133 (42)
Private	111 (35)
NGO	49 (16)
International cooperation agency	2 (1)
Not specified	18 (6)

responsible for implementing the project was usually public ($n = 139$) or private ($n = 111$), and less commonly an NGO ($n = 49$), international cooperation agency ($n = 2$), or unknown/unspecified ($n = 12$).

Table 2 describes the methodological characteristics of the studies. Most of the studies that were classified as experimental named “drug” as the most common type of intervention and had “treatment” as the primary purpose. The most common intervention models in such clinical trials were parallel groups and one group. The studies usually were conducted to evaluate safety and efficacy. Observational studies were most often “descriptive” or their type was “not specified” due to missing data in registries. Very few observational studies used an analytic design (e.g., case-control or cohort). Most of the studies were either open label or used double-blind masking. Phase III trials were the most frequent type, and Phase I and Phase IV trials were uncommon.

Table 3 shows the top 17 causes of DALYs for females of all ages in the Dominican Republic in 2013. The mean rate for these 17 causes was 588.05 DALYs per 100 000 females, and they accounted for about 50.35% of total DALYs. Ischemic heart disease (7.56% of total DALYs), neonatal preterm birth (4.84%), and major depression (4.16%) were the three main causes of DALYs in the female population. Of these 17 causes of DALYs, 13 were NCDs, accounting for 38.20% of total DALYs; three were communicable, maternal, neonatal, and nutritional diseases (10.20% of total DALYs), and only one was an injury (motor vehicle injury, 1.95% of total DALYs). In contrast, Table 3 also shows the top 17 health research topics during the years 2009–2013 considering studies that included female participants. The mean rate of DALYs attributable to the 17 most commonly studied diseases was 39.99 per 100 000 females, and these causes contributed 23.91% of total DALYs among females.

Table 4 shows the top 19 causes of DALYs for males of all ages in the Dominican Republic. The mean rate for all 19 causes is 785 per 100 000 males, and they represent 54.72% of total DALYs in this population, broken down by cause group as follows: NCDs, 33.46%; communicable, maternal, neonatal, and nutritional conditions, 10.38%; and injuries, 10.88%. Ischemic heart disease (9.03%), motor vehicle injury (6.53%), and preterm birth complications (4.69%) are the top three

TABLE 2. Methodological characteristics of health research conducted in the Dominican Republic (n = 313), 2009–2013.

Category	No. (%)
Type of study	
Observational	113 (36.1)
Experimental	196 (62.6)
Not specified	4 (1.3)
Observational studies (n = 113)	
<i>Model of study</i>	
Descriptive: Cross-sectional	36 (31.9)
Analytic: Case-control	2 (1.8)
Analytic: Cohort	2 (1.8)
Not specified /classified	73 (64.6)
Experimental studies (n = 196)	
<i>Type of intervention</i>	
Drug	145 (74.0)
Medical device	18 (9.2)
Biological	15 (7.7)
Behavioral	1 (0.5)
Not specified	17 (8.7)
<i>Intervention model</i>	
One group	84 (42.9)
Crossover	8 (4.1)
Factorial	1 (0.5)
Parallel groups	93 (47.4)
Other	1 (0.5)
Not specified	9 (4.6)
Primary purpose	
Prevention	33 (16.8)
Treatment	139 (70.9)
Other	14 (7.1)
Not specified	10 (5.1)
Endpoint classification	
Safety-efficacy	68 (34.7)
Efficacy	62 (31.6)
Safety	17 (8.7)
Pharmacokinetic	7 (3.6)
Other	18 (9.2)
Not specified/unclassified	24 (12.2)
Masking	
Open-label	87 (44.4)
Simple blind	18 (9.2)
Double-blind	61 (31.1)
Other	20 (10.2)
Not specified	10 (5.1)
Study phase	
Phase I	8 (4.1)
Phase I / Phase II	4 (2.0)
Phase II	12 (6.1)
Phase IIb	1 (0.5)
Phase III	62 (31.6)
Phase IV	7 (3.6)
Not specified	102 (52.0)

conditions responsible for DALYs in the male population. In contrast, the top 19 diseases researched in the period 2009–2013 account for a mean rate of 46.84 DALYs per 100 000 males and 23.16% of total DALYs in this population.

Among the top 19 conditions researched, NCDs represented 20.83% of total DALYs, while communicable, maternal, neonatal, and nutritional diseases accounted for 8.37% of DALYs; no research on injuries was identified. HIV/AIDS ($n = 68$), lower respiratory infections ($n = 14$), and other cardiovascular and circulatory conditions ($n = 11$) were the three most frequently researched conditions.

Out of the 313 studies, 25 (8.0%) of them investigated at least one risk factor of a specific cause of the disease burden. Of the 25 possible risk factors analyzed in the Global Burden of Disease Study 2010, nine risks factors were the subject of research: high-blood pressure ($n = 6$; 24%), low bone mineral density ($n = 4$; 16%), dietary risks ($n = 3$; 12%), tobacco smoking ($n = 3$; 12%), alcohol use ($n = 3$; 12%), high body-mass index ($n = 2$; 8%), suboptimal breastfeeding ($n = 2$; 8%), iron deficiency ($n = 1$; 4%), and unimproved sanitation ($n = 1$; 4%).

DISCUSSION

The findings show an imbalance between the health conditions being researched and public health needs as represented by DALYs. Overall, current research projects focus on a relatively small portion of the causes of DALYs for both males and females. Even though more DALYs are attributable to NCDs, research still pays considerable attention to communicable diseases. A similar situation was found by Stuckler et al. when comparing the WHO biennial budgetary allocations with the burden of disease from 1994–1995 to 2008–2009 (23). They observed that the WHO budget allocations in 2006–2007 were heavily skewed toward infectious diseases (87%), followed by 12% for non-communicable diseases and less than 1% for injuries and violence (23).

It is worrisome that DALYs resulting from injuries have not been tackled by recent research. The absence of injuries as an object of research denotes a significant gap, as injuries account for around 15% of total DALYs, especially among males as a consequence of motor vehicle injuries, homicides, and self-harm. Research on

highway traffic injuries has typically been neglected in many low- and middle-income countries (24). Other health issues with great weight in terms of DALYs also are neglected, for example, maternal and infant health (i.e., preterm birth conditions, neonatal sepsis). Unfortunately, minimal funding is directed toward neonatal infections, which received the lowest investment per DALY of all infections, while HIV and malaria received relatively greater investments per DALY (25).

HIV/AIDS is by far the most common topic of health research in the Dominican Republic. The global agenda to fund AIDS research has had an impact in the Dominican Republic HR profile. It is noteworthy that more than 90% of HIV/AIDS research projects were funded by international organizations; industry alone funded around 50% of HIV/AIDS research projects. Analysis of AIDS in the Dominican Republic had concluded that the epidemic is concentrated in certain population groups, since its prevalence is below 1% in the general population and consistently higher than 5% in transvestites and men who have sex with men. In addition, it is also high among sex workers, drug users, residents in sugar plantation mill towns (*bateyes*), people with low literacy levels, and female victims of violence (26). Therefore, to tackle DALYs related to HIV/AIDS and reduce health inequalities, research projects should involve these special populations. An example is the research done by Pérez-Then et al., who proposed the “Robin Hood principle” to allow the resources available for identification and treatment of HIV/AIDS to be used to build infrastructure in other priority areas. His project sought to reduce inequalities and promote equal rights in a vulnerable population living in isolated rural areas of the Dominican Republic (27). This is a model for public health intervention that is evidence-based and sensitive to gender and solidarity, as proposed in the human security paradigm.

Behavioral research appears to be neglected. Major depression and anxiety disorders are important causes of DALYs, especially for females. Even though psychiatric disorders do not represent a common cause of death in low- and middle-income countries, they are a significant cause of suffering and disability (28). Other conditions with very low weight in terms of DALYs were the subject of a large number of research projects

TABLE 3. Top 17 diseases or conditions in terms of number of studies in the period 2009–2013 versus the top 17 causes of disability-adjusted life-years (DALYs) in 2013 in females of all ages, Dominican Republic.

Top 17 diseases or conditions investigated, 2009–2013					Top 17 causes of DALYs in females, 2013				
Research on diseases or conditions	No. of studies	Rank of DALYs	DALYs (per 100 000)	% total DALYs	Rank	Cause of DALYs	No. of studies	DALYs (per 100 000)	% total DALYs
HIV/AIDS ^b	68	30	199.38	0.83	1	Ischemic heart disease ^a	2	1 816.80	7.56
Lower respiratory infections ^b	14	6	719.37	2.9	2	Neonatal preterm birth ^b	0	1 159.10	4.84
Other cardiovascular and circulatory conditions ^a	11	36	166.01	0.39	3	Major depression ^a	0	1 001.87	4.16
Acne vulgaris ^a	11	63	74.78	0.03	4	Diabetes ^a	3	982.87	4.08
Diabetes ^a	10	4	982.87	4	5	Anxiety disorders ^a	0	743.33	3.09
Tuberculosis ^b	9	48	121.10	0.5	6	Lower respiratory infection ^a	14	719.37	3.00
Dengue ^b	7	158	14.70	0.31	7	Iron-deficiency anemia ^b	2	702.28	2.91
Rheumatoid arthritis ^a	7	59	86.54	0.35	8	Ischemic stroke ^a	9	609.39	2.53
Breast cancer ^a	7	17	406.38	1.68	9	Neonatal sepsis ^b	0	586.05	2.45
Other congenital anomalies ^a	7	19	386.63	1.61	10	Hemorrhagic stroke ^a	0	575.77	2.39
Glaucoma ^a	5	155	13.84	0.06	11	Chronic obstructive pulmonary disease ^a	2	497.68	2.07
Diarrheal diseases ^b	3	22	345.91	1.42	12	Low back pain ^a	0	494.51	2.05
Cataracts ^a	3	103	97.96	0.15	13	Migraine ^a	0	468.42	1.95
Macular degeneration ^a	3	174	8.98	0.04	14	Motor vehicle road injury ^c	0	467.89	1.95
Non-Hodgkins lymphoma ^a	3	183	6.54	0.03	15	Other musculoskeletal ^a	0	446.47	1.85
Ischemic heart disease ^a	2	1	1 816.8	7.55	16	Congenital heart ^a	0	425.81	1.78
Chronic obstructive pulmonary disease ^a	2	11	497.68	2.06	17	Breast cancer ^a	7	406.39	1.69

^a Noncommunicable disease.^b Communicable disease.^c Injury.**TABLE 4. Top 19 diseases or conditions in terms of number of studies in the period 2009–2013 versus the top 19 causes of disability-adjusted life-years (DALYs) in 2013 in males of all ages, Dominican Republic.**

Top 19 diseases or conditions investigated, 2009–2013					Top 19 causes of DALYs in males, 2013				
Research on diseases or conditions	No. of studies	Rank of DALYs	DALYs (per 100 000)	% total DALYs	Rank of DALYs	Cause of DALYs	No. of studies	DALYs (per 100 000)	% total DALYs
HIV/AIDS ^b	68	21	386.11	1.29	1	Ischemic heart disease ^a	2	2 716.32	9.03
Lower respiratory infections ^b	14	4	918.15	3.06	2	Motor vehicle road injury ^c	0	1 963.45	6.53
Other cardiovascular and circulatory conditions ^a	11	55	144.44	0.48	3	Neonatal preterm birth ^b	0	1 402.05	4.69
Acne vulgaris ^a	11	71	84.27	0.28	4	Lower respiratory infections ^b	2	918.15	3.06
Diabetes ^a	10	5	901.27	3.00	5	Diabetes ^a	3	901.27	3.00
Tuberculosis ^b	9	34	223.92	0.75	6	Assault firearm ^c	0	866.38	2.88
Dengue ^b	7	73	80.96	0.26	7	Neonatal sepsis ^b	0	786.38	2.63
Rheumatoid arthritis ^a	7	110	38.34	0.12	8	Ischemic stroke ^a	9	755.14	2.51
Other congenital anomalies ^a	7	15	539.9	1.81	9	Hemorrhagic stroke ^a	0	702.72	2.34
Glaucoma ^a	7	163	10.42	0.03	10	Low back pain ^a	0	674.78	2.25
Diarrheal diseases ^b	5	20	410.64	1.37	11	Chronic obstructive pulmonary disease ^a	9	605.76	2.02
Prostate cancer ^a	3	17	498.90	1.66	12	Major depression ^a	0	581.46	1.94
Cataracts ^a	3	111	37.39	0.12	13	Neonatal encephalopathy ^a	0	554.53	1.86
Macular degeneration ^a	3	168	9.50	0.03	14	Iron-deficiency anemia ^a	10	549.65	1.83
Ischemic heart disease ^a	2	8	2,716.32	2.51	15	Congenital heart ^a	0	539.90	1.81
Chronic obstructive pulmonary disease ^a	2	11	605.76	2.02	16	Other congenital ^a	7	512.77	1.71
Non-Hodgkins lymphoma ^a	3	164	10.13	0.03	17	Prostate cancer ^a	17	498.90	1.66
Ischemic stroke ^a	2	9	755.14	2.51	18	Other hearing loss ^a	0	450.37	1.50
Iron-deficiency anemia ^b	2	14	549.65	1.83	19	Self-harm ^c	0	866.38	1.47

^a Noncommunicable disease.^b Communicable disease.^c Injury.

(for example, acne vulgaris). This pattern of unequal funding for health conditions is governed by the external forces described by Evans et al. as driving a global disparity of health research (29).

In terms of research sponsorship, the absence of national funding for health research is a noteworthy finding, as is the fact that the main sources of funding are the pharmaceutical industry and international donors (governments or NGOs). At the same time, public hospitals were the research setting for most studies. The potential public health benefits of this research need to be evaluated, given that the minimal involvement of the Ministry of Health in research and lack of collaboration with industry in the form of public-private partnerships may lead to lost opportunities to translate knowledge into action. Observational studies, which are easier and less costly to conduct, were not commonly done; however, this finding may be related to our data collection strategy, which identified formal registered studies.

Several limitations should be considered in interpreting the study findings. First, our ability to identify health studies from outside of the health sector may have been limited. For example, studies on specific health indicators such as nutrition and behavioral studies conducted by educational institutions may have been excluded on the assumption that the research project was not classifiable as “health research.” Even

though the research team members did their best to explain our broad definition of health to survey respondents, this bias was difficult to avoid. Second, CONABIOS and clinicaltrials.gov, our main sources of information, only registered experimental studies. This is a strong argument in favor of registration of observational studies (30). Third, some researchers and project managers from private institutions refused to participate, citing confidentiality owed to their funders or donors. This restriction might apply to both observational studies and experimental projects that were not included on official registries.

Conclusions

Given the imbalance found in this study between health research topics and public health needs as measured in terms of DALYs, a limited amount of research responds to the actual needs of Dominicans. Topics within the public health domain were less frequently studied than those with a clear orientation toward private interests. Over one-fifth of the research projects analyzed in this study focused on HIV/AIDS, leading to a situation in which other conditions with equal or greater weight in terms of burden of disease receive unequal attention. It is advised that the ongoing process of health research prioritization in the Dominican Republic take these results into account in

order to improve the health of Dominicans and reduce health inequalities. We are aware that decisions about resource allocation should not be based only on disease burden, but also on cost-benefit analysis, scientific quality of proposals, and ethical, sociopolitical, and cultural acceptability. The prioritization process for health research should take into account all of these considerations.

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REFERENCES

- Evans JR. Essential national health research. *New England J Med.* 1990;323(13):913–5. Available from: <http://dx.doi.org/10.1056/NEJM199009273231311>. Accessed 13 Nov 2015.
- Ravallion M, Gelb A, Harrison AE. Research for development: a World Bank perspective on future directions for research. World Bank Policy Research Working Paper No. 5437. World Bank; September 2010. 39 pp. Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1685050. Accessed 30 Apr 2015.
- Pang T, Sadana R, Hanney S, Bhutta ZA, Hyder AA, Simon J. Knowledge for better health: a conceptual framework and foundation for health research systems. *Bull World Health Organ.* 2003;81(11):815–20. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2572351/>. Accessed 30 Apr 2015.
- Xu G, Zhang Z, Lv Q, Li Y, Ye R, Xiong Y, et al. NSFC health research funding and burden of disease in China. *PLoS ONE.* 2014;9(11):e111458. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4219749/>. Accessed 13 Nov 2015.
- Yao L, Li Y, Ghosh S, Evans JA, Rzhetsky A. Health ROI as a measure of misalignment of biomedical needs and resources. *Nat Biotechnol.* 2015;33(8):807–11.
- Mitchell RJ, McClure RJ, Olivier J, Watson WL. Rational allocation of Australia's research dollars: does the distribution of NHMRC funding by National Health Priority Area reflect actual disease burden? *Med J Aust.* 2009;191(11-12):648–52.
- Catalá López F, Álvarez Martín E, Génova Maleras R, Morant Ginestar C. Relación en España entre la investigación sanitaria financiada por el Sistema Nacional de Salud y la carga de enfermedad en la comunidad [Relationship between research funding in the Spanish National Health System and the burden of disease]. *Rev Esp Salud Pública.* 2009;83(1):137–51. Available from: http://www.scielosp.org/scielo.php?pid=S1135-57272009000100011&script=sci_arttext. Accessed 30 Apr 2015.
- Luengo-Fernandez R, Leal J, Gray AM. UK research expenditure on dementia, heart disease, stroke and cancer: are levels of spending related to disease burden? *Eur J Neurol.* 2012;19(1):149–54.
- Commission on Health Research for Development. Health research: essential link to equity in development. Oxford: Oxford University Press; 1990.
- Pang T, Pablos-Mendez A, IJsselmuiden C. From Bangkok to Mexico: towards a framework for turning knowledge into action to improve health systems. *Bull World Health Organ.* 2004;82(10):719–810.
- IJsselmuiden C, Matlin SA, Maïga AH, Hasler J, Pannenberg O, Evans T, et al. From Mexico to Mali: a new course for global health. *Lancet.* 2008;371(9607):91–3.
- Nuyens Y. Setting priorities for health research: lessons from low-and middle-income countries. *Bull World Health Organ.* 2007;85(4):319–21. Available from: http://www.scielosp.org/scielo.php?pid=S0042-96862007000400018&script=sci_arttext. Accessed 30 Apr 2015.
- Goyet S, Touch S, Ir P, SamAn S, Fassier T, Frutos R, et al. Gaps between research and public health priorities in low income countries: evidence from a systematic literature review focused on Cambodia. *Implementation Sci.* 2015;10(1):32. Available from: <http://www.biomedcentral.com/>

- content/pdf/s13012-015-0217-1.pdf. Accessed 30 Apr 2015.
14. Becerra-Posada F, Minayo M, Quental C, Haan S de. National research for health systems in Latin America and the Caribbean: moving towards the right direction? *Health Res Policy Syst.* 2014;12(1):13. Available from: <http://www.health-policy-systems.com/content/12/1/13/abstract>. Accessed 13 Nov 2015.
 15. Oficina Nacional de Estadística. Informe general de los resultados del IX Censo Nacional de Población y Vivienda 2010. Volumen I. Santo Domingo, República Dominicana: Ministerio de Salud; June 2012. 548 pp. Available from: http://censo2010.one.gob.do/volumenes_censo_2010/vol1.pdf
 16. World Bank. Dominican Republic Overview. 2015. Available from: <http://www.worldbank.org/en/country/dominicanrepublic/overview>.
 17. Pimentel RD. Criterios para el establecimiento de un agenda en prioridades de investigación en salud en la República Dominicana. *Ser Reuniones Téc. CENISMI*, 1996. 2 vols.
 18. Mendoza H. Difusión de la investigación en salud en la República Dominicana. *Bol Cenismi.* 2007;17(2):1-2.
 19. Martínez-Martínez E, Zaragoza ML, Solano E, Figueroa B, Zúñiga P, Laclette JP. Health research funding in Mexico: the need for a long-term agenda. *PLoS ONE.* 20127(12):e51195. Available from: <http://dx.plos.org/10.1371/journal.pone.0051195.g004>. Accessed 6 May 2015.
 20. Global Burden of Disease Study 2013 Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015; 386(9995):743–800. Available from: <http://linkinghub.elsevier.com/retrieve/pii/S0140673615606924>. Accessed 13 Nov 2015.
 21. World Health Organization. Metrics: Disability-Adjusted Life Year (DALY). Available from: http://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/. Accessed 1 Jul 2015.
 22. Viergever RF, Terry RF, Karam G. Use of data from registered clinical trials to identify gaps in health research and development. *Bull World Health Organ.* 2013;91(6):416–25C. Available from: http://www.scielo.org/scielo.php?pid=S0042-96862013000600009&script=sci_arttext. Accessed 30 Apr 2015.
 23. Stuckler D, King L, Robinson H, McKeel M. WHO's budgetary allocations and burden of disease: a comparative analysis. *Lancet.* 2008;372(9649):1563–9.
 24. Min Huang C, Lunnen JC, Miranda JJ, Hyder AA. Traumatismos causados por el tránsito en países en desarrollo: agenda de investigación y de acción [Road traffic injuries in developing countries: research and action agenda]. *Rev Peru Med Exp Salud Pública.* 2010;27(2):243–7. Available from: http://www.scielo.org/scielo.php?script=sci_abstract&pid=S1726-46342010000200013&lng=en&nrm=iso&tlng=es. Accessed 6 May 2015.
 25. Seale AC, Head MG, Fitchett EJA, Vergnano S, Saha SK, Heath PT, et al. Neonatal infection: a major burden with minimal funding. *Lancet Global Health.* 2015;3(11):e669–70. Available from: [http://dx.doi.org/10.1016/S2214-109X\(15\)00204-1](http://dx.doi.org/10.1016/S2214-109X(15)00204-1).
 26. Consejo Nacional de VIH y SIDA (CONAVIHSIDA). Encuesta de vigilancia de comportamiento con vinculación serológica. Santo Domingo, República Dominicana; 2012.
 27. Pérez-Then E. A human security population-based approach to achieve equity, solidarity, and gender sensitivity for the population living in southwestern Bateyes of the Dominican Republic. 2009; Open Access Dissertations. Paper 418. Available from: http://scholarlyrepository.miami.edu/cgi/viewcontent.cgi?article=1417&context=oa_dissertations. Accessed 10 Nov 2015.
 28. Christensen H, Krysinska K, Murray S. The gap remains: NHMRC research funding for suicide and self-harm, 2000–2014. *Med J Aust.* 2015;202(10):525–6.
 29. Evans JA, Shim J-M, Ioannidis JPA. Attention to local health burden and the global disparity of health research. *PLoS ONE.* 2014;9(4):e90147. Available from: <http://dx.doi.org/10.1371/journal.pone.0090147>. Accessed 13 Nov 2015.
 30. Williams RJ, Tse T, Harlan WR, Zarin DA. Registration of observational studies: Is it time? *Canad Med Assoc J.* 2010;182(15):1638–42. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2952011/>. Accessed 22 Feb 2014.

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RESUMEN

Brechas en la investigación en el ámbito de la salud en la República Dominicana

Objetivo. Proporcionar un perfil básico de la investigación en el ámbito de la salud en la República Dominicana a través de la identificación de los problemas de salud o las enfermedades que han sido abordadas por los estudios realizados en el período 2000-2013, y determinar en qué medida esa investigación se corresponde con la carga de morbilidad en la población dominicana.

Métodos. Este fue un estudio descriptivo que buscó fuentes de datos primarias y secundarias para identificar las investigaciones en el ámbito de la salud realizadas en la República Dominicana desde el año 2009 hasta el 2013. Los datos sobre estos proyectos se recopilaron de los registros de clinicaltrials.gov y del Consejo Nacional de Bioética en Salud, así como de un cuestionario dirigido a los investigadores y los gerentes. Los años de vida ajustados en función de la discapacidad se derivaron del Estudio de Carga Mundial de Morbilidad 2013, para los hombres y las mujeres de todas las edades en la República Dominicana, y luego se compararon con el número de estudios de investigación sobre cada afección específica.

Resultados. Se identificaron 313 proyectos de investigación en salud realizados en la República Dominicana desde el 2009 hasta el 2013. La infección por el VIH/sida y las infecciones de las vías respiratorias inferiores fueron los dos principales temas investigados; sin embargo, representaban un porcentaje relativamente pequeño del total de años de vida ajustados en función de la discapacidad en los hombres y las mujeres de todas las edades en la República Dominicana en el 2013.

Conclusiones. La investigación dirigida a abordar las necesidades de salud de los dominicanos es limitada. El proceso en curso de fijación de prioridades para la investigación en el ámbito de la salud en la República Dominicana debe dirigir sus esfuerzos a corregir este desequilibrio.

Palabras clave

Prioridades en salud; investigación; ensayos clínicos como asunto; América Latina; República Dominicana.