Knowledge Translation in One Health: Actions for Strengthening the Health System

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This study aims to investigate and characterize the current knowledge on research initiatives associated with One Health, involving the formation and integration of research networks at Fiocruz, and to analyze the possibilities and limitations of using these coordination mechanisms to enhance research in One Health. An investigation was carried out on the institutional initiatives, mapping the researchers working on One Health. A low level of connections in the scientific collaboration network was observed, demonstrating the need to strengthen research actions. On the other hand, the notice released by the institution configures an action to mobilize and integrate researchers into the theme.
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Introduction

The constant changes in the world related to social, political, economic, and environmental determinants have caused changes in the way of life and, consequently, in the population's health conditions [1]. Therefore, integrating, mobilizing, and cooperating to share technical-scientific discoveries and the application of knowledge is essential to accelerate innovation, strengthen health systems, and improve the population's health. In this scenario of knowledge production, the translation of knowledge (TK) is a broad concept, encompassing all phases from knowledge creation to its application to produce beneficial results for society [2]. TK refers to transforming knowledge from research into practice for disseminating and implementing results favoring society [3]. In the transformation and interaction of knowledge, Unified Health (One Health) encompasses all the interdependency between human health, animal health, and the environment. This scientifically established definition arose from the connection of zoonosis studies involving multiple actors [4,5]. For the United Nations (UN), interdisciplinarity and the vision of One Health are fundamental to achieving the Sustainable Development Goals (SDGs) of the UN's 2023 Agenda [6]. Thereby, public health policies must connect sectors using interdisciplinary collaboration within a complex approach to One Health [5].

In this context, network-shaped work environments characterized by collaborative production are stimulated and incentivized. The network approach can be used to analyze the constitution of production spaces formed by institutional, public, or private actors, government actors, and individual actors, researchers, scholars, managers, or social actors [7]. In these environments, coordinating goals, communication, and resource optimization are crucial to guarantee the efficacy of the network [8,9].

We emphasize that the Oswaldo Cruz Foundation (Fiocruz), a research institution in Health, has been working on different fronts to strengthen network collaborative research. One of its actions for this purpose was the creation of the One Health Translational Research Program (Fio-Saúde Única) [10]. The initiative aims to strengthen the work of professionals from the institution, promote their articulation and integration, and mobilize resources to establish internal and external partnerships with researchers and research groups.

The goal of the present work was to characterize current knowledge on the formation and integration

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of research networks in Fiocruz and to analyze the possibilities and limitations of the formation and integration of these networks to increase research on One Health using the translation of scientific knowledge.

Since its appearance around the year 2000, the One Health approach has been working to advance its operationalization on global, regional, and national levels using commitments made between governments, academic institutions, and non-governmental organizations to strengthen intersectoral collaborations by using platforms, networks, director committees, and task forces [11]. The concept of One Health has been present in interdisciplinary and multisector discussions for several years, but there is increasing interest in applying and translating this approach into action [12].

An essential action in this context has been the quadripartite effort of the Food and Agriculture Organization of the United Nations (FAO), the UN's Environmental Programme (UNEP), the World Organization for Animal Health (WOAH), and the World Health Organization (WHO) to collectively act in order to prevent future pandemics and to promote Health sustainably using the One Health approach [13]. This joint effort resulted in the One Health Joint Plan of Action (2022-2026), which aims to strengthen the ability to face complex and multidimensional health risks and create more resilient global, regional, and national health systems. The plan was structured to consider six action lines that help establish sustainable health and food systems, reduce global health threats, and improve ecosystem management [13].

The operationalization process of One Health, characterized as a transdisciplinary, multisectoral, multiprofessional approach that focuses on society, must be carried out in a coordinated and articulated fashion to establish structuring cooperations that strengthen collective work and avoid the duplication of efforts [14] always aiming for healthcare in human, animal, and environmental healthcare. A coordinated action for this operationalization is structuring research networks that focus on collaboration and sharing of resources and knowledge, the quality of the relations among their participants, and collective goals and results [15].

In this context, Fiocruz has been working on the strengthening of collaborative network research by instituting the translational research program and the Fio-Saúde Única, which have been making an effort to integrate researchers who somehow develop studies on One Health and boast more than one hundred researchers registered in the program. Fio-Saúde Única has the goal of subsidizing future joint actions of different Fiocruz areas of operation, promoting transversality and considering the interdependence between human health, animal health, and the environment, all the while promoting and strengthening articulation and integration with professionals from partner institutions, government agencies, and society as a whole.

Translation of Knowledge in Research

Translation of Knowledge (TK) refers to applying scientific research and academic knowledge discoveries and breakthroughs, solving real problems to meet the demands of society. The term, a very commonly used term in Health, first appeared in the 1970s and began to be widely used early in the 1990s [16,17]. TK has various meanings. In Europe, the terms used are the science of implementation or use of research. In the United States, the terms dissemination, diffusion, use of research, transfer, and absorption of knowledge are frequently used [18]. We emphasizes that this is a vast area that still requires further studies, and it makes it possible to identify and use about ninety adjacent terms.

Differentiating TK from other theories is fundamental to ensuring that interactions between knowledge producers and users of knowledge are robust [16]. There are five "knowledge in action" theories, and their textual content differs. They all differ from TK in their disciplinary roots and types. These are the use of knowledge, diffusion of knowledge, implementation of knowledge, transfer

of knowledge, and TK itself [19]. According to Davison (2009) [16], TK has fundamental characteristics related to multidimensionality, involving interaction between the different actors, their target public, and their context, and with information often reported by the researcher about their work and the knowledge regarding the processes and products of the research. These characteristics can either be facilitators or create barriers to knowledge translation.

TK incorporates the steps between the production of new knowledge and their application in practical terms to produce results for society, which involves communication, interaction, sharing, management, and ethics and research as guidelines and a summary of results in a global context [20]. Fiocruz has therefore focused on research that aims to promote the union between scientific production and technological advancements, generating solutions for the population's health problems. It has been possible thanks to the participation of scientists and health professionals engaged in creating innovative methods to meet the demands of society.

Materials and Methods

The method developed was of the exploratory type, which uses a qualitative approach. The data collection strategy involved bibliographic research on existing databases such as PubMed and Scielo. Additionally, other contents were used, such as those made available by the World Health Organization (WHO), the Food and Drug Administration (FDA), and public documents on institutional and governmental websites. The analysis tool was Fiocruz's e-Lattes, a technological device based on web architecture. It can be accessed through https://elattes.fiocruz.br/ using a computer, a tablet, or a cell phone [20]. The databases used for the prospection of the tool are the Lattes platform, the Directory of Research Groups (DGP), the Brazilian Digital Library of Theses and Dissertations (BDTD), international scientific bases of the Web of Science already treated (CWTS), and the database of altmetric.com [21]. The study also mapped the results of the public call launched by Fiocruz through the Research Support Foundation of Rio Grande do Sul (FAPERGS). The research investigated and characterized current knowledge on the initiatives of research lines associated with One Health, which involve forming and integrating research networks at Fiocruz. The collected data attempted to identify punctual or collective institutional actions that aim to strengthen the One Health strategy in Fiocruz. Researcher mapping was done within the One Health Translational Research Program - Fio-Saúde Única. This network environment aims to articulate, integrate, and mobilize resources to establish internal and external partnerships with researchers and research groups. The tool generates information and indicators that allow for the measurement of scientific production and its relevance, whether it refers to an author in terms of productivity criteria (total number of articles), to an article using its relevance, to its influence on other researchers (total number of citations), or to the impact factor of the journal which published the articles [21].

Results and Discussion

The analysis generated by e-Lattes based on these data includes important metrics for the context of this research. Figure 1 shows indicators of the scientific production of Fio-Saúde Única researchers related to the number of publications per year and the stratification of the quality of these publications. Figure 2 presents the collaboration network of Fio-Saúde Única, in which dots represent researchers and colors represent groups of researchers formed according to their relations. Larger dots represent researchers with more publications. Figure 3 represents the distribution of the researchers participating in Fio-Saúde Única per area of operation; one researcher may be active in more than one area of knowledge. Based on the information extracted from the analysis generated by e-Lattes, we observed a higher number

Figure 1. Indicators of scientific production related to the One Health Network (between 2019 and 2023).

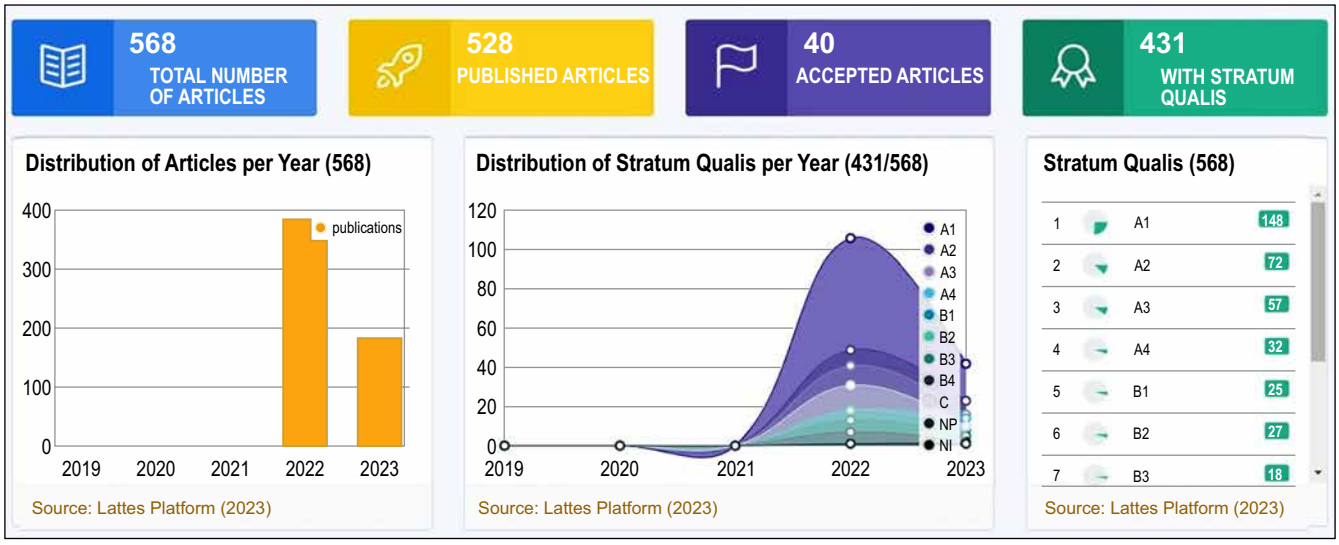
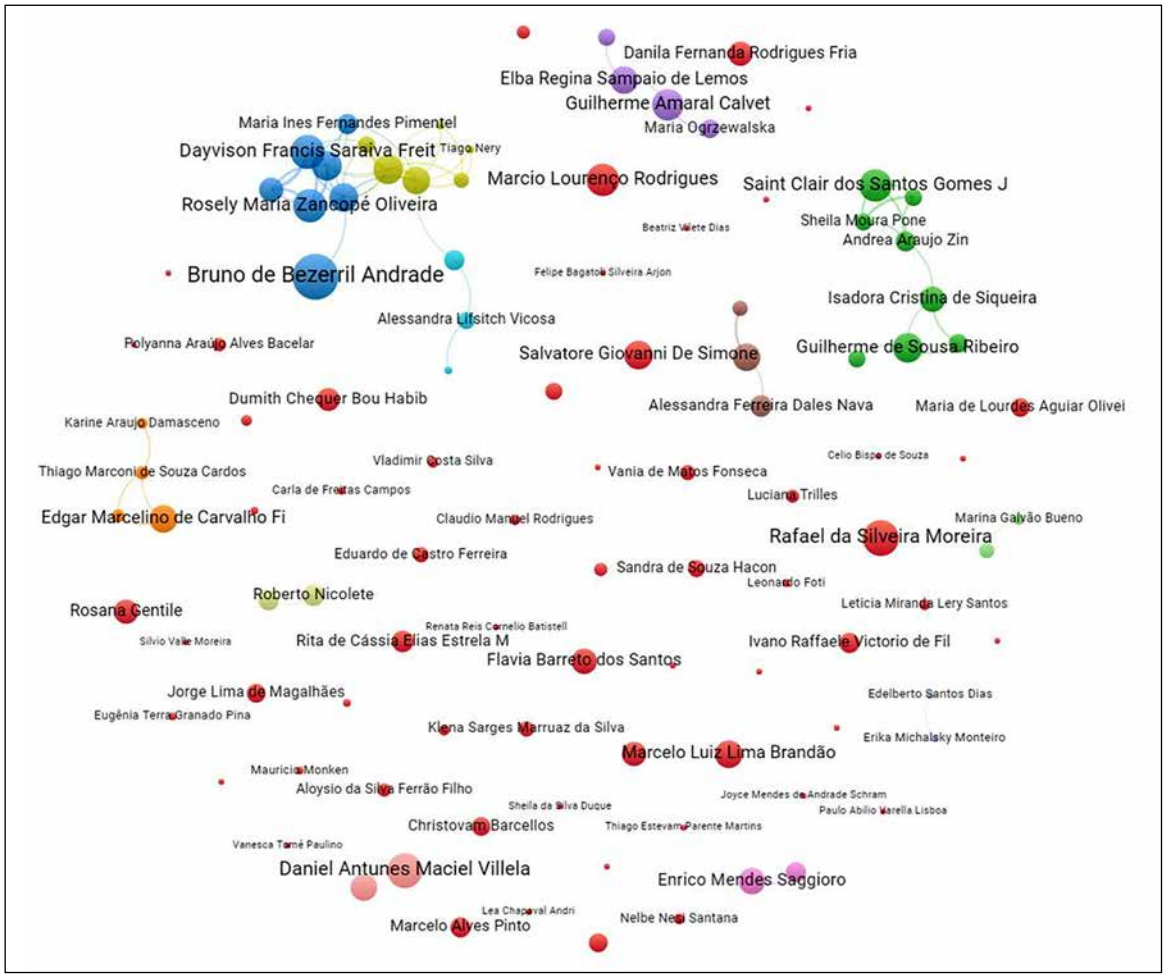
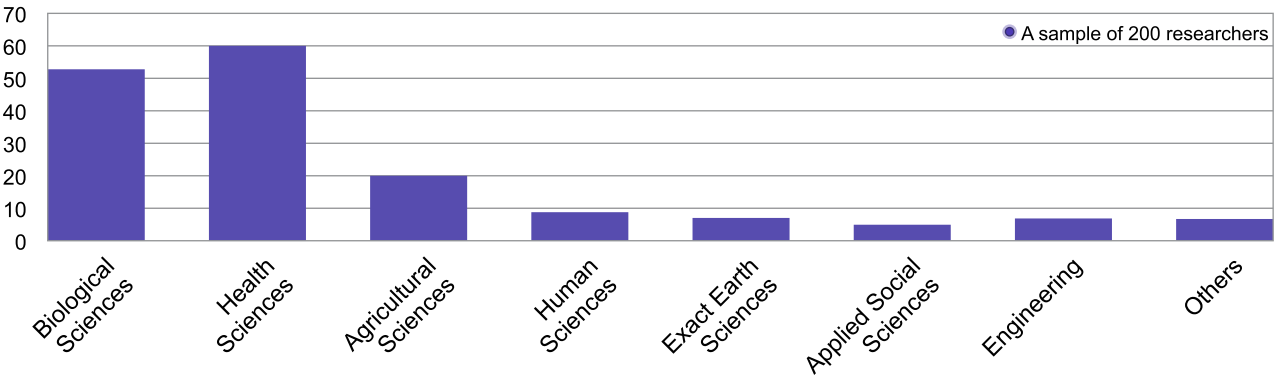


Figure 2. Scientific collaboration network - One Health, Fiocruz.



Source: Lattes platform.

Figure 3. Overlapping of fields of operation of Fio-Saúde Única researchers.



Note: A researcher may work in more than one field of expertise
Source: Lattes Platform (2023)

of publications for the 106 researchers registered in the network in 2022 (528 articles published and 40 accepted for publishing). However, we also observed a low level of connections in the scientific collaboration network, with the formation of small research groups, which shows the need to strengthen actions for collaborative network research in the field of One Health [14] within the institution by activating and mobilizing resources that promote a higher interaction between the actors and ensure the sustainability of the network. Another critical piece of information is the distribution of the fields of operation of the researchers registered in the network, as well as their institutional and sectional distribution. We observed at least 7 significant areas where these researchers work: biological and health sciences, agricultural sciences, exact and earth sciences, applied human and social sciences, and engineering. In this sense, this information illustrates the expectation of great potential to develop research on One Health, characterized by the transdisciplinary character, multisectoral cooperation, and inter-institutional work [11]. Other initiative mapped in this research was the public call launched by Fiocruz via the Research Support Foundation of Rio Grande do Sul (FAPERGS) [22], in a model structured between the two institutions to strengthen collaborative projects of multiple disciplines among the members of the Health Network and expand research on One Health in the state of Rio Grande do Sul (RS), focusing on the needs of the Unified Health System (SUS). In this work, 12 scientific projects were selected considering the One Health approach within the axis "Scientific research with disruptive or incremental innovation in One Health, with repercussions on human health." The institutions that participated in the public call in Rio Grande do Sul (universities, science and technology institutions, and institutions related to the state government) and in Fiocruz (technical-scientific units on a national level) whose projects were approved addressed these priority subjects: (i) antimicrobial resistance, (ii) pollution, (iii) disasters and the environment, (iv) social inequalities and vulnerable populations, (v) integrated surveillance in health, (vi) zoonosis and vectors; and (vii) medical microbiology. These themes are related to the internal and external networks of Fiocruz and have been working as complements to the different expertise distributed among the institutions. It is essential to highlight that the research lines of the projects approved in this public call directly relate to the action lines elaborated in the quadripartite joint plan of FAO, UNEP, WOAH, and WHO [13]. We emphasize

that the proposal of the public call makes it possible to integrate projects using multisectoral collaboration, inter-institutional articulation, and transdisciplinary actuation, which are important characteristics of the One Health approach [12, 14].

Conclusion

The challenge of One Health is to look at research from a wide perspective articulated in the ecosystem in a transdisciplinary, multisectoral, multiprofessional, and inter-institutional manner to integrate knowledge. In this context, Fiocruz has been implementing integrative actions: the public call launched by Fiocruz through the Research Support Foundation of Rio Grande do Sul (FAPERGS) [22] and the structuring of the One Health Network using Fio-Saúde Única. These actions aim to strengthen research on One Health, stimulating a higher interaction between researchers and better integrating projects to expand collaborative research. We observed that even with the activation of a research network, collaboration and integration between these actors are still incipient and, therefore, need structuring actions for their strengthening. For this purpose, the process of coordinated mobilization of this network would be crucial.

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