

# The Perspectives and Challenges of the Competency-Based Curriculum in Medical Education: A Literature Review

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## Abstract

In the presence of significant transformations that have occurred in medical education over the years, the curriculum model can be identified as the main and structural change, which has been improving in competency-based educational structures and processes. The aim of this study was to conduct a theoretical discussion on competency-based curriculum in medical education. The methodology used was a narrative literature review, with a qualitative approach, and had as a guide question: what are the challenges and perspectives on curriculum innovation in medical schools? A total of 17 references were used for this study and the disposition of these narrative results was organized in the discussion with the expectations and challenges of curriculum innovation and competency-based education; and some reflections of the Guideline of 1999, the CanMEDS framework of 2015 and the Brazilian DCN of 2014. The studies show that the competency-based curriculum brings the development of cognition, skills and attitudes necessary for medical practice of excellence and quality, which implies significant structural and functional changes that cover the entire teaching-learning cycle in the planning of medical education.

## Keywords

Medical Education, Competency-Based Education, Medical School, Evaluation of Medical School Curriculum

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## 1. Introduction

Medical education is an extremely relevant theme to the educational scientific

community and has a very broad approach because there is several existing models and methodologies, which are coming into force and/or applying and updating. Thus, this article was limited to the narrative of the competency-based curriculum.

The rationale for choosing this theme is due to the significant transformations that have occurred in medical education over the years, and the curriculum model can be identified as the main and structural change, which has been improving in competencies-based educational structures and processes. It is paramount the importance of improving research in this curricular area, in view of the need for good professional training that is guided by the educational planning organized by the teaching teams. Structural planning of this curriculum is key to success in quality medical training.

It is noteworthy that the paths taken by the history of medical education are of great value and cognitive enrichment for the choices and actions necessary for updates and methodological adaptations, thus justifying the need for a narrative review of this theme.

Especially since the 1970s, many definitions about competency appear in the medical literature, and share several common characteristics (Bollela & Machado, 2010).

Considering that this theme has great scientific relevance because it is new models of medical education that are coming into force and/or suiting and updating, as well as the opening of a large number of medical schools in Brazil being authorized by the Ministry of Education, the contribution of this research is necessary and of great value, both nationally and internationally.

When it comes to social justification, it should be taken into account that skills are worked on in training, optimizing a professional trained to meet the needs of the population with mastery in doing/attending medicine, so a future physician will have security in the care of the population, fulfilling the social needs expected and recommended by the Ministry of Education and Health of Brazil and by international entities.

Competency-based medical education (CBME) has emerged as a central strategy for educating and evaluating the next generation of physicians. The advantages of the CBME include: focus on the results and achievement of the student; requirements for a multi-faceted assessment covering formative and additive approaches; support for a flexible and time-independent trajectory through the curriculum; and greater responsibility to stakeholders with a shared set of common expectations for education, evaluation and regulation (Hawkins et al., 2015).

As a result, medical education is changing rapidly, and the Canadian Medical Education Directions for Specialists (CanMEDS) is part of that story. CanMEDS is, in essence, an initiative to improve patient care by improving physician training. From the outset, its main objective was to articulate a comprehensive definition of the skills needed for all areas of medical practice and thus provide a

solid foundation for medical education (Hawkins et al., 2015).

For the purpose of this research, it was taken into account that the competencies are worked in medical training seeking to optimize a professional trained to meet the needs of the population with mastery in health care, being a doctor trained with safety in his professional skills and attitudes, based on his knowledge acquired throughout the undergraduate course, thus being able to comply with the social needs expected and recommended by the Brazilian National Curriculum Guidelines and international curricular aspects.

The elaboration of the curriculum matrix of competency-based medicine requires a deepening of theoretical foundation, historical knowledge, evidence, diversified teaching methodologies and validated evaluation methods. The idea of this theoretical knowledge is to contribute to the planning of medical schools and serve as a guide for the elaboration of curricula.

Therefore, the aim of this study is to conduct a theoretical and narrative discussion about competency-based medical education.

## 2. Methodology

In this study, we choose to adopt a narrative review of the literature, with a qualitative approach.

This method allows the inclusion of several materials on the subject such as books, journal articles, newspaper articles, historical records, government reports, without exhausting the sources of information. In this way, the definition of concepts and review of theories allow to potentiate the understanding of the theme.

After the material gathering, a selection of studies with greater relevance was performed, followed by the interpretation of the information, and subsequent text analysis.

The present review used the following phases in its design: elaboration of the guide question; search in the literature; definition of the information extracted from the studies; evaluation of the included narratives; and compilation for literature review.

From the above, the question that is the guide of this work is: which are the challenges and perspectives on curricular innovations in medical schools? The question is also: is competency-based education in line with national and international recommendations for medical education?

The literature search was performed through indexed publications in the electronic libraries Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) and Scientific Electronic Library Online (SciELO) arranged according to the standards of Health Sciences Descriptors (DeCS) in Portuguese and English: “educação médica”/“medical education”, “educação baseada em competência”/“competency-based education” e “avaliação curricular das faculdades de medicina”/“curricular evaluation of medical schools”. The search terms were crossed individually in the electronic libraries mentioned using the Boolean operator

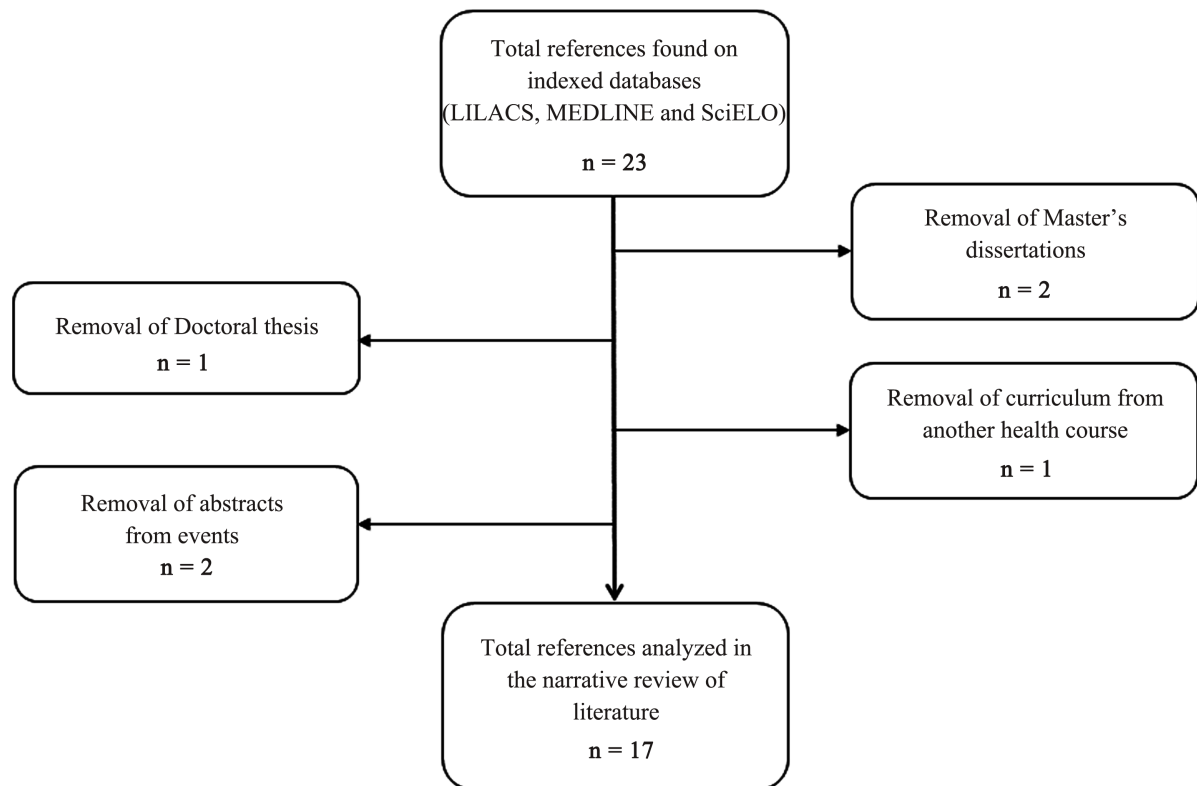
“AND” in order to restrict the scope of the research and include the articles pertinent to the theme.

The inclusion criteria in the study were: original articles and bibliographic materials that answered the fundamental question of this review, being complete texts available; publications in Portuguese/English which refer to the undergraduate medical course and publications with a maximum of 12 years. Exclusion criteria were the texts in the form of theses, dissertations, monographs, editorials and abstracts of events.

### 3. Results

It was found 23 publications, where 6 were excluded from subsequent analysis by being Master’s dissertations (n = 2), Doctoral thesis (n = 1), abstracts of events (n = 2) and curriculum of another health course (n = 1). In this way, 17 references were used that supported this study according to the theme, objective, guide question and stipulated methods (Figure 1).

The narratives were arranged in the discussion in two parts, being curriculum innovation and competency-based education with their expectations and challenges; and some reflections on the curricular innovation of the Guideline of 1999, the CanMEDS framework of 2015 and the Brazilian National Curriculum Guidelines of 2014.



**Figure 1.** Flow diagram regarding the selection process of references on “medical education”, “competence-based education” and “curricular evaluation of medical schools” in English and Portuguese searched on LILACS, MEDLINE and SciELO from the last 12 years. Source: Elaborated by the author (2022).

## 4. Discussion

For a better organization of reading and understanding in conducting this theoretical and narrative discussion about medical teaching based on competencies, it is necessary to go about curricular innovation and competency-based education with their expectations and challenges.

In this way, medicine has been undergoing through curriculum changes in the 21st century, and throughout this century, medical schools have been investing in curriculum innovation and seeking different ways to achieve an integrated curriculum that promotes health action based on humanistic principles. However, promoting curricular innovation is not the same as reforming the curriculum, as it implies effective design transformations and pedagogical practices that cannot be confused with the adoption of new educational technologies or the elaboration of new curricular matrices that reorganize the flow or workload of curriculum components (Boas et al., 2017).

For more than 60 years, competency-based education has been proposed as an approach to education in many courses. In medical education, interest in CBME has increased the last decade (Frank et al., 2017).

The International CBME collaborators work since 2009 to promote the CBME comprehension and accelerate its adoption all over the world. The authors describe three fundamental principles: 1) medical education should be based on the health needs of the populations served; 2) the main focus of education and training should be the desired outcome for students, not the structure and process of the educational system; and 3) the training of a physician should be continuous in education, training and practice (Carraccio et al., 2016).

Based on these principles, the authors state that educators have to demonstrate commitment to teaching, evaluating and modeling roles of the identified range of competencies. They should use effective and efficient assessment strategies and tools to support transition decisions in competency and not training time, empowering students to actively participate in their learning and assessment (Carraccio et al., 2016).

Educators should prepare themselves for a number of challenges when deciding to implement a competencies-based curriculum. Many of these challenges belong to three main aspects of implementation: organize the structural changes that will be needed to provide new curricula and evaluation methods; modify the teaching and evaluation processes; and aid changing the education culture so that the CBME paradigm can be accepted (Nousiainen et al., 2017).

The main considerations include: ensure the existence of educational continuity at all levels of medical education; change the way time is used in medical education; involve CBME in the planning of human health resources; ensure that competent physicians work in competent health systems; ensure that information technology supports CBME; ensure that the teaching staff development is supported and ensure that students' rights and responsibilities are adequately balanced in the workplace; and getting prepared for the costs of change with

adequate leadership to achieve success in the implementation (Nousiainen et al., 2017).

In research conducted in 2010, the authors analyzed 70 action plans from disciplines of a medical course installed in a philanthropic university in southern Brazil and concluded that the Higher Education Institution (Instituição de Ensino Superior, IES) analyzed had built the action plans of their disciplines guided by competencies, because the vast majority of competencies are contemplated in the curriculum of the university (Franco et al., 2014).

In another study, researchers conducted an essay based on a historical-conceptual review of P4, which represents a complex concept that involves a profound remodeling of health practices, implying the development of values, qualities, skills and uncommon knowledge, such as communication skills and person-centered care and models of medical education, demonstrates to integrate some key elements highlighted by curriculum reforms that focus on the importance of practical activities and public health (Depallens et al., 2020).

The same researcher also points out that P4, from the second half of the 20th century on, becomes relevant in curricula that include person-centered medicine and the integration of Primary Health Care.

When reflecting on the need for a curriculum committed to a humanized praxis in medical education, authors report that, through descriptive exploratory research conducted with 19 teachers, the humanism addressed in the curriculum is presented in a disjointed way, revealing that the treatment given to the theme is linked to specific components and the scenario in which it is developed, as well as the individual practice of the teacher (Boas et al., 2017).

By conducting a brief historical analysis of medical education in Brazil through its academic evolution, researchers revealed that changes in curricular architectures are not enough to change the profile of professionals. This same research also revealed that in Brazil there is a gap in the discussion about the transformative efficiency of different curricular architectures (Machado, Wuo, & Heinzle, 2018).

However, it is also necessary a reading path for some reflections of curricular innovation on the Guideline of 1999, the CanMEDS framework of 2015 and the Brazilian National Curriculum Guidelines of 2014.

In 1999, a Guideline n° 14 was published by the International Association for Medical Education in Europe (AMEE) already with premises related to competencies, but even at that time of publication competency was understood as synonymous with results in medical education, and its theory was so rich that even for the present day are useful for reflection and discussion on the subject (Harden, Crosby, & Davis, 1999).

Result-based education, a competency- and performance-based approach, at the forefront of curriculum development, offers a powerful and compelling way of reforming and managing medical education. The emphasis is on the product—what type of physician will be produced—and not on the educational process.

From this perspective, educational outcomes are clearly and unequivocally specified. They determine the content of the curriculum and its organization, the teaching methods and strategies, the courses offered, the evaluation process, the educational environment, and the curriculum schedule. A physician is a unique combination of different types of skills (Harden, Crosby, & Davis, 1999).

Also, on this Guideline n° 14 of AMEE, the authors bring that it is an approach to education in which decisions about the curriculum are guided by the results that students have to exhibit by the end of the course. The product defines the process. The agreed results for the curriculum guide what is taught and what is evaluated. A major challenge is the design and implementation of an appropriate system for student evaluation because standards need to be defined for each result (Harden, Crosby, & Davis, 1999).

For instance, for a practical procedure, the expected level of student productivity should be explained. This may vary at each stage of the course and may include: Level 1: awareness of the procedure; Level 2: complete theoretical understanding of the procedure; Level 3: observation of the procedure; Level 4: carry out part of the procedure; Level 5: carry out the procedure under supervision; Level 6: carry out the procedure without supervision.

Thus, this Guideline shows that the arguments for introducing results-based education and evaluating its role in medical education are strong and represent what is a valuable educational tool in medical education.

Still at this same time, but specifically in the early 1990s, researchers from the Royal College of Physicians and Surgeons of Canada, with the support of the self-funded charity Associated Medical Services, leveraged the important work Educating Future Physicians for Ontario project to develop a competency structure for the medical education (The Royal College of Physicians and Surgeons of Canada, 2015).

As a result, the CanMEDS Framework, has been formally approved by the Royal College in 1996 and subsequently updated; its last update was in 2015. CanMEDS is now used in dozens of countries of all continents, by medical schools and other health areas, making it the most recognized and widely applied professional competency structure in the world (The Royal College of Physicians and Surgeons of Canada, 2015).

In Canada, CanMEDS forms the basis of all Royal College educational standards for medical education. The use of a national competency-based structure for medical training is one of the reasons why the Canadian educational system is considered one of the strongest in the world (The Royal College of Physicians and Surgeons of Canada, 2015).

Still according to the CanMEDS, it is possible to observe some conceptual definitions quite interesting on competency-based education, such as follow.

- Competency-based medical education (CBME): an approach to design medical training focused on results in the form of skills;
- Competency: an observable capacity of a health professional that develops through stages of expertise, from beginner to master physician;

- Entrustable professional activity (EPA): a fundamental task of a discipline that can be entrusted to an individual who has the appropriate level of competence;
- Milestone: the expected capacity of a health professional in a stage of expertise.

Essential competence addresses the growing recognition of patient safety and the continuous improvement of quality as important components of bedside physician (The Royal College of Physicians and Surgeons of Canada, 2015).

It is also observed that the consolidation of the competencies worked in CanMEDS is defined by different axes as can be seen in **Figure 2**.

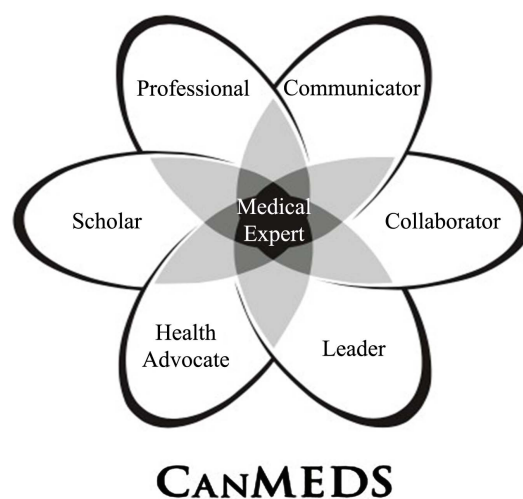
It is worth noting that there is also a checklist listing for each expected competency available in the framework.

CanMEDs axes show the conceptual relationship of competencies. In the center, the concept of Medical Expert defines the central function of the physician in the structure of CanMEDs and also defines the clinical scope of the physician's practice. In this central function, medical knowledge, clinical skills and professional values are applied in the provision of quality care focused on patient safety (The Royal College of Physicians and Surgeons of Canada, 2015) (**Figure 2**).

The function of communicator implies establishing relationships with patients and their families that facilitate the collection and sharing of information essential for effective health care.

As collaborators, physicians effectively work with other healthcare professionals to provide safe, high-quality, patient-centered care.

In the role of leaders, physicians engage with others to contribute to the vision of a high-quality healthcare system and take responsibility for providing excellent patient care through their activities as clinicians, administrators, academics or teachers.



**Figure 2.** The CanMEDs (2015) axes proposed by the royal college of physicians and surgeons of Canada. Source: Extracted from <http://www.royalcollege.ca/rcsite/canmeds/canmeds-framework-e>.



As health advocates, physicians contribute their knowledge and influence when working with communities or patient populations to improve health. They work with those they serve to determine and understand needs, speak on behalf of others when needed, and support the mobilization of resources to effect change.

In the role of student, physicians demonstrate a lifelong commitment to excellence in practice, through continuous learning and teaching of others, evaluating evidence and contributing to teaching.

And finally, as professionals, physicians are committed to the health and well-being of patients and society through ethical practice, high personal standards of behavior, responsibility to the profession and society, regulation led by physicians and maintenance of personal health.

The training of new generations of physicians has a multiplier effect to the extent that students will be agents who will produce care and health care in our society (Bollela & Machado, 2010).

In 2014, the new DCNs were published for the medical course. This document provides a number of recommendations to which higher institutions should adapt. In it, sociocultural, humanistic and biological aspects of the human being are considered in an interdisciplinary and multiprofessional way throughout the years of course.

The directives proposed in this document emphasize the concern to train effective general practitioners in the patient's approach to primary care and urgency/emergency and to be resolute in the promotion and reduction of health risks. In other words, it provides for the training of a professional with general, critical, reflective and ethical skills, ready to act at all levels of health care and who is able to practice health promotion, prevention and rehabilitation actions, always respecting the patient's right to citizenship and dignity (Brasil, 2014; Meireles, Fernandes, & Silva, 2019).

These DCNs guide changes in curricula, teaching and learning processes and assessment for the development of professional skills and competences. The concept of competence has been appropriated in a fertile way in the discussion about changes in health education. By replacing professional practice in focus, it helps pressure schools to rethink their curricula and evaluation processes, reorienting educational planning from the desirable competency profile for their graduates (Aguiar & Ribeiro, 2010).

Medical schools need to prepare young doctors to work in an increasingly complex health scenario, with changes in patient and public expectations and growing demands from employer authorities. Competency-based education offers many advantages as a way to achieve this. It emphasizes relevance in curriculum and accountability, and can provide a clear and unambiguous framework for curriculum planning, with intuitive appeal. It encourages the teacher and student to share responsibility for learning and can guide student assessment and course evaluation (Harden, Crosby, & Davis, 1999).

It can be affirmed, in a simplified and synthetic way, that competency is the

ability to mobilize, articulate and put into practice knowledge, skills and attitudes necessary for the effective performance of the activities required in a work context (Santos, 2011).

It comprises the use of knowledge, communication, technical skills, clinical reasoning, values, emotions and reflections in daily clinical practice at the service of the individual and the community (Epstein & Hundert, 2002).

The curricula of medical courses in Brazil are guided by the National Curriculum Guidelines (DCN) for medical training based on the health demands of the community. Many institutions today have curricula guided by DCN 2001 and 2014 (Freitas, Ribeiro, & Barata, 2018).

The 2001 guidelines marked major changes for medical education until, in June 2014, the Brazilian Ministry of Education launched the National Curriculum Guidelines of the Undergraduate Course in Medicine that became the parameters to be observed in the organization, development and evaluation of medical courses throughout the country (Brasil, 2014).

From the framework of these guidelines, the principles, foundations and purposes of medical training have been formally organized in line with such well-established guidelines; the current moment requires medical schools to train a professional with a holistic view and ethical, technical and scientific training, aware of its social relevance (Gontijo et al., 2013; Brasil, 2014).

The function of a matrix of competencies is to express collective consensus about what is indispensable and the content that no student should stop knowing when graduating (Gontijo et al., 2013).

Therefore, DCNs recommend that medical training should be based on competencies, and teaching by competencies implies developing in the student the ability to mobilize knowledge, skills and attitudes to deal with real life situations, problems and dilemmas, and their certification expresses social legitimation of people who are now recognized as capable of acting in the medical career, translating the excellence of medical practice, primarily in the scenarios of the Brazilian Unified Public Healthcare System (Sistema Único de Saúde, SUS) (Brasil, 2014).

The DNCs bring in their official document three main areas of competence of medical practice: Health Care, Health Management and Health Education. Health Care is divided into two subareas: Attention to Individual Health Needs and Attention to Collective Health Needs. Among these definitions, there is a range of specific characteristics and key actions to be achieved by the graduate and being evaluated by the implementing competency (Brasil, 2014).

The DCNs establish general and specific competencies, the profile of the graduate and privilege a curriculum that has as its axis of development the health needs of the population, and should promote integration and interdisciplinarity in teaching and care practices (Bollela & Machado, 2010).

Competency-based education has many inherent advantages, which should make it an attractive model for curriculum planning for developers, teachers, employers, students and the general public (Harden, Crosby, & Davis, 1999).

This perspective invests in the development of curricula that strengthen the cultural, ethical, social and historical dimensions that underlie the medical humanities, providing a singular meaning to the action of the medical professional (Boas et al., 2017).

The practices humanized and advocated by the NCDs involve interdisciplinary knowledge, political will, consistent critical views and readings, since there is the purpose of producing health in a collective context, considering the autonomy and protagonism of its actors (Boas et al., 2017).

## 5. Final Considerations

From the above, it is considered that the established objectives were achieved, because through the theoretical path that was accomplished, it was possible to evidence that the curriculum based on competencies for medical education is shown as an innovation and relevant contribution in the training of future health professionals in general.

When analyzing the Guideline, the CanMEDS and the Brazilian DCNs, it was possible to verify that in the educational process, the curriculum by competency is present as a guide and guidelines, because they prioritize the definition of the results, and the paths to follow are presented in a secondary way; that is, first the result that is desired is established, then the way to achieve it.

From the literature that was selected for analysis, it is possible to point out that the educational practices contained in the curriculum by competency seek to approach professional practice, because it is evident that the contents are mobilized in practical learning situations, which also contributes to the identity formation of the professional.

Finally, it is considered that the competency-based curriculum brings the development of cognition, skills and attitudes necessary for medical practice of excellence and quality, and that this implies significant structural and functional changes that cover the entire teaching-learning cycle in the planning of medical education.

In the case of future practices, it is relevant to have a medical professional with greater integration of his competencies through learning and clinical experience acquired in training for his due performance in the medical conduct according to the needs, values and safety of the patient who will receive this care.

## Conflicts of Interest

The authors declare no conflict of interest.

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