



Texto & Contexto Enfermagem

ISSN: 0104-0707

texto&contexto@nfr.ufsc.br

Universidade Federal de Santa Catarina
Brasil

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FAMILY HEALTH STRATEGY: A TECHNOLOGICAL INNOVATION IN HEALTH
Texto & Contexto Enfermagem, vol. 24, núm. 2, marzo-junio, 2015, pp. 584-592
Universidade Federal de Santa Catarina
Santa Catarina, Brasil

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FAMILY HEALTH STRATEGY: A TECHNOLOGICAL INNOVATION IN HEALTH

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ABSTRACT: The importance of the Family Health Strategy in the health sector in Brazil, and the debate on technology and technological innovation have led to the development of a theoretical reflection aiming to characterize the Family Health Strategy as a non-material technological innovation of the health field. In order to construct the text, the philosophical and sociological approach was used, as was the conceptualization of technological innovation, found in international documents and in Brazilian legislation and publications regarding technological innovation in health care. These references were used in order to analyze what is prescribed for the Family Health Strategy in the National Primary Healthcare Policy, emphasizing the innovative aspects in relation to biomedicine, which made it possible to support that the Family Health Strategy consists of a non-material technological innovation in health care, of the incremental type. It is concluded that the Family Health Strategy is a non-material technological innovation in health care, due to the principles which it anchors, and is incremental, as it does not completely break with the traditional model in health care.

DESCRIPTORS: Family health. Technology. Innovation. Management of science, technology and innovation in health. Science, technology and society.

ESTRATÉGIA SAÚDE DA FAMÍLIA: UMA INOVAÇÃO TECNOLÓGICA EM SAÚDE

RESUMO: A importância da Estratégia Saúde da Família no setor saúde no Brasil e o debate sobre tecnologia e inovação tecnológica, motivaram a elaboração de uma reflexão teórica com objetivo de caracterizar a Estratégia Saúde da Família como uma inovação tecnológica não material do campo da saúde. Para a construção do texto utilizou-se a abordagem filosófica e sociológica, a conceituação de inovação tecnológica, constante em documentos internacionais, e na legislação brasileira e publicações sobre inovação tecnológica em saúde. Este referencial foi utilizado para analisar o que está prescrito para a Estratégia Saúde da Família na Política Nacional de Atenção Básica, destacando os aspectos inovadores em relação à biomedicina, o que possibilitou sustentar que a mesma consiste em uma inovação tecnológica não material em saúde, do tipo incremental. Conclui que a Estratégia Saúde da Família é uma inovação tecnológica não material em saúde, pelos princípios que se ancora, e incremental, porque não rompe integralmente com o modelo tradicional em saúde.

DESCRIPTORES: Saúde da família. Tecnologia. Inovação. Gestão de ciência, tecnologia e inovação em saúde. Ciência, tecnologia e sociedade.

ESTRATEGIA DE SALUD DE LA FAMILIA: UNA INNOVACIÓN TECNOLÓGICA EN SALUD

RESUMEN: La importancia de la Estrategia de Salud de la Familia en el sector de la salud en Brasil y el debate acerca de la tecnología y la innovación tecnológica, motivaron la elaboración de una reflexión teórica con el objetivo de caracterizar el Estrategia de Salud de la Familia como una innovación tecnológica no material en la salud. Se utilizo documentos nacionales y internacionales, la legislación brasileña y publicaciones sobre innovación tecnológica de la salud para analizar lo que se prescribe para la Estrategia de Salud de la Familia en la Política Nacional de Atención Primaria, destacando los aspectos innovadores en relación a biomedicina, lo que permitió mantener que esta consiste en una innovación tecnológica no material de la salud, del tipo incremental. Se concluyó que la Estrategia de Salud de la Familia es una innovación tecnológica no material de la salud por los principios en que se basa, e incremental porque no se rompe por completo con el modelo tradicional de la salud.

DESCRIPTORES: Salud de la familia. Tecnología. Innovación. Gestión de ciencia, tecnología e innovación en salud. Ciencia, tecnología y sociedad.

INTRODUCTION

The Family Health Strategy (FHS) represents a significant and structuring alternative for Brazilian health policy, with a view to attending the stipulations of the Brazilian Constitution of 1988 on health, and the principles of the Unified Health System (SUS).¹⁻²

Considering the FHS's potential for change in relation to the hegemonic model of biomedicine, can it be considered as a technological innovation? What theoretical bases support this understanding? What type of innovative technology is it?

In one non-systematic study undertaken in a number of health databases, such as PubMed, the Virtual Health Library (*Biblioteca Virtual da Saúde*) and in the Coordination for the Improvement of Higher Education Personnel (CAPES) Periodicals Site database of theses and dissertations, various studies were found which dealt with the issues of technology and technological innovation in health.³⁻⁶ We also found in this review studies which addressed the consequences of technological innovation in health professionals' workloads,⁷⁻⁸ studies which take the FHS as a technological innovation⁸⁻⁹ and productions which conceptualize the terms 'technology' and 'technology in health'.¹⁰⁻¹² However, publications were not found which explained why the FHS can be considered to be a technological innovation.

In this context, a theoretical reflection was structured with the aim of characterizing the FHS as a non-material technological innovation of the health field.

The reflection was constructed recovering the terms of technique, technology and technological innovation, available in the philosophical and sociological approach, and the conceptualization of technological innovation found in international documents and in Brazilian legislation, as well as the relevance of technological innovation in health care. It finalizes the argument analyzing what is prescribed for the FHS in the Brazilian Primary Healthcare Policy (PNAB), relating it to the theoretical debate regarding technological innovation.

RELATIONS BETWEEN TECHNIQUE AND TECHNOLOGY

The consequences which technology has offered society in recent years are undeniable, whether these involve the advances which are important for the health field and for the treatment

of diseases, or negatively, for the destruction of humanity such as, for example, through the creation of the atomic bomb.⁶

The word 'technology' denotes a complexity not easy to discuss. It may be seen as: the production of artifacts,¹³ a means of human knowledge,¹⁴ knowledge which functions as know-how,¹⁵ a project of artifacts and their planning, in the sense of true theory of praxis,¹⁶ as objects, systems and processes,¹⁷ and as social knowledge put into practice.¹⁸ In the light of this complexity, it is highly difficult to arrive at a satisfactory definition, such that no relevant aspect should be excluded.

As a result, in order to discuss technology, it is appropriate to refer to the term 'technique', which in human history has nearly always been reflected in the highly instrumental application of procedures/steps for resolving problems.¹⁹

One classical author who makes one of the most compelling contributions to the discussion of the relations between technique and technology is the Spaniard José Ortega y Gasset.¹⁷ For him, in the same sense formulated by Karl Marx,¹⁸ Man is understood as a being with needs which are imposed by his biological constitution, nature being part of that which surround this man and which, in producing, differentiates him from the animals. This differentiation through production allows invention and the obtaining of that which does not exist in nature.²⁰

In order to address needs, human beings use technique, which is nothing more than a set of actions used by them for altering the environment in which they live and meeting their needs. It is important to emphasize that there is a philosophical debate regarding the concept of need, and that there are needs of different natures, that is, needs directly linked to survival and needs created by human beings themselves in different historical societies. The needs of humans are different from those of animals. For human beings, what is basic for survival is not enough, and in order to respond to this "something else", they use techniques, which allows them to produce what is superfluous.²⁰

In the history of humanity, it is possible to identify three stages of technique: the technology of chance, the technology of the artisan, and the technology of the technician.²⁰ The technology of chance corresponds to that undertaken in the early history of humanity and in some contemporary societies termed "simple or primitive", in which

members are not aware of their ability to transform nature in order to meet their desires. The technology of the artisan is identified in ancient times in Greece and Rome, and in the Middle Ages, then being perceived as an aptitude and occupation of male technicians. In this stage, the "artisan is, at the same time, the person who invents, plans and undertakes the task".^{17:37} The third stage is the technology of the technician, materialized in the awareness that humanity can invent systematically, in which the technique ceases to be a manipulation and comes to be manufacturing, the technique of scientific development.

Technology can "be understood as knowledges resulting from the techniques used by human beings in order to extend and improve their survival, both in relation to nature and in relation to themselves".^{21:71} It is the ancient technique with the scientific basis, which is materialized in a broad variety of products, goods or services and processes which are developed and provided to society aiming to meet human beings' needs.

Another author who also made a great contribution to this discussion is the Argentinian Mario Bunge.¹⁷ Bunge emphasizes that technique and technology consist of the production of something, that is, an artifact. The artifact derives from something made with art and can be material, palpable or physical material, but also something non-material, both conceived prior to their ending, requiring planning and supposing the need for knowledge.²²

For Bunge, technology is defined "as the field of knowledge relating to the design of artifacts and to the planning of their accomplishment, operation, adjustment, maintenance and monitoring, in the light of scientific knowledge".^{23:231} As a result, we can understand that in this technique, this knowledge is empirical and prescientific (technology of chance and of the artisan); while in technology, it consists explicitly in techniques with a scientific basis (technology of the technician).¹⁷

From a sociological perspective,¹⁸ in analyzing the emergence of the capitalist means of production, Marx shows how technology is used for valorization of capital. The search for means to revalorize capital and promote the continuity of the growth via technological innovation leads to industrial revolutions and transformations which make the old methods of production obsolete and provide opportunities for the creation of others.¹⁸

In spite of the theoretical convergences and some divergences among innumerable authors, it is possible to assert that it is the relation with science that differentiates technique and technology.^{6,16-17,19-21,23} Technology must not be understood only as a product or as sets of material products, in order not to "incur the mistake of banalizing both technique and technology",^{24:19} and for people not to generalize the conception of technology, reducing it to technical procedures of operation, or its product.

The complexity of arriving at a definition regarding technology requires us always to take into consideration: the relation with science and technique; integration of material and immaterial elements; their relations with economic, political and cultural factors; and their association with the social and economic structures of a specific society.

TECHNOLOGICAL INNOVATION: CONCEPTIONS AND TYPES

One of the theoreticians who most influenced theories of innovation was the Austrian economist Joseph Schumpeter. His argument is that economic development is led by innovation through a dynamic process in which new technologies substitute the old, a process he termed creative destruction.²⁵

The types of innovation can be subdivided into: introduction of new products or qualitative change in an existing product, introduction of new methods of production, opening up of new markets, development of new sources of supplies of raw materials or other inputs, and the creation of new market structures or changes in industrial organization.²⁵

The process of productive restructuring occurred in the capitalist countries, and has influenced the means of producing worldwide, and also influenced discussion and conceptual formation regarding technological innovation. One example is the Organisation for Economic Cooperation and Development (OECD), which today brings together governments from thirty-four developed countries, and which systematized some references for the term 'technological innovation' described in the Oslo Manual.²⁶

The Oslo Manual supports the existence of four types of innovations: innovations of product, which involve the introduction of a new or significantly improved good or service regarding

its characteristics or stipulated uses;^{26:57} process innovations, which bring together “implementation/adoption of new or significantly improved production or delivery methods,”^{26:58} including significant changes in techniques and equipment; innovations in marketing, through the implementation of a new method of marketing with significant changes in the conception of the product”;^{26:59} and organizational innovations, which consist of the implementation of a new organizational method in the organization of the workplace or its external relations.^{26:61} Also according to the OECD,²⁶ the first two types are related closely to the concepts of technological innovation, while the last two are associated with the understanding of innovation.

In Brazil, the formulations of the Oslo Manual are used by the Brazilian Institute of Geography and Statistics (IBGE) for analysis/evaluation of Research in Technological Innovation.²⁷ They are also present in the Brazilian Law 10.973,²⁸ which provides information on incentives for innovation and scientific and technological research in the productive environment. The law defines innovation as introduction of what is new or improvement in the productive or social environment which results in new products, processes or services.

In relation to the characteristics of the type of innovation selected in the Oslo Manual, they may be: incremental and radical. The radical innovations are linked to more intense breaks, generating a major impact on the productive system, which can make the existing technological bases obsolete, while incremental innovations promote improvements in what they do and/or improvements in how it is undertaken, providing continuity to the process of change.²⁹

TECHNOLOGICAL INNOVATION AND WORK IN HEALTH

Technological innovation can occur in the services which deal with products, with information, with knowledge, and in services which deal with people that include the field of health.³⁰ Innovation is incorporated in the machines or instruments used in the productive process, but is also related to how the work is organized, technologies of relations, and to changes in the processes of the organization of the work, as well as to the knowledge made available to the worker.^{18,31-32}

“In the field of health, one can observe a usual reduction of the term technology understanding it as equipment, and, further, as the medical equipment. However, technology must be understood as a set of tools, among them the actions of work that transform nature. In addition to equipment, one must include the knowledge and actions necessary for operating them: the knowledge and its procedures. The contemporary meaning of technology, therefore, relates to the material and immaterial resources of the technical acts and of the labor processes”.^{12:381-2}

This support of technology associated with the material and immaterial aspects is confirmed by other workers who, in undertaking studies in the health sector, showed that the term must not be seen only as material product, but also as a process of knowledge and instruments, means and organizational systems which form a basis for and delimit the various ways of undertaking work in health.^{6,10-12,21,31-33}

The understanding of technological innovation associated with material and immaterial aspects is also supported in the theoretical reflections on human work.¹⁸ In applying this theory in the health sector, one finds that the work in health takes place in the sector of services, and has as its aim the therapeutic action of health, motivated by care needs presented by people, individually or in populational groups. The subject of labor consists of that in relation to which the activity focusses, which will be transformed by the action of the workers of the health care area. The subject of labor in health care is the human beings throughout their lifecycle. The means and instruments of labor may be machines, tools or equipment in general, but also, in a broader perspective, including knowledges, technologies of care, and technologies of organization of labor. And, finally, the product is the provision of healthcare itself, which is consumed in the act of its undertaking.³²

The product – which in material production has the status of something palpable – in health care area does not have a physical and material result. In undertaking a surgical act, in undertaking a nursing consultation, in applying a dressing, or in a health education action, the product is not separate from the act of its production³².

In the Brazilian health field, one proposal for meaningful change in the organization of the practices and in how to understand health, with

implications in the product resulting from the care work, is the FHS.

THE FAMILY HEALTH STRATEGY AS A TECHNOLOGICAL INNOVATION

The FHS was created by the Brazilian Ministry of Health in 1994, initially termed the Family Health Program (FHP). It uses the principle of Primary Health Care (PHC) formulated at the Alma-Ata Conference, as well as being grounded in the premises required through the creation of the SUS.^{1,34-35} The process of construction and implantation of the FHS is the result of a set of clashes resulting from different ideological conceptions and social actors over the years. The way that the clashes was given shape by the National Primary Health Care Policy (PNAB)¹ has a long trajectory of formulations and reformulations and

struggles which result mainly from discussions in the health field.

The FHS is constituted in a proposal of change of the traditional model of health care based on the positivist science paradigm known as biomedicine. This model – fragmented, technician, hospital-centered, and centered on the disease – has been shown to be incapable of meeting the population's health needs efficiently and fairly.³⁶⁻³⁸

In order to characterize the FHS as a technological innovation, emphasis is placed on what changes in the practices, in the conception of health, in the purpose taken for the care work, and in the understanding of which is the subject of labor on health care. As well as what changes in the instruments of labor used, and in the product of the work. This is summarized in figure 1.

TRADITIONAL MODEL OF HEALTH	PARAMETERS	FAMILY HEALTH STRATEGY
Based on the premises of biomedicine.	PRINCIPLES	Based on the premises of Primary Health Care and the Unified Health System.
Grounded in the understanding of health and in the absence of disease.	CONCEPTION OF HEALTH	Adopts a broader notion of the health-illness process.
Centered on the doctor.	PROFESSIONAL RELATION	Extends to a multi-professional team working on an interdisciplinary perspective.
Centered on the disease and the cure.	ASSISTANCE	Includes curative actions and actions of health promotion, prevention of harm, and rehabilitation.
Is a professional action directed towards the person who needs treatment of disease.	THE LABOR PURPOSE	Is the professional action directed towards a wider understanding of care given to the people and the collective of a determined area.
The physical body of the individual/affected body part.	THE SUBJECT OF LABOR	Is the human being with health problems in his or her entirety, considering his or her familiar, cultural and social context.
Equipment and materials such as stretchers, gauze and syringes, among others, as well as Protocols, structured knowledge on internal medicine.	THE INSTRUMENTS OF LABOR	Equipment, materials, and care protocols, similar to those used in the traditional model, including others with a view to covering the integral dimension of the subject.
The care activity provided as: the dressing applied, the given diagnosis, the prescription provided.	THE PRODUCT OF LABOR	other dimensions such as: educational actions, implementation of programs and measures for changes in the social indicators and in the indicators for morbidity and mortality.

Source: based on the productions of the Brazilian Ministry of Health¹ Marx¹⁸ and Pires.³²

Figure 1 - Theoretical parameters which support the FHS as a technological innovation in health care

The FHS adopts a broader conception of health and of the understanding of the deter-

minants of the health-illness process. It proposes articulation between technical and popular

knowledges, and the mobilization of institutional and community resources for care for health problems.

The new model calls for an integral responsabilization regarding attention to the health needs of the set of the population, as well as suggesting a reorganization of the Brazilian health care model, anchored in principles such as universality, equity, and comprehensiveness of the care.¹⁻² This new proposal generates a care result which is differentiated. In this sense, it incorporates a new set of health actions, in the individual and collective ambit, including promotion, protection, prevention, diagnosis, treatment, rehabilitation, harm reduction, and health maintenance. Treatment and cure are no longer the core of the care.

The assistance focuses on the individual in his/her comprehensiveness, considering each person as a part of collectives and in his/her family and socio-cultural relations. The FHS also calls for the use of knowledges which form a basis for the production of bonds, autonomization and embracement, in association with structured scientific knowledge, such as internal medicine and epidemiology.³⁷ The FHS incorporates multiple material and non-material technologies, as well as of differing complexities. This is constituted as a low technological density model, if one compares it with the structural organization and equipment available in other spaces that make up the health-care networks, such as the hospitals and centers of diagnostic investigation.²

In relation to who undertakes the health work, the centrality of the hegemony changes from a specified professional category to a proposal for multi-professional team work, acting in an interdisciplinary perspective. It proposes the division of responsibilities and the association of different professional competences, with a view to providing improvement in the quality of the care, and becoming closer to a comprehensive vision of the people.

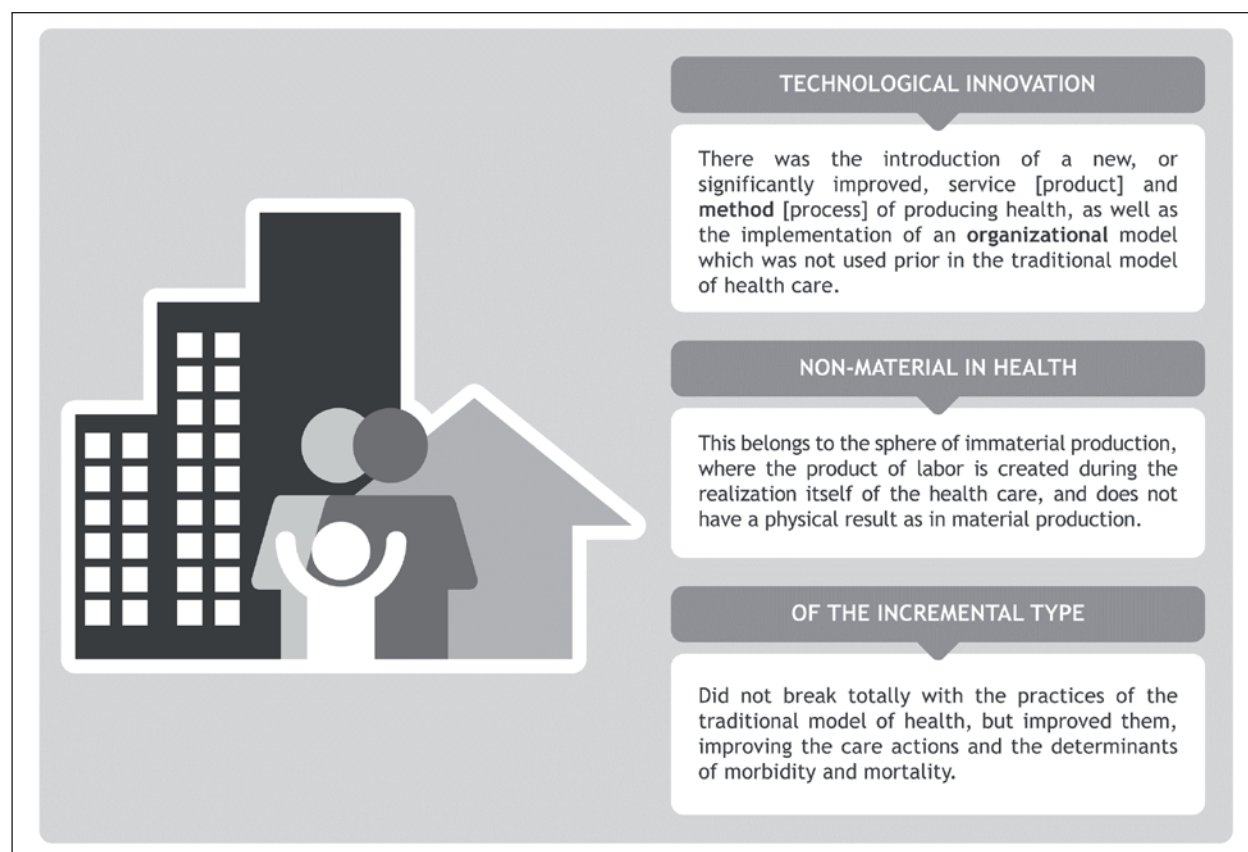
The data on the FHS shows that the indicators related to morbidity and mortality have reduced, and those that reflect the coverage of the services have grown significantly since its implantation in 1994. In April 2014, 35,889 Family

Health Teams had been implanted in 5,371 municipalities, covering 58.01% of the population, which corresponds to approximately 112,551,908 persons assisted.³⁹⁻⁴⁰ Although the FHS does not yet offer care coverage for the entire population, and has some weaknesses regarding the financial aspects and problems involving the physical structure of the services, the consequences of its implantation have been very positive.² "This public policy (FHS) has not failed; on the contrary, within the limits in which it operates, it has been a major success. Various papers show that (the FHS) is always superior to the traditional way of organizing primary health care".^{2:22-3}

The actions of the FHS have also broadened the distribution of medications, along with the number of examinations undertaken, with emphasis being placed on the Papanicolaou test, and has led to greater prenatal monitoring, although the most significant contributions have been identified in three major areas of care: children's health, women's health, and adult health.^{2,40} In children's health, emphasis is placed on the decline in child mortality and the increase in vaccinal coverage using tetravalent vaccines in children below one year of age. In women's health, there has been evidence of a drop in the proportion of live births among mothers below 20 years of age, while in adult health, with the control of systemic arterial hypertension, declines have been ascertained in the indicators for admissions resulting from Cerebrovascular Accidents and Congestive Cardiac Insufficiency in the population aged over 40 years old.⁴⁰

Considering the arguments and data presented, and understanding technological innovation to be that which can trigger significant changes in the work processes and products, and that organizational innovation must provide opportunities for the implementation of an organizational method which has not been used previously,^{26:62} a conceptual summary was elaborated, illustrated in figure 2.

Considering the modifications proposed, and which took place, through the implementation of the FHS, it is possible to argue that it consists of a non-material technological innovation in health care, of the incremental type.



Source: Based on the productions of the Ministry of Health,¹ OECD²⁶ and Pires.³²

Figure 2 - Conceptual summary of the FHS as a technological innovation in health

CONCLUSION

The present reflection presented three axes of argumentation - the relations between technique and technology, the definition of technological innovation and of the types of innovation, and the importance of technological innovation in health - in order to characterize the FHS as a non-material technological innovation of the incremental type.

The conclusion was supported by the evidence found in the literature, in the National Primary Health Care Policy (NHCP), and in the databases of the Brazilian Ministry of Health, which point to a break, although not in its entirety, with the traditional model guided by biomedicine, improving, and presenting new services and processes. The study also shows that this is a new form of work organization in health care, which has as its result a service provided by multi-professional teams. It is a service with characteristics of non-material production, in which the process of production and the product are consumed simultaneously.

The study also argues that this is a non-material technological innovation of the incremental

type, because its application allowed improvements in the results of the work in health care, improving the way of undertaking the health care, and not breaking entirely with the knowledges and clinical practices of care used by the traditional model of health. The non-material technological innovation in health care of the incremental type, termed the FHS, is an important and positive policy for the health field.

Finally, the definition of the FHS as a technological innovation in health does not occur through its possible material technological apparatus which the physical structures have or do not have in the different geographical contexts, but rather, through the theoretical and political principles in which it is anchored, consisting of a fruitful path for overcoming the limits of the traditional conception of thinking about and producing health.

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