Translational research in Brazil: research topics and their adherence to the SUS Agenda

Pesquisa translacional no Brasil: temas de pesquisa e sua aderência à Agenda do SUS

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ABSTRACT This study aims to prospect groups and themes of translational research in Brazil that have the potential of transforming research into solutions for health nationally. It also aims to evaluate whether or not there is convergence with the 2018 Agenda of Research Priorities of the Ministry of Health, the Agenda. This is an exploratory, descriptive study, based on a search in public databases of free access. Sixty-four programs/groups were located: eight postgraduate programs, 12 research programs, and 44 groups linked to translational health research. Most of the postgraduate programs and all research programs are linked to Public Institutions in the Southeast region. The thematic analysis did not include the 20 ongoing research/graduate programs. The 44 research groups were categorized according to the 14 thematic axes and the 172 lines of research of the Agenda lead by four independent and blinded researchers. The results showed the inexistence of adherence between the themes these groups investigate and the SUS (Unified Health System) priority Agenda. In a scenario of increasing demand for health needs, translational research could reduce distancing between the research developed in Brazil and the necessities of the SUS.

KEYWORDS Unified Health System. Public health. Translational medical research. Research.

RESUMO *O estudo objetivou prospectar grupos e temas de pesquisa translacional no Brasil, que detenham potencial de transformar pesquisa em soluções para saúde no âmbito nacional, e avaliar se existe convergência com a Agenda de Prioridades de Pesquisa do Ministério da Saúde, a Agenda. Estudo exploratório, descritivo, realizado a partir de busca em bases de dados públicos de acesso livre. Foram localizados 64 programas/grupos, sendo 8 programas de pós-graduação, 12 programas de pesquisa e 44 grupos na área de pesquisa translacional em saúde cadastrados no Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). A maioria dos programas de pós-graduação e todos os programas de pesquisa são vinculados a Instituições Públicas da região Sudeste. A análise temática não incluiu os 20 programas de pesquisa/pós-graduação existentes. Os 44 grupos de pesquisa foram categorizados de acordo com os 14 eixos temáticos e com as 172 linhas de pesquisa da Agenda por 4 pesquisadores independentes e cegados. Os resultados mostraram a inexistência de aderência entre os temas de pesquisa desses grupos e a Agenda de prioridades do Sistema Único de Saúde (SUS). Em cenário de aumento de demanda de necessidades em saúde, a pesquisa translacional permitiria reduzir o distanciamento da pesquisa desenvolvida no Brasil com as necessidades do SUS.*

PALAVRAS-CHAVE *Sistema Único de Saúde. Saúde pública. Pesquisa médica translacional. Pesquisa.*

Introduction

Collective health is regarded as a scientific field in which 'knowledge and understanding about the health object are produced and, where different disciplines operate, which contemplate it from various angles'[1]. It is a relatively new field of research, which emerged in the mid-1970s, strongly influenced by preventive medicine and social[2]. This field arises in a context of great articulation and social mobilization[2], with the proposal of producing new reflections on health, especially in its social aspects.

With the advent of redemocratization in Brazil and the establishment of the Magna Carta of 1988, health is now formally recognized as the right of all and the duty of the State. The article 198 of the Federal Constitution of 1988 guarantees that access to this right will come about through actions and health services organized in a regionalized and integrated network forming a Unified Health System (SUS)[3].

In the last 30 years, there have been advances in the implementation of SUS that have led to important changes in health care for the population, such as the expansion of services and professionals linked to SUS and improvements in the access conditions to this system[4]. However, despite these advances, it is clear that this is a developing health system that aims to ensure universal coverage and equity[5]. Actions such as sanitary and epidemiological surveillance, health care, water inspection and other human consumption inputs and even the formulation and execution of the blood and derivatives policy are its fields of activity[6]. This broad spectrum of activity allied to the population and regional diversity, changes in the epidemiological and health profile, among other factors, produce challenges for the public system to achieve its objectives. The complexity of the actions proposed by the SUS brought a great challenge, awakening the need for a greater inter-sectoral and multidisciplinary dialogue in order to improve efficiency and resolution.

In the same period, in the 1990s, research groups working in the field of translational research appear in the United States at the National Cancer Institute[7], with the objective of 'promoting interdisciplinary research and accelerating the bidirectional exchange between basic and clinical science, in order to move the basic research findings from the laboratory to environments applied involving patients and populations'[8], initially, focused on research in the area of cancer and, later extending to other health areas. According to the European Society for Translational Medicine, translational medicine (here we use it as an term analogous to translational research and translational science) is defined as an 'interdisciplinary segment of the biomedical field supported by three pillars: bench, bed and community', whose main objective is to combine disciplines, resources, knowledge, specialists and techniques within these three pillars in order to promote improvements in prevention, diagnosis and therapy[9].

Since its inception, translational research has undergone major expansion, especially in the United States. An important example of this country was the creation, in 2012, of the National Center for Advancing Translational Sciences (NCATS) to provide faster new treatments and cures for various diseases by reducing bottlenecks between scientific discovery and use by patients[10].

One area that has use potential and expansion of translational research is the Health Economic-Industrial Complex (Ceis), a term that emerged in the mid-2000s, which envisages combining political economy with the vision of collective health, consisting of three components: chemical and biotechnological basis (drugs and medicines, vaccines, blood products and diagnostic reagents); mechanical, electronic and material basis (mechanical equipment, electrical and electronic equipment, prostheses and orthoses and consumables) and service providers (hospitals, outpatient clinics and diagnostic and treatment services)[11].

Translational research in health is understood as scientific research that aims to reduce the distance between the production of knowledge in laboratories and practical application in medicine, health services, through innovative interventions for the population[12]. This is a great challenge that translational research causes in the field of collective health in Brazil, since basic and clinical research in health have not always been aligned with the new and growing demands of SUS, which represents a major gap to be addressed.

In order to fill this gap, the Ministry of Health launched the National Agenda for Priorities in Health Research of the Ministry of Health, in 2018, aiming to align health activities with scientific, technological, and innovation research activities and to direct resources available for investments in strategic research themes for SUS[13]. This agenda brings 172 lines of research structured in 14 thematic axes: 1 – Environment, Work and Health; 2 – Pharmaceutical Assistance; 3 – Post-Merger Evaluation; 4 – Health Technology Development and Innovation; 5 – Chronic Noncommunicable Diseases; 6 – Communicable Diseases; 7 – Health Economics and Management; 8 – Work Management and Health Education; 9 – Health Programs and Policies; 10 – Women's Health; 11 – Health of the Black Population and Traditional Communities; 12 – Health of the Elderly; 13 – Indigenous Health; and 14 – Maternal and Child Health[13].

Likewise, considering that both collective health and translational research are relatively new scientific fields with interdisciplinary proposal, this paper aims to prospect groups and themes to present a panel on translational health research at national level and to evaluate if there is convergence between the agenda of the federal government and the academic research developed by the Research Groups in Brazil.

Material and methods

Exploratory and descriptive study, carried out from active search parameterized in the Postgraduate Sucupira Platform (Coordination for the Improvement of Higher Education Personnel – Capes), on the institutional website of the Oswaldo Cruz Foundation (Fiocruz), in the National Registry of Courses and Higher Education Institutions (e-MEC) and the Research Groups Directory in Brazil (RGD/National Council for Scientific and Technological Development – CNPq).

The Sucupira platform is a tool that gathers information and allows analysis and evaluation of Brazilian postgraduate courses, and is the basis for the National Postgraduate System[14]. Fiocruz is the main non-university institution for the training and qualification of human resources for the SUS and for the area of science and technology in Brazil[15]. E-Mec is the official database on courses and public and private higher education institutions in Brazil[16]. And the RGD/CNPq consists of an inventory of the scientific and technological research groups that are active in Brazil. The RGD allows the identification of human resources, lines of research, areas of knowledge, sectors of application involved, scientific, technological and artistic production and partnerships established between the groups and these institutions[17].

The terms 'translational research', 'translational medicine', 'translational medical science', 'translational medical research', 'translational research, medical', 'medical translational research', 'research, medical translational', 'medical research, translational', 'knowledge translations', 'translations, knowledge', 'program', 'postgraduate', 'line of research', 'collective health' were used for searches in RGD and combined, through Boolean 'AND' and 'OR' operators, in the period December 2018 to March 2019. The data were organized into tables of Microsoft Excel® containing group name and/or program, name of the institution and type (public or private), Brazilian region, area of concentration and lines of research involving this area of knowledge. In the RDG, the filters 'name of the group', 'name of the search line' and

keyword of the search line were also applied in order to ensure that all groups addressing the theme of translational search were located. After pre-selection, they were excluded from the RDG: I) groups in the areas of education and veterinary medicine due to those related to research concerning educational practices in the classroom and these for being studies focused on animal health without direct relationship with human health, respectively, and II) status of registered in directory as excluded (not active). For the pre-selection of postgraduate programs, those not directly and/or indirectly related to the health area were excluded.

After this stage, the research groups were categorized, in an independent manner, by 4 researchers, according to the 14 thematic axes and 172 lines of research that form the Agenda[13], and the disagreements, regarding the categorization that occurred among the 4 researchers, were kept. The research themes of the groups were categorized into up to three axes of the Agenda, according to Caetano et al.[18], The research themes of the groups were categorized into up to three Agenda axes, according to Caetano et al.[18], due to many of these groups addressing multiple foci. In this study, as well as that conducted by Guimarães[7], it was agreed to group all search terms as 'translational research' in the results and discussion.

This study was not appreciated by the Research Ethics Committee because it only involved bibliographic searching in publicly accessible databases and did not have direct or indirect access to researchers registered in these research groups.

Results and discussions

Sixty-four programs/groups were located, including 8 postgraduate programs, 12 research programs and 44 groups linked to the translational health research area. Among the postgraduate programs, 7 of them are of the *StrictoSensu* modality and linked to public Institutions, and 1 of the *LatoSensu* modality linked to the private education Institution, located in the Southeast region (*figure 1*).

Figure 1. Postgraduate Programs and Research Programs focusing on Translational Research, Brazil - 2019
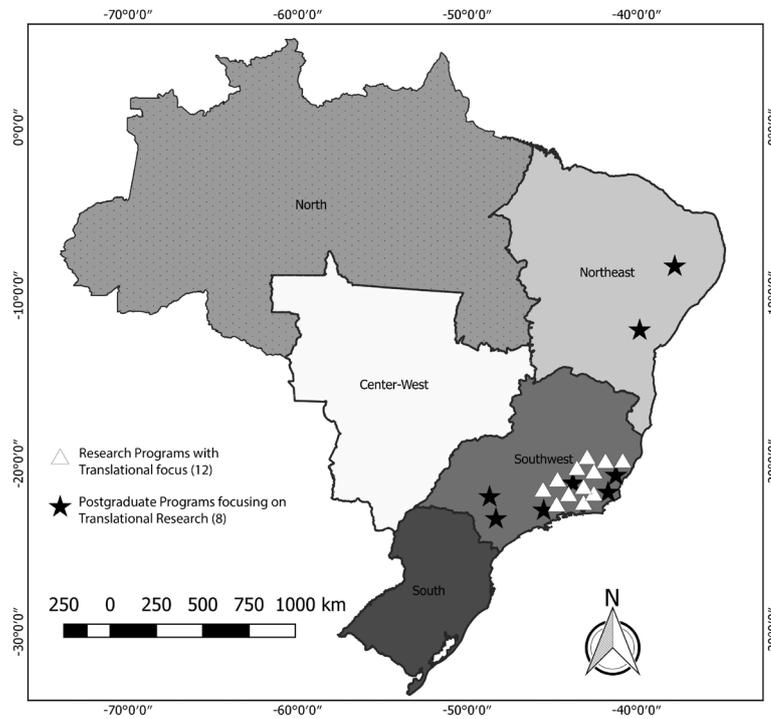
Fiocruz was the institution with the largest number of programs focusing on translational research (n=12) (*figure 1*), as well as two postgraduate programs and four research groups that address a wide range of topics relevant to the scenario. Chagas disease, leishmaniasis, schistosomiasis, emerging diseases, tuberculosis and other mycobacteriosis, neurological diseases, cancer, metabolism disorders, omics networks and scientific computing in health and environment, nanotechnology and synthetic biology, as well as a program focused on health promotion[19].

Of the 63 groups initially found in the RDG, 7 were excluded, because they were related to education, 2 in veterinary medicine, 1 in astronomy, and 9 were repeated. Of the 44 research groups registered in the RDG included

in the study, the Southeast region was the region that most presented research groups focused on translational research (n=16), at the same time that it was the one that most concentrated postgraduate programs with this theme (n=6) and the 12 translational research programs (*figure 2*). The health sector is responsible for most of all scientific and technological production in Brazil, however, this does not occur homogeneously, concentrating in the Southeast region[20]. The significant participation of the health sector in the scientific environment can be explained by several factors, such as: 1) the health sciences area brings together the largest number of permanent professors (doctors) in the area, with 12.921 (year 2017), and, of these, 7.430 are concentrated in the Southeast region – São

Paulo, Rio de Janeiro and Minas Gerais[21]; 2) Another relevant aspect is that this area is the area with the highest concentration of postgraduate programs in Brazil, with 681 programs, according to data for 2017, among which 372 are located in the Southeast region, especially in the state of São Paulo[21]. Santos et al.[22] report that the Southeast, being the richest and most developed region of the Country, concentrates most of the postgraduate courses, research facilities and trained researchers, which contributes to the greater receipt of financial resources.

Figure 2. Distribution by Brazilian region of research groups with a translational approach, Brazil - 2019
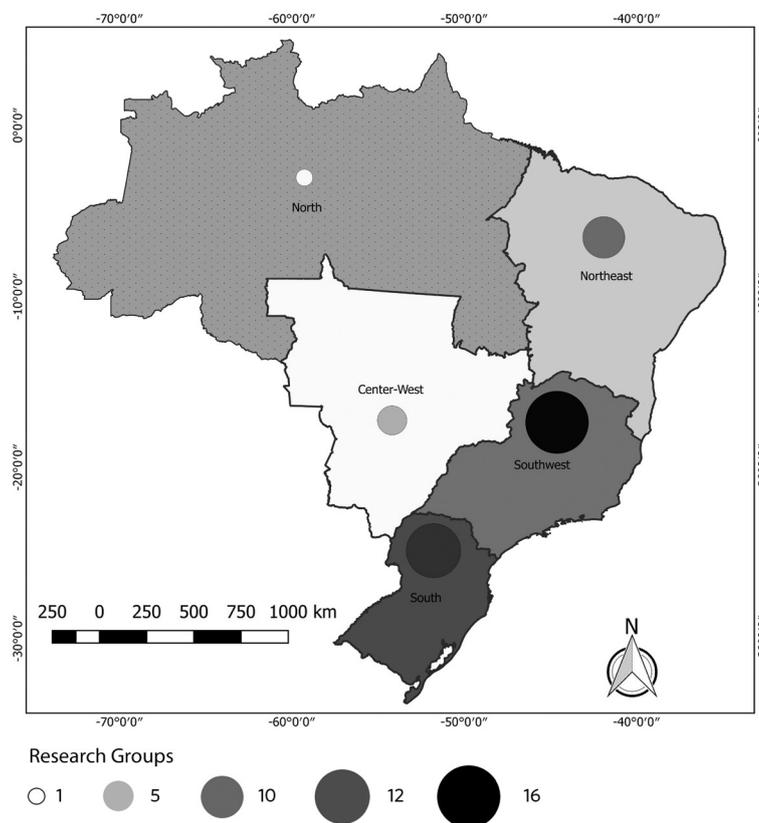
Source: Research Groups Directory/CNPq 2018/2019.
Elaborated: Alessandro Igor da Silva Lopes in 2019/02/02.
Geographic Coordinate System, Datum SIRGAS 2000.

Research groups related to the theme of translational research correspond to 0.8% of health research groups (total health research groups = 5.549, a search performed on March 30, 2019), which indicates little representativeness of translational research within the context of health.

Graph 1 shows the distribution by concentration areas registered in the research groups. It is observed that they are grouped

into [15] distinct areas related to health sciences, where medicine is the most prominent area in the field of translational research with 19 groups (43.2%), followed by the area of collective health (7 groups, 15.9%).

Interest in translational research is recent and has increased in recent years[22]; this fact was confirmed in this study, which found that 86.4% of the groups (n = 38) were created after 2010.

Graph 1. Distribution by concentration area of translational research groups, Brazil – 2019
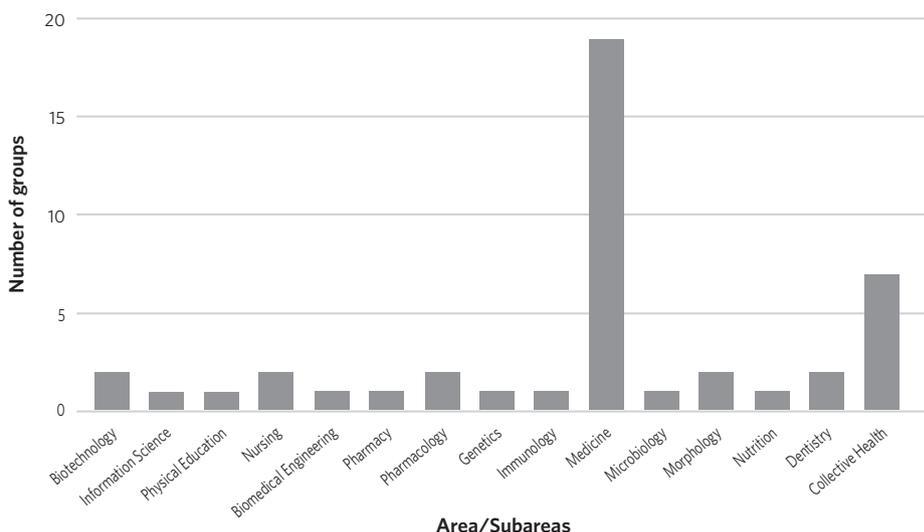
Source: Own elaboration based on information from 44 research groups registered in the CNPq Research Groups Directory, captured on March 20, 2019.

According to the National Cancer for Advancing Translational Science (NCATS)[23], the translational research spectrum represents the phases of research from the biological basis to interventions that improve the health of individuals, involving different times (T): T0 represents the basic research; T1, preclinical research; T2, the clinical research; T3, the clinical implementation; and T4, implementation in the field of public health.

After extensive discussion among the researchers of this study for the categorization of the research groups, consensus was reached on 45.5% of the classifications. The difficulty in reaching consensus on categorizations can be attributed to factors such as: 1) the need for the Agenda to objectively present research lines within the 14 axes; 2) the need for further detailing and updating the description of the research groups on the scope of work of the groups within the directory; 3) the low use of health research priorities – although the Ministry of Health has, since 2005, presented the discussion around them, initially as the National Agenda of Priorities for Health Research (ANPPS)[24] and, later, in 2018, with the Research Priorities Agenda of the Ministry of Health[13] – which are still little used as a guiding instrument for research and the availability of financial resources to support the development of health projects; and 4) the view of independent researcher evaluators, their backgrounds and their previous interdisciplinary experiences, which may have contributed to different conclusions. By any means, the groups categorized by consensus

(45.5%) were then organized by thematic axes, which are shown in *graphic 2*. As can be seen, the groups for which consensus was reached (n = 20) showed that, although they address topics relevant to health, their research themes do not correlate with the Ministry of Health Agenda, in response to SUS priorities. The groups categorized in axes 2, 4, 5, 6, 8 and 9, related to pharmaceutical care, technology development and health innovation;

noncommunicable chronic diseases; communicable diseases; work management and health education and health programs and policies, respectively, are unique groups. These themes are directly related to the economic-industrial health complex, sectors par excellence of translational research; in addition to chronic noncommunicable diseases, which include oncology, the area in which translational research originated.

Graph 2. Distribution of research groups according to their approach to the thematic axes of the Research Priorities Agenda of the Ministry of Health (APPMS)
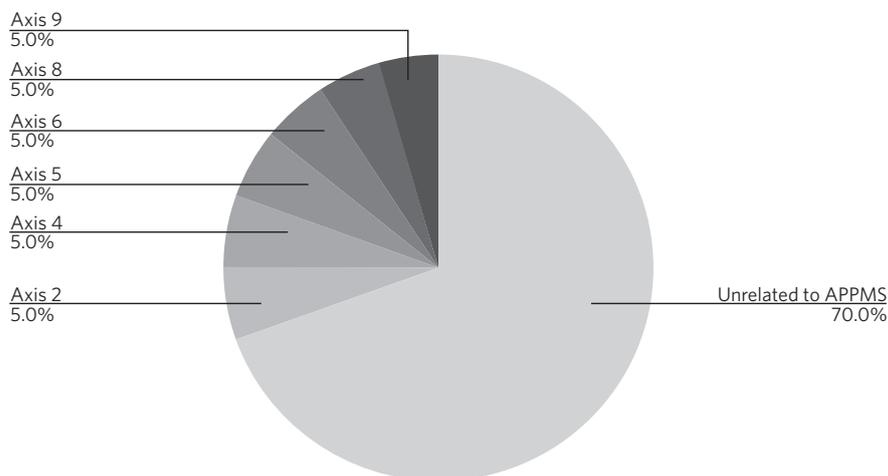
Source: Elaborated from the analysis of the four researchers, based on information from the CNPq Research Groups Directory and the Research Priorities Agenda of the Ministry of Health. Research Groups represented in the graph = 20.

Oelke, Lima and Acosta[25] identify some challenges for the translational research scenario in Brazil, such as: 1) lack of familiarity and knowledge about the translation of knowledge; 2) from the identification of problems, generate new knowledge that is translated into practice; 3) little discussion among the main interested parties and absence of partnership between researchers and knowledge users (health professionals, policy makers, educators, managers, administrators,

community leaders and patients). In addition to these challenges, we also consider relevant the need for: 1) greater alignment between the needs of the health system and the researchers who generate scientific and technological knowledge; and 2) greater targeting of investments to relevant health problems.

It is increasingly essential that the allocation of resources be based on a rational prioritization process. Initiatives such as the Research Excellence Framework in the United Kingdom

represent an important research evaluation system aimed at ensuring the continuity of a worldwide research base that is dynamic and responsive to health demands, allowing the accountability of public investment in research and subsidizing the selective/priority allocation of funding in the research[26].

The NCATS establishes research priorities such as: discovery and preclinical development of drugs; biomedical, clinical and health research computing; clinical research, dissemination and implementation; and clinical tests[10,26]; with these priorities defined, this research center provides the participation of small companies to act in the resolution of these problems.

In the United Kingdom, translational research is one of the six major research areas of the Medical Research Council (MRC). According to this body, the objectives of knowledge translation are: 'to drive innovation, accelerate the transfer of the best ideas for new interventions and improve the return on investment in fundamental research', in order to transform fundamental discoveries into improvements to the health of the population, added to economic benefits. In this context, a translational research group was created to 'ensure strong support for translational research within the framework of the MRC, overseeing and guiding the activities involving this type of research'[27]. In the United Kingdom, as in the United States, translational research encourages partnerships with academia and industry in areas of strategic importance.

Unlike these countries, the discussion on translational research within the Brazilian Ministry of Health is not yet fully delineated, as it does not present in its organizational structure the insertion of translational research linked to health research priorities. The search carried out on the Ministry of Health website using the term translational research identified specific situations linked to research groups in the area of oncology and events, in which this theme was addressed[28].

Santos et al.[22] when evaluating the fulfillment of the National Agenda of Health Research Priorities, through research promotion by the Ministry of Health itself, demonstrate that articulation with other bodies and sectors was an important strategy for funding the Agenda, in order to facilitate the search for solutions and to optimize the use of public resources. The study confirmed that the establishment of priorities at the local level, such as in the Research Program for SUS, produces important results in the reduction of regional disparities[20].

The funding should be directed to priority research lines, focused on solutions to health problems of the population and which translate into improvements for SUS[18]. To rationalize the use of health resources, it is necessary to direct resources towards health priorities so that the Agenda becomes a source of guidance in further funding and in the elaboration of new programs and public policies.

Health is a complex agenda, therefore, increasingly demands interdisciplinary actions. The Research Priority Agenda of the Ministry of Health is an important guiding instrument for identifying the main problems encountered in the SUS. An expanded discussion with academia/universities/research institutes could make this Agenda even stronger for finding solutions. Translational research brings the concept of interdisciplinarity into its basic concept, and this can add more value to programs and policies conducted by the Ministry of Health.

Limitations

The search did not include postgraduate programs that present only lines of research with translational focus because the Sucupira platform does not allow direct search in the lines of research, needing, for this purpose, to first access Higher Education Institutions and programs individually. The professional experiences and the different previous

academic training of independent researchers may have corroborated distinct conclusions. The information filling in the RDG and the Lattes curricula of leaders, for the most part, is insufficient; however, this limitation was circumvented by combining this information and using thematic axis keywords for greater data consistency. The Agenda of the Ministry of Health was published in 2018 and may not yet be fully known by researchers in order to direct their lines of research, however, research should seek to align with health demands to translate into benefits for society.

Final considerations

Although the discussion about prioritizing health research is not recent, Agendas are still little used as a research guidance tool and for directing financial resources and research guidance. In a scenario of increased demand for health needs, it is increasingly important to target health research resources to SUS priorities. Translational research can bring great contributions, because it allows a greater approximation between the generated knowledge and its application to the individual or society. The topics studied by research groups focused on translational research had no correlation with the Agenda, indicating that translational research still has little representation in the Brazilian research scenario. At the same time, it tends to contribute to the health field and especially to public health; assists in the creation of process and product innovation, allowing greater access of the population to innovative products to meet unmet health needs and contributing, therefore, to better management of public resources.

Collaborators

Correia CVSR (0000-0002-4610-6113)* contributed to the conception, planning, analysis and interpretation of data; critical review of the content; and approval of the final version of the manuscript. Rezende KS (0000-0002-5183-2291)* contributed to the conception, planning, analysis and interpretation of data; critical review of the content; and approval of the final version of the manuscript. Rosa SSRF (0000-0002-1247-9050)* contributed to the planning, analysis and interpretation of data; critical review of the content; and approval of the final version of the manuscript. Barreto JOM (0000-0002-7648-0472)* contributed to the planning, analysis and interpretation of data; critical review of the content; and approval of the final version of the manuscript. Felipe MSS (0000-0003-4347-6853)* contributed to the conception, planning, analysis and interpretation of data; critical review of the content; and approval of the final version of the manuscript. ∎

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