

## Original Article

# Development of Health Research Structures Over the Last 25 Years: Main Achievements and Challenges

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## Abstract

**Background:** In 1990, one of the most important strategies of supporting and managing reproductive research focused on development of research structures. This targeted vision, at the first step, mainly followed through creating research units. The present paper aims to explore the policies and strategies of medical research centers (MRCs) development, and its achievements and challenges over the last 25 years.

**Methods:** Based on expected outcomes of better directions of research activities aligned with the priorities and policies of research, the Deputy of Research and Technology of Ministry of Health and Medical Education (MOHME), initiated the set up and development of research units.

**Results:** During the last 24 years, the number of MRCs has increased from 1 in 1992 to 736 in 2016. The progressive trends of expansion of the research centers are affected by a complex set of influencing factors. At first steps of program, the process of establishment and development of research structures followed slow trends in few unstructured primary centers. From 2008 to 2012, a rapid investment in development of research structures in biomedicine fields led to numerous complex challenges in supervision and management of MRCs (MRCs).

**Conclusion:** Participatory approach in research centers management, benefiting from all available capacities of research stakeholders, could be considered as a practical strategy for better management of limitations and achieving targeted goals.

**Keywords:** Health research, Iran, Research center

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## Introduction

In Iran, the science and technology health plan, as the main national convention, provided the vision of Iran by 2025.<sup>1</sup> According to this plan, in order to optimize the implementation of programs, the dynamic collection of goals, policies, strategies, and requirements was clarified in the comprehensive scientific map.<sup>2-4</sup> In context of the vision of Iran by 2025 as an ideal healthy society; health research has been discussed as one of the essential components of health-society and improvement of quality of life.<sup>1,4</sup>

In order to achieve this expected vision, a national integrated system of health research, including more than 58 governmental medical sciences universities/faculties and their 736 affiliated research centers and research institutions were organized under the supervision of the Ministry of Health and Medical Education (MOHME).<sup>5,6</sup> Through this interactive system, a research center, as the

key element, was defined as a facility or building dedicated to research, commonly with the focus on a specific area.<sup>5-8</sup>

Research management in association with growth, development, and coordination of research can act as one of the most important factors to render the other components of health research system (HRS) coherent.<sup>9,10</sup> During the past 2 decades, Iran has had noticeable increasing trends in both input and output of medical researches. These trends have been impressive, especially for scientific papers and affiliations.<sup>11-13</sup>

Along with the other influencing factors, the rapid progress of scientific outputs in the fields of medicine and health sciences, on a large scale, support the development of research structures and provided facilities.<sup>7,14</sup> On the other hand, considering the rapid grow in quantitative expansion of research centers, policy makers and researchers are faced with numerous complex challenges in research management.<sup>15,16</sup>

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The present paper aimed to explore the policies and strategies of development of medical research centers (MRCs), achievements along with the considerable challenges over the past 25 years.

### Materials and Methods

In 1990, one of the most important strategies of supporting and managing reproductive research focused on the expansion of health-related researches. This targeted vision, at the first step, mainly followed through creating research units. Expected outcomes of these processes were better directions of research activities in line with the priorities and policies of research.

General overviews, definitions and criteria of development of research units were developed by Supreme Council of Cultural Revolution. The approved instructions were then communicated to the Ministry of Science Research and Technology and the MOHME.

In 1994, based on national and sub-national research commitments of MOHME, adjusted protocols for licensing procedures and certain principles were approved by council of monitoring, evaluation and development of medical sciences universities.

From that time, protocols of development of public and private research centers are used, as the main reference of scientific and executive assessments for issuance of necessary licenses.

The core structure of MRC develops based on a founding group that consists of, at least, 5 researchers who work on the aligned field of research. In addition to the human resources, all other specific required infrastructures must be extended.

Most of the initial MRCs were started with the support of the Deputy of Research and Technology of MOHME but during their developmental phases, they become more empowered to raise resources which was achieved through self-governing of absorption of national and international resources.

In this approach in defining the MRC functions, capacity building and stewardship have been considered as prerequisites of interested knowledge production. Accordingly, the MRC through the following function follow their predefined goals:

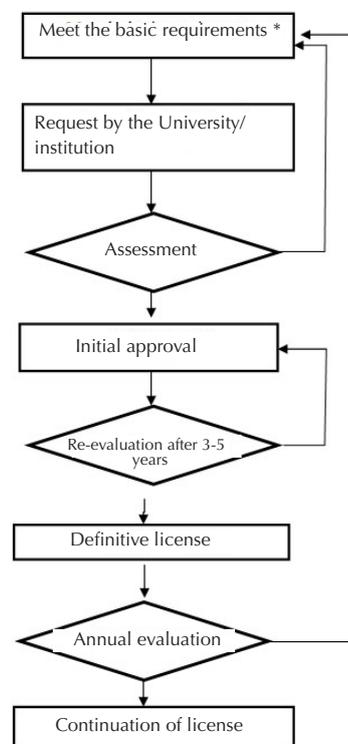
- Reinforcement of the scholarship and promotion of creative thinking;
- Development of human resources and health research experts;
- Promotion of knowledge and technical skills to develop and promote scientific thinking;
- Maintaining and strengthening the independency and autonomy of universities and research centers;
- Increasing the research outputs;
- Strengthening and developing cooperative links with

industry;

- Increasing international cooperation in research and technology;
- Promoting further involvement of health research stakeholders;
- Following and monitoring the scientific indicators of national health research based on the comprehensive Scientific Map of the Country;
- Refining the research interest of each member contributing to their own specific research domain;
- Resource mobilization;
- Participatory approach for designing or validating standard guidelines for cooperation in prevention, diagnosis and treatment of health risk factors and diseases; and
- Covering and centralizing all facilities, equipment and required manpower to accomplish the mission of health networks.

It is noticeable that, based on the requirements of ongoing management of research structure development, at 2 time points of 2009 and 2016, the instructions and regulations were reviewed. In the last edition, some important points of qualification of scientific products, collaborative researches and international competition in research were more emphasized.

Figure 1 shows the procedure of initial and definitive



**Figure 1.** Flow Diagram of Procedure of MRCs Development. \*Includes basic requirement of infrastructure, financial support of the university, academic and research qualification of founding staff (see more details at <http://www.hbi.ir>).

stage of obtaining licenses and development of MRCs.

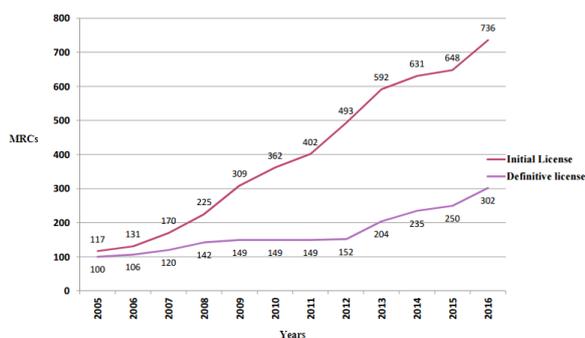
**Results**

Structurally, research units based on their extent of the structure and scope of activities, form and develop under the headings of research centers, and research institutes, which consist of at least 3 approved MRCs with common fields of research.

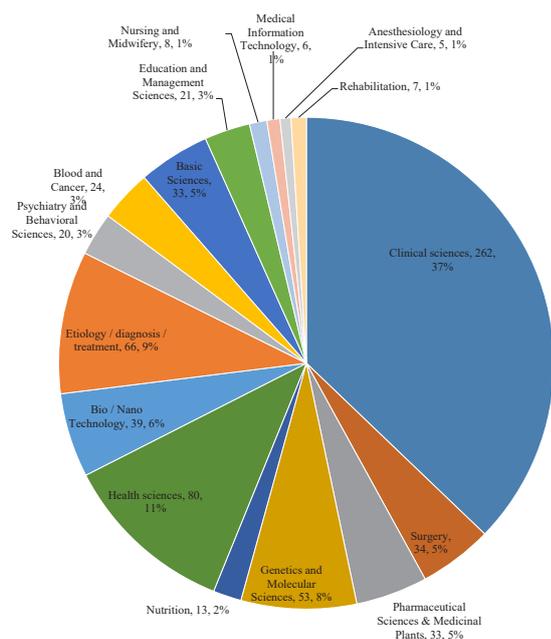
The first center was established in 1992, called “Rajai Cardiovascular Research Center” was launched at the University of Medical Sciences.

Following the beginning of the establishment of research centers, the number of MRCs has increased during the last 24 years from 1 in 1992 to 736 in 2016. Figure 2 shows the trends of MRCs according to their approval process.

From 736 research centers, 377 centers are active in the clinical domains of health and medicine. The remaining 359 work in bio-medical fields (Table 1).



**Figure 2.** Trends of Quantitative Growth of Medical Research Centers (2005–2016).



**Figure 3.** Distribution of MRCs Based on the Fields of Activities.

**Table 1.** Distribution of Research Units According Their Types and Approval Process (up to 2017)

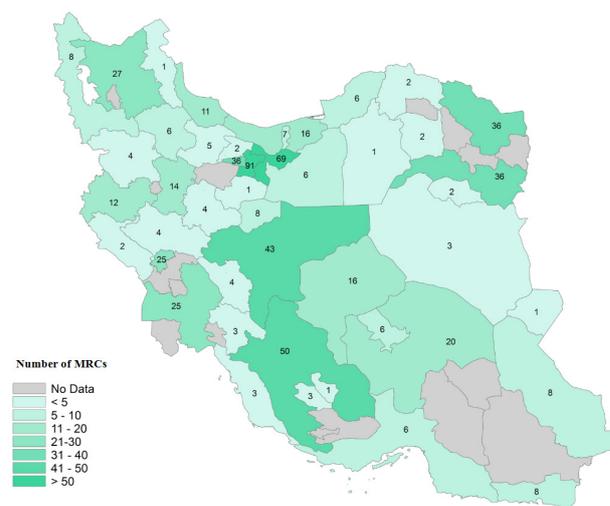
Research Units	Initial	Definitive	Total
MRCs	434	302	736
Institute	39	3	42

Most of the initial MRCs started with the support of the Deputy of Research and Technology of MOHME but during their development, they become more empowered to absorb resources from national and international sources of funding.

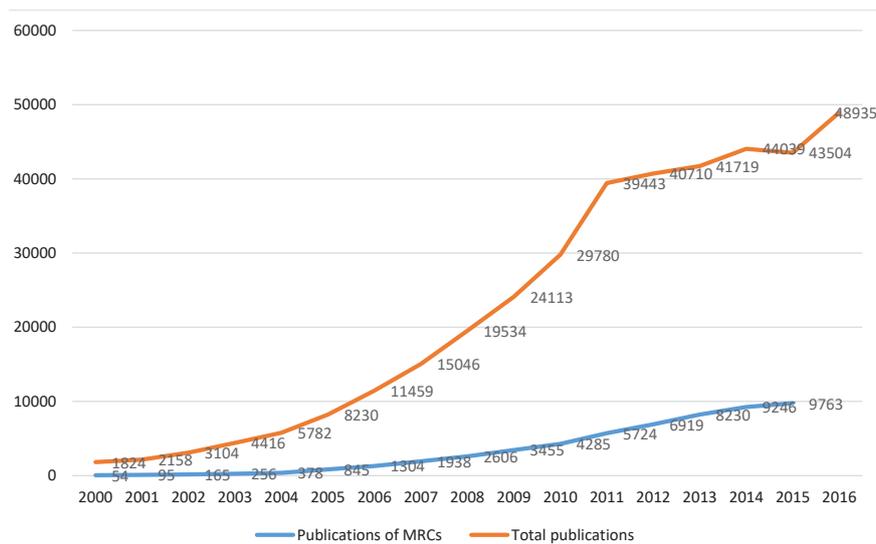
In addition to the general classification of clinical and bio-medical, MRCs are specialized under 16 specific domains of medical sciences. Figure 3 shows the distribution of MRCs based on fields of activities.

Regarding the geographical distribution of MRCs, most of these units were assigned to one medical university. In this regard, Teheran University of medical Sciences (TUMS), Shahid Beheshti University of Medical Sciences (SBUMS), and Shiraz University of Medical Sciences (SUMS) have the top 3 ranks with 91, 69 and 50 MRCs, respectively. Figure 4 maps the distribution of MRCs according to medical sciences universities. It is notable that most of MRCs are concentrated in the central and northern parts and the lowest density pertains to south and southeast areas.

Reviewing the articles published in the Scopus database during the past 16 years affiliated with Iranian research centers/institutes demonstrates that medical articles account for 23%–38% of the country’s contribution account. However, only 12% of the total budget is allocated to the MOHME and only 18% of faculty members in universities and research institutes are affiliated to this ministry (Figure 5).



**Figure 4.** Geographical Distribution of MRCs.



**Figure 5.** Trends of Total Iranian Publications Compared With Publication of Articles Associated With Research Units in the Scopus Database (2000–2016).

## Discussion

Based on the provided information, the progressive trends in development of research centers could be divided in 3 main phase, in each of which the speed and the slope of growth trends are affected by a complex set of influencing factors.

From the beginning, back in 1990, through the first time period of MRCs development, strategies focused on expansion of health researches and increasing capacities for research. Following that, the MOHME committed to supporting the pioneer MRCs.

During this time, because of limited areas of health infrastructure, especially the insufficiency and limits of relevant laws and policies, the process of establishment and development of research structures had slow trends and mainly included few unstructured centers that, under the supportive cooperation of top level medical universities, were established based on personal interests.

From 2008 to 2012, based on the Supreme Leader's strong emphasis on the scientific revolution, a substantial rapid investment was made in formation and development of research structures of biomedicine. This was achieved through facilitating research policy derivate from national documents such as the 2025 vision and its reflection in the fourth and fifth economic and social national developmental program.

A new era began in 2013, when the MOHME policies changed focus from its research support program to providing well-developed research units. Now, the main concern is quality of the research and research outcomes. These are mainly accomplished through strategies such as qualitative evaluation of MRCs as well as updating the regulations of legal licenses to research units.

To achieve the first regional position of science and

technology, as the main strategy of National Scientific Map, increasing MRCs, was followed based on health priorities. It was also emphasized as one of the most critical objectives of the Fifth Development National Plan in health domain.<sup>17</sup> However, over time and under the influence of different factors, this strategy faced many problems. Considering the rapid growth in quantitative expansion of research centers, now management of optimum efficiency has become a major concern for policy-makers.<sup>15,16,18</sup>

One of the most important concerns is international scientific competitions. Medical universities must reach the 100 top ranks of international scientific ranking. In this regard, instability of some administrative policies, time consuming processes of policy reform, limitation in financial resources, complicated processes of providing and allocating funds, and non-fulfillment of some supporting commitments (such as securing 4% of the cost of public research centers) are the major challenges. Despite the targeted vision, it now seems that due to some limitations in monitoring and personal preference of many researchers, some of the main goals are ignored.<sup>5,8,10</sup>

Lack of full transparency in the status and missions of non-governmental research centers in the research system and the need for clarifying their relationship with public research centers along with the challenges associated with investment of organizations, institutions and industries in research are other important issues.

On the other hand, the role of MRCs in the process of linkage between knowledge production and utilization of knowledge to improve the health status needs to be further clarified. Dispersion of MRCs, which is the result of scattered growth of MRCs, should be resolved

by their cooperation. Otherwise, it will lead to wasted financial and human resources.

It should be noted that based on the results of the related analysis in the fields of management of RCs, the variation of quantity, quality, and creativity of functions in MRCs need more attention.<sup>10,19-22</sup> These differences are mainly the result of individual talent, expertise, and enterprise of the researchers. The structure of social relations, roles, and leadership, however, may also make critical differences.<sup>23,24</sup> As another important point, centers co-operating with large medical schools are very important contexts for research production,<sup>23,25</sup> especially in the field of biomedical research, where successful trends are highly collaborative.<sup>23,25</sup>

As considerable points, human resource management, flexibility of structures, architecture and readiness of knowledge management, mechanisms of knowledge storage and benchmarking are proposed as the main determinants of knowledge produced in Iranian medical sciences research centers.<sup>15,19,20</sup>

Moreover, participatory approach in research centers management benefiting from all available capacities of research stakeholders, through resource mobilization, could be considered as a practical strategy. This advantage may overcome limitations in financial and human resources.<sup>26,27</sup>

Considering the above, following the mission of quantitative and qualitative promotion in medical research in the country, DRT targeted a comprehensive plan for management and policymaking for medical research structures. Some main point of this commitment are as follow:

- Supporting the establishment of research units and research centers based on health priorities and capacity of the applicant organizations and universities;
- Establishment of appropriate infrastructure for multidisciplinary and interdisciplinary research, particularly in the fields of health sciences research;
- Identifying successful examples as models for investigative unit;
- Improving the quality of medical research;
- Development of 22 comprehensive central laboratory systems in medical universities;
- Developing and supporting large national cohort studies in medical universities;
- Development of systematic programs for national and sub-national data registries;
- Supporting of large scale researches in Health Research Networks;
- Revival of the National Development Research Institute of Medical Sciences (NIMAD) as the main national sponsor organization for medical research;

- Cooperation and coordination with the Ministry of Science research for improving the quality of health-oriented products;
- Providing facilities for international submission of inventions and technologies in the field of health;
- Supporting technologic markets, specialized collaborative scientific conferences, festivals, and health related exhibitions;
- Development and conducting training courses for research assistants and research staffing that can effectively involve young physician scientists in the required priorities areas of research;
- Scientific and financial support of post-doctoral courses; **and**
- Special support for elite researchers and young assistant professors.

We propose that, for better management, research activities of MRCs could be organized in frame of research network assigned to health priorities at national and sub-national levels. Also, a systematic foresight research perspective will enable MRCs to improve their research activities in the fields of national health priorities.

In conclusion, based on present priorities, health research policies should create a balance between all of the expected targets, from solving the public health problems to international competition in science and technology. Participatory approach in management or research structures should benefit from all stakeholders in different fields of policy makers, managers, researches, funders and even users of researches.

#### **Ethical Considerations**

Ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

#### **Conflict of Interest Disclosures**

The authors declare that there is no conflict of interest.

#### **Authors' Contributions**

SD and AE developed the main design of manuscript. All co-authors had contribution to the revision of the manuscript.

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