Proposal for a Basic Pharmaceutical Education Plan and Professional Competencies of the Pharmacist

(Version 22 April 2014)

Pan American Conference on Pharmaceutical Education (CPEF)

This document is intended for academics and professionals involved in the education of pharmacists, graduate-level and post-graduate education, and ongoing human resources

education; and also to professionals in pharmaceutical schools and professional associations, pharmaceutical chemists, and everyone interested in the subject of pharmacy education.

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Conflict of Interest Statement

None of the collaborators in the Working Group for this proposed Basic Pharmaceutical Education Plan and Professional Competencies of the Pharmacist has concurrent or financial interests, or interests of any other kind.

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Acknowledgments

The document has been prepared by Prof. Patricia Acuña Johnson. In the initial drafting stage, comments by Dr. Adriana M. Ivama Brummel were considered. Prof. Beatriz Badilla Baltodano provided key collaboration in the final review and editing, with the help of Prof. Zully Vera Galván.

This document was drafted with reference to the proposal of the Working Group of Lima, Peru, entitled "Basic Pharmaceutical Education Plan," published by PAHO/WHO in 1999 and subsequently studied at the VI, VII and VIII Pan American Conference on Pharmaceutical Education held in Montevideo, Uruguay (2008), Porto Alegre, Brazil (2010), and Havana, Cuba (2012), respectively.

The Pan American Conference on Pharmaceutical Education and the Pan American Health Organization/World Health Organization (PAHO/WHO) are grateful for the valuable contribution of everyone who facilitated the preparation of this document, especially those who participated in the conference meetings and workshops. The participants enriched the discussion forum with their contributions.

Abbreviations and Acronyms

AACP	American Association of Colleges of Pharmacy
APhA	American Pharmaceutical Association
GPP	Good Pharmacy Practice
COHIFFA	Latin American Conference of Schools of Pharmacy
COIFFA	Ibero-American Conference of Schools of Pharmacy
CPEF	Pan American Conference on Pharmaceutical Education
FEFAS	South American Pharmaceutical Federation
FFA	Pharmaceutical Forum of the Americas
FEPAFAR	Pan American Federation of Pharmacy
FIP	International Pharmaceutical Federation
OFIL	Organization of Ibero-Latin American Pharmacists
PAHO	Pan American Health Organization
WHO	World Health Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization

Executive Summary

Access to and rational use of drugs continues to be a major challenge in most of the countries in the Region of the Americas and elsewhere in the world, despite the efforts made and the resources invested. The factors that have affected the achievement of these objectives include the segmentation and fragmentation of drug supply systems in the delivery of health services, and the difficulties related to supply management, and to drug quality and inappropriate drug use by prescribers and patients.[1,2]

For several years, the World Health Organization (WHO) and the International Pharmaceutical Federation (FIP) has been jointly studying the role of the pharmacist in health systems [3,4,5] and has recognized the need for a curriculum that meets professional needs to develop this role. Specifically these organizations have recommended including not only knowledge but also attitudes and skills, which a group of experts summarized as seven attributes or "stars": caregiver, decision-maker, communicator, manager, life-long-learner[6], teacher, and leader. An eighth star (researcher) was later added [7].

The Pan American Conference on Pharmaceutical Education (CPEF), an initiative of the Pan American Health Organization (PAHO) in partnership with the schools of pharmacy of the Americas, has helped guide pharmacy curricula in the countries of the Americas. The Statement of Principles of the I CPEF (Miami, United States, 1990) established pharmacists' commitment—as drug specialists—to primary health care (PHC), the necessity to include them in health teams, and the duty of schools of pharmacy to maintain inter-institutional collaboration at the national and international levels. The II CPEF (Ixtapa, Mexico, 1993) recognized the mission of pharmacy education and the responsibility to train health professionals and keep citizens informed of changes in health care systems, and to provide them with knowledge and values to stimulate public involvement in the development of the profession's policies, practices, and guidelines going forward. The III CPEF (Buenos Aires, Argentina, 1996) agreed on a Declaration that included the creation of the Pan American Committee on Pharmaceutical Education and a strategic line of action committing the participants to developing a proposal to review the pharmacy curriculum in order to establish the minimum content required to facilitate the exchange of students, educators, and professionals, and to allow the inclusion of other pharmaceutical competencies, as well as updating the knowledge base. In light of this recommendation—and the varying nature of pharmaceutical programs in the countries of the Americas—a Basic Pharmaceutical Education Plan[8] was published, which quickly became a guide for training pharmacists. At the IV CPEF (Santiago, Chile, 1999), discussion began on the competencies of pharmacists as drug experts, based on the agreements reached at previous conferences. The recognized competencies of the "seven-star pharmacist" [6] were adopted, along with those included in the Basic Pharmaceutical Education Plan[8]. At the same time, it was agreed that the pharmacy curricula in the countries of the Americas would be reviewed in order to establish common curricula. The V CPEF introduced the concept of the global pharmacist and the need to continue moving forward in the construction of a high-quality, common

curriculum. The frame of reference for discussion and agreement at the last three conferences (Montevideo, Uruguay, 2008; Porto Alegre, Brazil, 2010; and Havana, Cuba, 2012) has been the need for a new Basic Plan for pharmacy studies, with quality standards for self-evaluation and continuous improvement of programs—all in a changing, dynamic professional context—while also considering the specific conditions in each country.

Traditionally, pharmacists have been considered drug experts, knowledgeable about the development and purchase of drugs, and about their ultimate benefits for the individual. However, the new professional approach recognizes drugs as important therapeutic tools, but not the only ones, and the focus is shifting to individuals, families, and communities[9]. As part of the activities promoted by PAHO/WHO to strengthen health systems in the Americas[10], a strategy has been developed since 2008 to strengthen pharmaceutical services based on primary health care (PHC).[11] As a way of joining forces and helping to strengthen the pharmacist's role in this area, a working group made up of the Pharmaceutical Forum of the Americas (FFA), PAHO/WHO, the International Pharmaceutical Federation (FIP), and CPEF developed a set of proposed competencies for pharmaceutical services based on PHC and on Good Pharmacy Practice (GPP) [12].

In this context, the VIII CPEF agreed to create a working group (GT-BP/CPEF) to draft a new Basic Plan for Pharmacy Studies, based on: the document of the Lima Group[8]; the draft document in development; the newly defined role and attributes of pharmacists; the criteria for rigorous practical training; and the activities exclusive to pharmacists—all in the context of competency-based training. With regard to the competencies required for PHC- and GPP-based pharmaceutical services, reference was made to the proposal developed by the Technical Group (PAHO/WHO, FIP, FFA, and CPEF). As a result, the GT-BP/CPEF began identifying the competencies for the other areas of professional action common to pharmacists in the countries of the Americas, considering the CPEF agreements and discussions, and other available references.

This document is presented as an updated proposal for the harmonization of pharmacy education. It should be kept in mind that there are different titles in the Region, including pharmacist, pharmaceutical chemist, and pharmaceutical biologist, as well as roles and areas of professional action that include community pharmacy, hospital pharmacy, the pharmaceutical industry, chemistry, biochemistry, food science, and clinical analysis. However, this document does not deal with all these variations; it addresses only the common aspects identified at the CPEFs.

This document is intended for academics and professionals involved in the education of pharmacists, graduate-level and post-graduate education, and ongoing human resources education; and also to professionals in pharmaceutical schools and professional associations, pharmaceutical chemists, and everyone interested in the subject of pharmacy education.

Objectives of this Proposal

1. **General objective**

To have, for discussion, an updated, competency-based Basic Plan for Pharmacy Studies, with a view to harmonizing the education of pharmacists in the Americas, based on the agreements made in previous Pan American Conferences on Pharmaceutical Education.

2. **Specific objectives**

- Update the common areas or domains of professional practice of pharmacists, chemist/pharmacists, and similar professionals in the countries of the Americas.

- Explain the basic requirements for the pharmacy curriculum in the professional areas or domains identified and the professional profile agreed to at the VIII Pan American Conference on Pharmaceutical Education.

- Present the general and specific competencies of pharmacists in the professional areas or domains identified and the professional profile agreed to at the VIII Pan American Conference on Pharmaceutical Education.

1. Introduction

The objective of this document is to propose a new, competency-based curricular model for pharmacy studies in the countries of the Americas. This proposal arises from the need for new educational and methodological strategies that make it possible to move from a teacher-centered model to a student-centered one.

What is the reason for this need in pharmacy education? The pharmaceutical profession has undergone major changes, in particular starting in the last two decades of the past century. These changes are related to society's approach to pharmaceuticals, with the focus shifting from the drugs themselves to the patient.

From both perspectives, quality is fundamental both in the educational process and in the pharmaceutical services provided. Not only is specific professional knowledge required, but also attitudes, skills, and values that allow today's pharmacists to take part in a globalized, quickly changing world where patients are the direct beneficiaries of their actions.

Accordingly, it became necessary to update the Basic Pharmaceutical Education Plan, published by PAHO in 1999, when has since become a guide for the vast majority of countries in the Americas. This new document also aspires to be a guiding instrument for pharmacy studies in the Americas and the Caribbean, promoting curricular innovation and quality as its core components.

This paradigm shift in education will require our schools and colleges to:

- Promote educational innovation.
- Provide the human and material resources needed to put innovation into practice. This will require academics who have been trained in new educational methodologies; laboratories and clinical fields of practice of sufficient quality and quantity for all students; availability of information and communication technologies, etc.
- Promote the development of values.
- Prepare tools and indicators to evaluate the teaching-learning process with a view to their continuous improvement.

This proposal is based on the following core principles[13]:

- Commitment to quality
- Ethical and social involvement
- Student-centered model, where the teacher is a facilitator of the educational process
- Learning based on values that inform the process of innovation and that focus mainly on personal and social development, knowledge, and ethical/social involvement.

- Development of thinking in its various forms
- Acquisition of the instrumental, interpersonal, and systemic competencies required by students for their professional and social performance and integration—which involves more than technical mastery of their specialty
- Use of new information and communication technology (ICT)
- Development of leadership in educators and students
- Promotion of teamwork

Given the role of today's pharmacist in the world, special consideration should be given to values-based learning, the development of competencies, and commitment to quality. With regard to educational quality, as a result of the work done by CPEF, PAHO will soon publish a "*Proposal for the Accreditation of Latin American Pharmaceutical Degree Programs*."

With regard to the importance of values in modern education, the World Declaration on Higher Education for the Twenty-First Century: Vision and Action[14] states: "*On the eve of a new century, there is an unprecedented demand for and a great diversification in higher education, as well as an increased awareness of its vital importance for sociocultural and economic development, and for building the future, for which the younger generations will need to be equipped with new skills, knowledge and ideals.*"

Society demands competent professionals for the new realities. Redesigned curricula must be based on new competency-based professional profiles, in consultation with and involving various stakeholders, including professionals and labor organizations.

The great paradox of current times is that progress in knowledge, science, research, and technology has widened the gap between the most advanced countries and less advanced developing countries. The current world scenario requires professionals to be aware of these changes and differences. Universities are responsible for raising student awareness and encouraging them to become ethically and socially involved and responsible, putting their capacities and competencies at the service of others, not just themselves. Schools and colleges of pharmacy are responsible to society for the professionals they train. And pharmacists must face this reality.

It is therefore necessary to highlight how important it is for Latin American and Caribbean countries—whose institutions of higher education have heterogeneous systems, economic resources, and academic training and teaching standards—to have functional, responsive mechanisms for collaboration and academic/student exchange, that include mutual recognition of equivalent curricula and that help mitigate the gaps in the countries and institutions with the least resources.

1.1 The pharmaceutical profession and pharmacy studies

Throughout its history, pharmaceutical practice has undergone significant and major transformations due to scientific and technological developments and sociocultural changes that have had an impact on various areas of daily life, such as health and education. This has been especially clear in the last four decades—a reality that has had an impact on the pharmacy curricula and the education that pharmacists receive[15].

Advances in biotechnology have resulted in new pharmaceutical duties and responsibilities in the industrial sector, which now faces complex processes of manufacturing, quality control, storage, and registry—needs that training institutions must meet. As caregivers, pharmacists initially devoted themselves to supplying and dispensing drugs; today, they have taken a leading role as active members of the health team, with shared responsibility for drug therapy. This new patient-centered professional approach has been strengthened by various factors:

- Continuously rising life expectancy in the population
- A focus on disease prevention rather than treatment, resulting in a higher quality of life for patients, while encouraging self-care and independence
- The need to ensure that the community has equitable access to effective, safe, high-quality drugs
- Scientific and technological advances that have led to a substantial increase in the pharmacological arsenal, strengthened in turn by the advent of custom therapies arising from the development of biotechnology and genetic engineering
- The opening of borders, which began several years ago with a view to economic trade, and which has allowed the free movement of professionals and the acquisition and application of more and new knowledge

In addition to all of the above, fundamental changes in higher education began in earnest in the 1980s. The so-called “massification of higher education” expanded both supply and demand, also affecting pharmacy education. The explosive emergence of new universities and diverse institutional projects brought with it a sizeable increase in the number of pharmacy programs, resulting in the need to harmonize them and, at the same time, to establish quality standards to evaluate them and certify their quality.

1.2 Pharmaceutical Education policies

Many years before the concepts of regionalization and globalization arose, international organizations such as the Pan American Health Organization (PAHO) and the World Health Organization (WHO) expressed interest in the health of their member states[15]. WHO has published several documents specifically addressing the social function of pharmacists in health systems, including *The role of the pharmacist in the health care system* (Report of a WHO Meeting, Tokyo 1993)[16], which makes the following recommendations:

a) Full utilization of the pharmacist's technical competencies in the health care system and in the development of national pharmaceutical policies, and
b) The development of educational and training mechanisms to enable pharmacists to take on new duties and responsibilities

WHO has not only recognized the evolution of pharmaceutical practice, increasingly identifying its social function in the various areas of professional practice, such as industry, clinical study, hospitals, health care centers, and communities; it has also recognized the need to promote the pharmaceutical practice as an exclusive professional service that is, at the same time, a complementary part of a health team, with the patient as the main beneficiary of the pharmacist's work. This spurred the idea of promoting pharmacy care as a way to ensure optimal therapeutic results with drugs by actively involving the pharmacist as a part of the health team who collaborates at the same level as all its other members and other professional health care providers[17].

Good pharmaceutical practice and a patient-centered approach have been emphasized and disseminated by various professional and educational organizations, including the International Pharmaceutical Federation (FIP), the Pan American Federation of Pharmacy (FEPAFAR), the South American Pharmaceutical Federation (FEFAS), the Organization of Ibero-Latin American Pharmacists (OFIL), and the American Pharmaceutical Association (APhA); and the Pan American Conference on Pharmaceutical Education (CPEF), the American Association of Colleges of Pharmacy (AACP), and the former Latin American Conference of Schools of Pharmacy (COHIFFA), now the Ibero-American Conference of Schools of Pharmacy (COIFFA). All these groups have prepared and disseminated documents that highlight the active role that pharmacists play in the rational use of drugs and in primary health care aimed at improving the quality of life of the population—documents that have served as the basis for study and modifications to the pharmacy curriculum over time.

Collaboration between WHO and FIP has provided guideline documents on pharmaceutical professional practice and its implication in pharmacy education. The most recent documents include *Developing pharmacy practice – A focus on patient care*, whose objective is to provide trainers with a guide to pharmaceutical professional practice and highlight the need for ongoing training to update pharmacists' knowledge. This document responds to the need to define and develop a global understanding of the meaning of pharmacy care at all levels[18]. *Good pharmacy practice. Joint FIP/WHO GPP: Standards for Quality of Pharmaceutical Services*[9] is a document that includes a definition of GPP and its requirements in good professional practice, and establishes standards for its development.

Competencies of the Pharmacist for the Development of Pharmaceutical Services Based on Primary Health Care and Good Pharmacy Practice is a publication resulting from a joint by PAHO/WHO, the Pharmaceutical Forum of the Americas (FFA), FIP, and CPEF, aimed at strengthening the pharmacist's ability to deliver pharmaceutical services based on primary health care[12].

1.3 The pharmacist in a global world

As has been mentioned, the global trend in pharmaceutical professional practice is to focus on patient, family, and community care; taking an active part in the health team; and providing the pharmaceutical services necessary to ensure that patients have access to timely, safe, and effective treatment. These functions constitute a great challenge today, considering the extraordinary growth in the pharmacological arsenal, especially in recent decades. Adding new drugs and controlling their quality and rational use has brought new challenges both to developed and developing countries. Further difficulties include the higher cost of health care, limited economic resources, lack of human resources in the health care sector, and inefficient health systems, as well as social, technological, economic, and political changes, among others[19].

Globalization—a phenomenon that has favored trade in products and services between countries belonging to regions and subregions that have developed through the integration of political and economic blocs—has also facilitated the recognition of academic grades and degrees (though in many cases, there has been more talk than action), leading to rapid changes in the health care field and to new problems related to greater mobility and migration[19]. Countries have had to make efforts to provide health care, including pharmacy care, by establishing health and education policies and strategies whose ultimate aim has been to go beyond economic interests in order to support the important work of the pharmaceutical profession in maintaining the health, quality of life, and well-being of the community.

However, for most countries in the Region of the Americas, access to and rational use of drugs remains a great challenge. Difficulties persists, such as the segmentation and fragmentation of drug supply systems for health care services, the correct management of supplies, and the poor quality and inappropriate use of drugs by prescribers and patients[20,21].

In this new scenario, the PAHO-UNESCO-FIP working group on the development of pharmacy education initiatives has proposed a pharmacy education model based on professional needs in accordance with the proposal made by the working group on global pharmacy education in *The Pharmacy Education Taskforce. Action Plan 2008-2010* (Figure 1).[22] It should be emphasized that pharmacy education should responsibly meet society's requirements for pharmacists: providing evidence-based science and practice, and professionals who have the necessary competencies to deliver the services required by their communities[23].

Fig.1. Proposed educational model based on professional needs (PET 2008-present)

	Needs: ***Local, regional, national & international***	
Education: ***Education to support development and achievement of competencies***	***VISION***	***Services:*** ***Services are needed to meet these needs***
	Competencies: ***Competencies required to provide services***	

Source*: The Pharmacy Education Taskforce. Action Plan 2008–2010 (WHO/UNESCO/FIP, 2008)*

In its document, *A Global Competency Framework for Services Provided by Pharmacy Workforce*[24], FIP provides a minimum set of behavioral competencies based on a comparative study identifying common behavior in the different frameworks of professional performance in the following domains: Pharmaceutical Public Health, Pharmacy care, Organization and Management, and Professional/Personal. The compiled information shows that there has not been a significant increase in the number of countries reporting the use or development of new national competency frameworks since 2009.

Nevertheless, the paradigm shift in the educational process has meant that many pharmacy curricula now include subjects or activities common to physicians, pharmacists, nurses, psychologists, occupational therapists, kinesiologists, and other professionals, without having to put aside other aspects of pharmacy education.

It should be noted, however, that receiving training to obtain the professional title is only the first step in a continuing education process that should continue throughout the professional life of a pharmacist.

1.4 The Pan American Conference on Pharmaceutical Education

The Pan American Conference on Pharmaceutical Education (CPEF), an initiative of the Pan American Health Organization (PAHO) in partnership with the schools of pharmacy of the Americas, has helped guide pharmacy curricula in the countries of the Americas. The Statement of Principles of the I CPEF (Miami, United States, 1990) established pharmacists' commitment—as drug specialists—to primary health care (PHC), the necessity to include them in health teams, and the duty of schools of pharmacy to maintain inter-institutional collaboration at the national and international levels.

A recurring theme—characteristic of the social and economic conditions that characterized the 1990s and a motive for discussion ever since—is the relevance of the curricula and the need for education based not only on knowledge but also on skills, abilities, and values that respond to the concept of life-long learning.

The II CPEF (Ixtapa, Mexico, 1993) recognized the mission of pharmacy education and the responsibility to train health professionals and keep citizens informed of changes in health care systems, and to provide them with knowledge and values to stimulate public involvement in the development of the profession's policies, practices, and guidelines going forward.

The III CPEF (Buenos Aires, Argentina, 1996) agreed on a Declaration that included the creation of the Pan American Committee on Pharmaceutical Education, coordinated by an executive committee made up of five members: representatives of the last three conferences, the representative of the Secretariat of the following conference, and a PAHO staff member. The Declaration also included a strategic line of action committing the participants to developing a proposal to review the pharmacy curriculum in order to establish the minimum content required to facilitate the exchange of students, educators, and professionals, and to allow the inclusion of other pharmaceutical competencies, as well as updating the knowledge base. In light of this recommendation—and the varying nature of pharmaceutical programs in the countries of the Americas—the first session of the CPEF Executive Committee (New Orleans, 1998) heard a proposal for a workshop to be held with the participation of representatives of the curriculum committees of various universities in Region. This motion was passed and PAHO, together with the School of Pharmacy and Biochemistry of Universidad Nacional Mayor de San Marcos (Lima, Peru), organized the working group that produced and published the Basic Pharmaceutical Education Plan (PAHO/WHO, 1999), which quickly became a guide for training pharmacists. This document identifies the areas of professional practice common to the Region and with the greatest growth, related areas of knowledge, and the duties and qualities of the pharmacist, as well as integration initiatives and pre-professional practices to be considered when building the curriculum.

At the IV CPEF (Santiago, Chile, 1999), discussion began on the competencies of pharmacists in terms of fulfilling the agreements reached at previous conferences. The recognized competencies of the "seven-star pharmacist" 6 were adopted (WHO, 1997), along with those included in the Basic Pharmaceutical Education Plan (PAHO/WHO, 1999). At the same time, it was agreed that the pharmacy curricula in the countries of the Americas would be reviewed in order to establish a common core curriculum.

The V CPEF (Miami, United States, 2002) introduced the concept of the global pharmacist and the need to continue moving forward in the construction of a high-quality, common core curriculum for a pharmacy education without borders. This same meeting reported on the existing mechanisms for evaluating the quality of the pharmacy curricula in different countries in the Region.

The frame of reference at the last three conferences (Montevideo, Uruguay, 2008; Porto Alegre, Brazil, 2010; and Havana, Cuba, 2012) has been the need for an updated reference document for pharmacy studies that corresponds to health conditions in the Region. At the most recent conference, agreements were reached that led to the creation of a working group to implement the agreements and recommendations and finish the existing draft. The Conference also defined the profile of the kind of pharmacists that society needs today, reaffirming their qualities and the criteria for rigorous practical training, as well as the activities exclusive to pharmacists—all in the context of competency-based training.

The main topics at the VI CPEF (Montevideo, Uruguay, 2008) were the quality and integration of pharmacy education in the Region, and the projection of the profession. Accreditation was recognized as an accurate, objective tool for evaluation. At the same time, working committees were established on Core Curriculum for Pharmacy Studies and on Accreditation, laying the foundation for what would subsequently become the respective documents.

Discussion and analysis continued at the VII CPEF (Porto Alegre, Brazil, 2010), with a view to producing the future documents *Accreditation of Latin American Pharmaceutical Degree Programs* and *Basic Plan for Pharmacy Studies and the Competencies of the Pharmacist*.

At the VIII CPEF (Havana, Cuba, 2012) a framework was established to study the competencies of the pharmacist. In order to join forces and help strengthen professional performance, the Conference endorsed a proposal (prepared by a joint working group, made up of the FFA, PAHO/WHO, FIP, and CPEF)[12] to attribute specific competencies to pharmaceutical services based on primary health care (PHC) and good pharmacy practice (GPP). As part of the activities promoted by PAHO/WHO to improve health systems in the Americas[10,11], the strategy to strengthen PHC-based pharmaceutical services has been in development since 2008, focusing more on the patient and less on drugs. This approach, which recognizes drugs as important therapeutic tools, but not the only ones, shifts the focus to individuals, families, and communities[25,26]. The position paper redefines pharmaceutical services as the "*set of actions in the health system that aim to guarantee comprehensive, integrated, and continuous care to address the health needs and problems both of individuals and the general population, using drugs as an essential element and helping achieve equitable access to and rational use of drugs. Actions taken by pharmacists working in health teams with community participation, or taken under the coordination of pharmacists, are directed at achieving concrete health outcomes with a view to improving the quality of life of the population."* The position paper also defines the roles and functions corresponding to pharmaceutical services.

At the same conference, concerning the need for an up-to-date curriculum for pharmacy education, a working group was created to draft the new Basic Plan for Pharmacy Studies, which would be developed in the second half of 2012. The document would be based on the following components: a) the document of the Lima Group[8]; b) the work previously completed, bringing together previous CPEF agreements[27]; c) the newly defined professional profile of the pharmacist, reached at the VIII CPEF; d) qualities of the pharmacist, according to the newly defined professional profile; criteria for rigorous practical training; and the activities attributed exclusively to pharmacists, also as agreed at the VIII CPEF; e) a competency-based curriculum; and f) available publications on the work done on this issue by different national and international agencies and organizations. Also, since the competencies required for PHC- and GPP-based pharmaceutical services were adopted, the document also identifies the competencies required in the other areas of professional action by pharmacists, common to the countries of the Americas.

2. Proposed Curriculum for Pharmacy Studies

This document is presented as an updated proposal for the harmonization of pharmacy education. It should be kept in mind that there are different titles in the Region, including pharmacist, pharmaceutical chemist, and pharmaceutical biologist, as well as roles and areas of professional action that include community pharmacy, hospital pharmacy, the pharmaceutical industry, chemistry, biochemistry, food science, and clinical analysis. However, this document does not deal with all these variations; it addresses only the common aspects identified at the CPEFs.

2.1 The pharmacist and environmental change

Modern societies have undergone an explosive process of structural change characterized by great scientific advances, the adoption of new technologies, the explosive development of communications and information technology, and rapid globalization, with social and economic repercussions. The Universidad 2000 report, known as the "Bricall Report" [28], mentions that "*knowledge, innovation, and the ability to learn are three complementarity aspects of the current activity in advanced societies" … "universities also have an essential contribution to make to the social, cultural, and community development of the local or regional environment*."

In other words, universities have had to adapt to this new national and international context in order to respond properly to the requirements of this new society and to the emergence of new problems, needs, and interests.

2.2 Competency-based learning

The concept of competencies has been described as "*complex processes of responsible performance suitable to a given context" [29]*.

Competency-based learning (CBL) implies profound changes and transformations in the curriculum, involving commitment not only from educators, but also from the institutions and academic units they represent, whose frame of reference is the quality of student learning.

Competency-based learning (CBL) is based on a teaching/learning system that enables students to progressively develop their autonomy and capacity to learn, based on an analysis of professional requirements and the definitions and priorities that correspond to the necessary competencies for professional practice. Ultimately, CBL enables students to acquire necessary generic and/or cross-cutting competencies (instrumental, interpersonal, and systemic) competencies specific to the profession, scientific and technical knowledge, and the ability to apply them in different complex contexts, integrating them with their own attitudes and values, and creating their own personal and professional way of acting[13].

In order to achieve these objectives, universities—through the academic unit that runs the degree program—should guarantee that professional training is provided in an intellectual and personal environment worthy of the academic community.

Pharmacy programs should therefore have an educational plan that responds to national needs and that is built collectively by pharmacy professionals, professional associations, academics, and graduates, as well as by employers of pharmacists and members of their working teams. This educational plan should aim for a well-rounded, high-quality education for students, by linking education, research, and outreach to individuals, families, and the community. From the standpoint of the educational methodologies used in the teaching/learning process, this plan should be student-centered, with the teacher as mediator and facilitator, and focused on learning rather than teaching.

The stated curriculum should be the roadmap to producing graduates who have the professional profile the country needs. It should also contribute to understanding, interpretation, preservation, improvement, development, and dissemination of national, regional, international, and historic cultures in a context of pluralism and cultural diversity [6].

The following sections describe the areas of pharmaceutical professional practice in the Region, the professional activities that are exclusive to pharmacists and those that are non-exclusive, and the components of the curriculum, such as graduation requirements, degree-level standards, length of the degree program, values and competencies, criteria for rigorous practical training. Finally, a proposal is made for the evaluation of generic and cross-cutting competencies.

2.3 Areas of professional practice in the countries of the Americas

The main common areas of pharmaceutical professional practice in the countries of the Americas that have seen the greatest growth in the last two decades are:

- Community pharmacy
- Hospital pharmacy
- Pharmaceutical industry
- Education
- Public health and regulatory matters

The most important areas identified as not common are:

- Clinical laboratory
- Food
- Toxicology
- Cosmetics
- Chemistry

Table 1 shows the main areas of pharmaceutical professional practice in selected countries of the Americas and the Caribbean.

Table 1. Areas of pharmaceutical professional practice in selected countries of the Americas and the Caribbean

Country	Areas of pharmaceutical professional practice
ARGENTINA	• Community pharmacy care • Hospital pharmacy care • Pharmaceutical industry (medicines) • Cosmetic industry • Pharmaceutical industry (synthetic drugs, active ingredients extracted from plants, biotechnology)
BRAZIL	• Community pharmacy • Clinical pharmacy • Hospital pharmacy • Food industry • Pharmaceutical industry (medicines) • Clinical analysis laboratory • Education and research • Public health services • Homeopathy • Preparation of pharmaceutical compounds
CHILE	• Community pharmacy (pharmacy office) • Hospital pharmacy • Industry • Education and research • Food science • Analytic laboratory (to a lesser extent than currently) • Toxicology • Biotechnology/gene therapy
COSTA RICA	• Community pharmacy • Hospital pharmacy • Pharmaceutical industry (production, quality control, medical visits, management, marketing and sale, health registries) • Education and research
UNITED STATES OF AMERICA	• Community pharmacy: pharmacy offices and outpatient clinics with pharmacy care (ambulatory clinics) • Hospital pharmacy • Biotechnology • Industry: information on medicines, medical visits and research • Homeopathy • Information technology • Radiopharmacy

2.4 Professional work reserved for pharmacy degree-holders

A. Exclusive

1. Act as technical[a] manager of: private pharmacies; pharmacies in public, private, and armed forces health care facilities; drugstores; distributors; laboratories or industrial plants involved in research, design, synthesis, development, production, quality control, fractionation, packaging, sterilization, storage, conservation, distribution, importation, export, and transportation of pharmaceuticals and health products for humans and other living things. Supervision of technical personnel under their responsibility.

[a] In the large majority of countries, Technical Director/Manager is a position held exclusively by pharmacists, but there are exceptions. This circumstance led to a debate among participants in the workshop concerning whether this is relevant. Since the activities listed in this text as exclusive to pharmacists differ from country to country, it has been agreed that the new Basic Plan should reflect this reality.

2. Dispense drugs and prepare pharmaceutical formulations and compounds in pharmacies that deal directly with the public (private, community, charity clinics, etc.) or in health care facilities (hospitals, sanatoriums, health centers, dispensaries, etc.); technical management or similar functions and/or health team functions, in accordance with current legislation and regulations in each jurisdiction.

3. Act as pharmaceutical supervisor of different public and private facilities and entities at the municipal, district, provincial, national, and international levels.

4. Take part in research and design, development, production, quality control, packaging, storage, and distribution of pharmaceuticals manufactured in series by the pharmaceutical industry; act as technical director or in a similar function at the national or provincial level, in accordance with current legislation and regulations.

B. Non-exclusive

1. Investigate, design, synthesize, develop, produce and inspect, prepare, fractionate, package, store, conserve, distribute, dispense, and administer drugs and health[b] products.
2. Conduct pharmacotherapeutic treatments and follow-ups with patients, family members, and the community in order to obtain favorable therapeutic results and improved quality of life.
3. Be the professional responsible for the technical management of industrial plants that carry out all the processes listed in item 1a) concerning food, veterinary products, disinfectants, insecticides, and biocides.
4. Direct, coordinate, and participate in preclinical and clinical pharmacological and toxicological studies.
5. Extract, isolate, investigate, identify, and conserve active agents, drugs, and nutrients (natural or obtained from synthetic and/or biotechnological processes).
6. Be a member of the technical staff responsible for production, inspection, development, fractionation, and storage[c] in pharmacies, in plants that produce pharmaceuticals, food, and cosmetics, and in laboratories or institutes related or linked to such industries.
7. Advise and participate in accreditation, technical supervision, and categorization in any public or private facility where pharmacists carry out their professional work.
8. Advise other members of the health team and the public regarding the rational use of drugs and other health products.
9. Establish technical, hygiene, and safety specifications for the environments where technological processes are carried out, both in public or private areas and in hospitals and

[b] In many countries of the Americas, several of these functions (such as the inspection, preparation, fractionation, packaging, storage, conservation, distribution, and administering of drugs) are exclusive to pharmacists—and in particular, dispensing.

[c] In many countries of the Americas, inspection of drug storage conditions is the exclusive responsibility of pharmacists.

industrial settings used for the preparation, storage, distribution, and dispensing of drugs and other pharmaceutical products, dietary products, cosmetics, food products and other health-related products[d].

10. Participate in conducting studies, consultations, technical assistance, audits, and inspections, and offering expert opinions and interpretations on subjects within their domain, before legislative and judicial bodies, and public or private entities (municipal, provincial, national, and international).
11. Take part, as a member of a health team, in the administration, planning, programming, implementation, and evaluation of health campaigns and programs.
12. Take part in preparations to regulate, classify, evaluate, and certify imported raw materials and drugs and drugs for export, involving medicines, food, cosmetics, and other health-related products.
13. Take part in the preparation, drafting, and updating of the national pharmacopeia, drug formularies, codes, and regulations, including food-related texts and any other text or legal provision related to pharmaceutical activity and public health.
14. Organize, participate in, and manage centers involved in drug information, drug supply, drug management and control, and health products, and carry out active pharmacovigilance in public and private[e] agencies.

2.5 Components of the Curriculum

2.5.1. Profile of the pharmacist

The profile of pharmacist, according to the consensus reached by the delegates to the VII and VIII Pan American Conference on Pharmaceutical Education, meets the following definition:

> A health professional who is expert in drugs, socially committed to the promotion, protection, maintenance, and improvement of health, and to the quality of life of the population; and who has scientific, technical, technological, and humanistic competencies.

2.5.2. Educational level and length of the degree program

For countries that have not adopted the PharmD degree program, it is recommended that the bachelor's degree level and the title of pharmacist (e.g. pharmaceutical chemist) be used (minimum 4.5 years when the program is organized in four-month periods and 5.5 years in the case of semesters). The program should have a pre-professional internship period not less than one semester in length.

[d] In some countries of the Americas, these functions correspond exclusively to pharmacists, except food and non-medical cosmetics.

[e] In some countries of the Americas, these functions are exclusive to pharmacists.

2.5.3. Values and principles

The group adopted the following principles for pharmacy education, corresponding to those approved for the renewed PHC [30]:

a) Values

- Right to the highest attainable standard of health
- Equity
- Solidarity

b) Principles

- Responds to the health needs of the population
- Services focused on quality
- Government responsibility and accountability
- Involvement
- Sustainability
- Cross-disciplinary approach

2.5.4. Competencies

The VIII CPEF reaffirmed the qualities of the pharmacist identified in the Good Pharmacy Education Practice (GPEP), adopted by the Working Group (WG) in Lima, Peru (PAHO/WHO, 1999) and described by the Working Group in Vancouver as the Seven-star Pharmacist (WHO, 1997)—with two additional stars: researcher[7] and ethicist[31]:

- Care-giver
- Decision-maker
- Communicator
- Leader
- Manager
- Life-long learner
- Teacher
- Researcher
- Ethicist

The WG also reaffirmed that the curriculum should explicitly include learning objectives of a general nature that reflect an education aimed at achieving outcomes that ensure that pharmacists not only are knowledgeable, but also have attitudes, abilities, skills, and behaviors that support and add value to their experience.

For the purposes of this work, the WG proposed the adoption approach to and definition of competencies and its corresponding categories listed in *Strategies for the Development of Primary Health Care Teams,*[11] which proposes the following definition:

> *Competencies (e.g., knowledge, skills, and attitudes) are personal characteristics that become evident when a task is carried out or a job is performed. They are related to successful performance of an activity, work-related or otherwise.*

The same document describes the competencies of the PHC team and classifies them as generic, specific, and humanistic. It establishes that "*the notion of competencies is currently a human resources management concept and a strategy for human resources management that allows improved links between management, work, and education. Consequently, competencies entail an integrated combination of knowledge, skills, and attitudes that lead to appropriate and timely performance in several different contexts*"." The matrix of competencies for the PHC team is shown in Table 2.

The competencies of the health professionals should, of course, be compatible with the core components of health systems.

The specific competencies of a pharmacist are shown in Table 3. These involve a combination of competencies of the PHC team, functions and services established in the Guidelines for the Development of Pharmaceutical Services, in the Good Pharmacy Practices, and in the Global Competency Framework for Services Provided by Pharmacy Workforce[24].

The core competencies do not specify specific areas of work (private pharmacy, pharmacies in public and private facilities, laboratories, industrial plants, etc.) but the necessary competencies in any of these places. The core curriculum will include a description of the areas of professional action, together with the professional profile of each degree/title.

Given the above, and with reference to the document produced at the aforementioned workshop, ten families of General Competencies for Basic Pharmaceutical Education can be defined:

2.6 Areas of knowledge

The areas of knowledge to be included in the pharmacy curriculum are listed below. They coincide with those already identified in the Basic Plan[8] (PAHO/WHO, 1999) as those needed for a pharmacist to achieve specific required competencies:

- "Hard sciences"
- Pharmaceutical science
- Biomedical science
- Social and administrative sciences
- Integration activities
- Pre-professional practice (internship)

Each area of knowledge will be included in the courses or modular content of the curriculum, depending on how the curriculum has been structured in each pharmacy program.

2.7 Criteria for rigorous practical training in pharmacy degree programs

Practical training must be guaranteed by the academic unit that offers the pharmacy degree program, in accordance with the following criteria:

a) Practical training activities will be planned and conducted in accordance with the general objectives of the curriculum and with the profile of the pharmacist in training.
b) Practical training activities will be held in appropriate areas, such as computer laboratories, science and pharmaceutical science laboratories, documentation and/or drug information centers, hospitals and health care centers, research centers, pharmaceutical plants, and other establishments associated with the profession.
c) Laboratory and other practical work should promote the development of skills that enable a pharmacist to make observations and findings regarding physical, chemical, and biological phenomena, and to use scientific method to identify relevant information and analyze it critically.
d) Practical work will be carried out in universities, hospitals, and health care facilities, and in other professionally related public and private centers, upon approval of the institution offering the degree program, in order to ensure that these places meet the requirements for educational centers.
e) Learning experiences will be planned and carried out under the supervision of instructors formally recognized by the institution offering the degree program.
f) When planning, steps should be taken to ensure that sufficient resources are accessible and available, and that activities are properly coordinated.
g) The different teaching/learning experiences should ensure that students comply with the ethical principles of the profession.
h) Throughout the degree program, students should be given opportunities to participate in schedule basic and/or applied research and outreach activities that favor their integration in multidisciplinary teams and with the community, while helping to achieve the profile that the country has established for pharmacists.
i) All practical learning experiences should be formally evaluated.
j) Practical activities will help integrate the training periods included in the curriculum.

Universities that offer pharmacy degree programs will structure their respective curricula so as to meet the aforementioned criteria for rigorous practical training, according to the situation in each country.

The competencies, skills, knowledge, and behavior described above, as well as the criteria for rigorous practical pharmaceutical training, are offered as a recommendation. Its implementation in each country, region, or institution will depend on the corresponding legal framework, needs, and readiness to adapt, taking into account both the profile of pharmacy graduates and the opportunities and requirements of life-long professional development.

2.8 Competencies and behavior of the pharmacist in the Region of the Americas

Table 2 presents the *functions* or *domains* of pharmaceutical professional practice in the Region, as well as the corresponding competencies and behavior that a pharmacist should be able to demonstrate. The third column of the table should be understood as specific competencies; each is expressed by an active verb and a function.

Table 3 also proposes domains and areas of pharmaceutical professional practice common to the countries of the Region of the Americas. (To be discussed at the IX CPEF)

Table 4 proposes levels of achievement of competencies in each domain. Levels of achievement refer to the level of complexity to be reached in a given competency.

Table 2. Specific competencies of a pharmacist according to the document "Primary Health Care-based Pharmaceutical Services" [26]

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
1. Functions involving public policies: This category describes the competencies necessary for effectively selecting options and for planning, implementing, and evaluating policies and programs related to pharmaceutical services.	1.1. Develop public policies.	1. Recommend and support national policies that promote better health outcomes.
		2. Participate in the preparation of policies and programs that allow the proper functioning of pharmaceutical services and that improve health outcomes.
		3. Collaborate with other health professionals on action to improve health outcomes.
	1.2. Implement policies and programs.	1. Develop plans to implement science-based courses in accordance with current legislation, regulations, and policies.
		2. Describe the implications of the options, emphasizing those applicable to the determinants of health and the national health strategy, and recommend or decide on what action to take.
		3. Demonstrate an understanding of public policies and related programs, and participate in their implementation, monitoring, and evaluation.
	1.3. Draft and update regulations and directives for pharmaceutical practice.	1. Participate in the preparation and updating of legislation and standardization related to pharmaceutical services.
		2. Implement, coordinate, and participate in teams and committees that help improve the quality of pharmaceutical services or the health outcomes of the population.
		3. Participate in the preparation of directives and clinical and pharmacotherapeutic protocols, including the role of each professional and service, and the corresponding referral and counter-referral mechanisms.
		4. Prepare or participate in the preparation of referral and counter-referral protocols in order to ensure comprehensive, continuous care.
	1.4. Help protect the health and safety of the population and the environment	1. Prepare or participate in preparing protocols and adapting services in order to adopt "green" practices for the effective use of energy resources, proper waste disposal, and recycling, whenever possible.
		2. Promote the collection of drugs that have expired or are unfit for consumption, using reverse logistics, in keeping with public policies on patient safety and environment protection.
2. Functions involving the organization and management of	2.1. Plan, manage, and evaluate pharmaceutical	1. Take stock of and manage the resources of the pharmaceutical service (financial, infrastructure, etc.) in order to ensure the effective use of these resources.

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
pharmaceutical services: This category describes the competencies for effectively managing pharmaceutical supplies and services in accordance with the principles of good governance, and integrating these services into integrated health services networks (IHSNs). This includes managing incidents such as outbreaks and emergencies.	services in coordination with integrated health services networks (IHSNs) and the health system	2. Understand and promote the principles of good governance and transparency in order to ensure that they are applied in the management of pharmaceutical services, drugs, and strategic supplies.
		3. Demonstrate accurate, timely decision-making capacity and good judgment as part of good governance.
		4. Ensure the provision and continuity of pharmaceutical services.
		5. Ensure the planning and management of production schedules.
		6. Manage the human resources of pharmaceutical services.
		7. Recognize the value of the pharmaceutical services team and the importance of its integration with other multidisciplinary services and teams.
		8. Recognize and manage the potential of each team member in accordance with his or her performance.
		9. Ensure that the services have appropriate facilities and trained staff, and that standardized procedures are followed and documentation is available in order to supply and dispense prescription drugs and other health products.
	2.2. Select drugs and other supplies	1. Coordinate or participate in committees on pharmacy and therapeutics (P&T) and health technology assessment (HTA) in order to ensure proper selection of drugs and technologies.
		2. Demonstrate an understanding of the concept of essential medicines and evidence-based selection.
		3. Ensure that drugs and supplies are selected using the concept of essential medicines and following criteria based on the best available evidence.
		4. Guarantee that (local, regional and/or national) medical formularies are up-to-date and linked to standardized treatment guidelines and protocols, and based on the best available evidence.
	2.3. Carry out procurement of drugs and other supplies	1. Demonstrate the ability to select products that comply with current legislation and suppliers that guarantee high-quality, safe, and effective products.
		2. Ensure that procurement is properly integrated with national drug lists and formularies, (push/pull) supply management systems, and payment mechanisms.
		3. Demonstrate an understanding of drug procurement processes, including tenders, price registries, purchases methods, and delivery systems, and how to evaluate them.
		4. Demonstrate the ability to develop mechanisms to ensure transparency and the absence of conflicts of interest.

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
		5. Supervise, monitor, and evaluate the procurement of medicines and other essential supplies in order to ensure their timely and cost-effective availability.
		6. Develop a contingency plan to guarantee timely availability and avoid stock-outs, while maintaining critical stocks.
	2.4. Provide drugs and essential supplies	1. Demonstrate an understanding of drug stock management in order to minimize errors and maximize accuracy.
		2. Ensure proper storage conditions for all drugs and, in particular, for controlled substances in order to ensure the availability of quality products.
		3. Ensure effective management and control of inventory to guarantee timely availability and avoid stock-outs.
		4. Implement a documentation and registry system to guarantee timely availability and avoid stock-outs.
		5. Assume responsibility for quantifying and planning drugs and supplies in order to ensure timely procurement and availability.
		6. Ensure correct logistics and timely delivery to dispensaries and pharmacies in order to guarantee timely availability of drugs and supplies.
		7. Demonstrate an understanding of transportation conditions in order to guarantee drug quality.
		8. Ensure the proper storage and management of drugs that require special transportation and storage conditions (e.g. thermolabile or subject to special controls) in order to guarantee timely availability of quality products.
	2.5. Develop and implement quality management systems for products and services	1. Guarantee that all drugs, including samples, are handled and distributed in a trustworthy manner, assuring the quality, efficacy, safety of use, traceability, and authenticity of the product along the chain.
		2. Develop a manual of good practices and standardized operational procedures along the entire pharmaceutical chain in order to guarantee the quality, efficacy, and safety of drugs and the effectiveness of services.
		3. Carry out self-inspection or other activities to monitor and evaluate services to ensure compliance with current legislation.
	2.6. Guarantee the availability and the rational use of drugs and other essential supplies in situations involving disaster prevention and	1. Demonstrate the capacity to perform functional roles in response to a public health emergency.
		2. Develop, together with the relevant agents (e.g. manufacturers, wholesalers, government agencies, etc.), a plan that provides access to an uninterrupted supply of essential drugs within the framework of a strategy for emergency preparedness or pandemics.

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
	mitigation, and in health emergencies	3. Demonstrate an understanding of the principles of drug donation in disasters and emergencies.
	2.7. Prepare formulations and compounds	1. Formulate and prepare extemporaneous pharmaceutical compounds, parenteral solutions, cytostatic reconstitutions, and other formulations required by the services, to guarantee the timely availability of safe, quality products.
		2. Prepare drugs in accordance with good manufacturing/drug preparation practices to guarantee the timely availability of safe, quality products.
	2.8. Perform drug fractionation	1. Correctly fractionate and prepare drugs and other essential supplies to guarantee the timely availability to patients of safe, quality products in the necessary quantities.
		2. Package and label drugs and other essential supplies to guarantee patient safety and correct use, identifying the patient and the drug and providing relevant information, user warnings, guidelines on correct use, and possible adverse reactions.
	2.9. Remove and dispose of drugs	1. Conduct frequent controls of drug supplies, ensuring that drug samples are included in periodic inspections of expiration dates and in the elimination of expired supplies.
		2. Remove drugs, including samples, quickly and efficiently from circulation when they have expired or when it is known or suspected that they are defective, misleadingly labeled, falsified, or counterfeit, separating these so that they are not dispensed or distributed.
		3. Report suspected or confirmed quality problems and counterfeit drugs to the responsible authorities.
		4. Take the necessary steps for proper handling and disposal of residues from drugs and essential supplies.
		5. Encourage patients and the general public to return drugs and health products that are expired, unwanted, or unneeded. Alternatively, they should provide patients with appropriate information on procedures for the safe elimination of expired or unwanted drugs.
3. Intramural and extramural functions directly involving the patient, family, and community	3.1. Promote health and evaluate health conditions	1. Participate in prevention activities that promote public health and prevent diseases, and refer patients to other professionals when necessary, particularly in areas such as the treatment of smoking and infectious diseases, including sexually transmitted diseases.
		2. Take part in patient care and evaluation processes such as health management,

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
		disease prevention, and promotion of healthy lifestyles, including groups that need special care, such as children, pregnant women, and older adults.
		3. Demonstrate an understanding of the individual characteristics of patients, such as educational level, cultural beliefs, literacy, native tongue, and physical and mental capacities.
		4. Interpret biological and physicochemical parameters according to specific patient needs, in order to evaluate the patient's response to the pharmacological treatment.
	3.2. Dispense drugs and supplies	1. Correctly dispense prescription drugs and drugs for minor problems.
		2. Dispense other health supplies and products (e.g. inhalers, blood glucose meters, etc.).
		3. Review and validate prescriptions received in digital or paper format, with regard to therapeutic, social, economic, and legal aspects of the prescription.
		4. Demonstrate an understanding of the options and make recommendations or substitutions for generic drugs.
		5. Give advice and sufficient oral and written information to ensure that the patient understands it and obtains the maximum benefit from the treatment.
	3.3. Document patient information	1. Register each intervention made, as well as the clinical history and use of medicines by patients and their family.
		2. Compile, review, and maintain confidential, up-to-date information on clinical history and use of medicines.
		3. Offer continuity of care, transferring or integrating relevant information—on patients, on medications, or on other aspects of health care—among the different services.
	3.4. Provide advice to patients for minor symptoms and refer patients to other services	1. Objectively evaluate health conditions and identify the need to refer a patient to another service or level of care.
		2. Provide first aid and necessary care and refer the patient to another service or level of care.
		3. Select appropriate medicines for minor symptoms, providing advice on their pharmaceutical use (e.g. for diarrhea, cough, fever, insect bite, etc.).
		4. Discuss therapeutic goals and drug use with patients and reach decisions based on the patient's needs and preferences.
		5. Conduct follow-up and receive cross-referrals from other services, and document

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
		interventions.
	3.5. Promote the rational use of drugs	1. Participate in decision-making related to health policies and in regulatory proposals to promote drug access and the quality and rational use of drugs.
		2. Advise and provide guidelines to the public on the safe and rational use of drugs and other health products, including selection, use, contraindications, storage, and adverse effects of prescription and non-prescription drugs.
		3. Carry out activities promoting the rational use of drugs, aimed at the public and other members of the health team.
		4. Develop and/or use educational materials for health maintenance, health promotion, and disease prevention programs aimed at a broad range of patient populations, age groups, and levels of knowledge about drugs and health.
	3.6. Manage pharmacotherapy and follow-up	1. Monitor therapy to ensure that therapeutic results are obtained.
		2. Identify, prioritize, and solve drug-related problems (including errors).
		3. Contribute and use all clinical and patient data necessary for coordinating effective pharmacotherapy, especially when several health professionals are involved in patient treatment.
		4. Monitor patient progress and outcomes.
	3.7. Participate in and conduct pharmacovigilance	1. Document and report adverse reactions (pharmacovigilance), including documentation, reporting, and correction of errors of measurement in order to ensure patient safety.
		2. Develop and participate in pharmacovigilance programs, including errors in medication; and report drug-related problems (poor quality or suspected falsification) in order to ensure patient safety.
4. Functions involving research and knowledge management	4.1. Promote and participate in health research	1. Participate in the design, monitoring, and evaluation of clinical trials, promoting and respecting bioethical principles.
		2. Promote and participate in the design, monitoring, and evaluation of health research.
	4.2. Organize and provide drug information	1. Demonstrate an understanding of reliable information sources and a capacity to interpret information involving evidence of efficacy, cost-effectiveness, quality, safety, and other related subjects.
		2. Demonstrate an ability to recover, select, evaluate, organize, and disseminate relevant information on drugs and drug quality, in accordance with user/client needs.

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
		3. Provide technical assistance or make recommendations to prescribers on pharmacotherapy, including the selection of the right drug and dosage.
		4. Ensure that the information provided to patients, other health professionals, and the public is based on scientific evidence, up-to-date, objective, understandable, non-promotional, accurate, and appropriate.
		5. Educate patients about how to evaluate and use health care information obtained from the Internet or other sources, including information on drugs; and insist that they consult a pharmacist on the information found.
		6. Inform patients and caregivers about how to obtain and critically assess information to meet their personal health needs.
5. Functions involving professional performance	5.1. Comply with current legislation (including ethical/bioethical aspects)	1. Demonstrate an understanding of current legislation related to public health, drugs, and pharmaceutical services, in particular regarding the registration and use of medicines.
		2. Fulfill and comply with national professional obligations, directives, and legislation, including professional codes of ethics and drug abuse codes.
		3. Demonstrate an understanding of legislation governing intellectual property rights and patents.
		4. Demonstrate an understanding of the necessary steps for a drug to be registered for it to be allowed to be distributed in the market, including aspects related to product safety, quality, efficacy, and cost-effectiveness.
		5. Demonstrate the ability to establish guidelines for professional practice and implement them effectively.
		6. Use patient information only for authorized purposes.
	5.2. Promote continuing education of human resources (pharmaceutical services and the health team)	1. Develop, support, and facilitate continuing, life-long education of human resources in pharmaceutical services.
		2. Promote the development of competencies in members of health services and other health professionals.
		3. Contribute to the educational development of future professional.
		4. Help educate prescribers on the subjects of access and evidence for proper drug use, including the necessary parameters to monitor and adjust prescriptions.
	5.3. Promote life-long professional development	1. Document continuing professional development activities (demonstrate training and continuing professional development aimed at improving their clinical knowledge, skills, and professional performance).
		2. Demonstrate up-to-date knowledge of drugs and the assessment of new

Functions/domains	Competencies	Behavior that a pharmacist should be able to demonstrate
		technologies.
		3. Recognize his/her own weaknesses, limitations, and need for training; and take action to overcome this.

Table 3. Proposed domains and areas of pharmaceutical professional practice common to the countries of the Region of the Americas

DOMAIN	FUNCTION
1. Regulation, control, and inspection	Carry out, within the legal framework, the control, regulation, and inspection of pharmaceutical and cosmetic products and medical devices; also, act as an authority for the establishment and inspection of pharmaceutical facilities, and help improve the legal framework.
2. Pharmaceutical assistance	Help promote and reestablish patient health through timely, efficient, safe, and informed provision of pharmaceutical services at the different levels of complexity of care.
3. Private pharmacy	Plan, acquire, store, and dispense drugs; prepare pharmaceutical compounds to reestablish health through timely, efficient, safe, and informed provision of pharmacy care to the community; manage the pharmacy; assess health conditions objectively, and identify the need to refer patients to another service or level of care. Provide first aid and necessary care and refer patients to another service or level of care. Make pharmaceutical recommendations, selecting appropriate medicines for minor symptoms (e.g. diarrhea, cough, fever, insect bite, etc.). Discuss therapeutic goals and drug use with patients and reach decisions based on the patient's needs and preferences. Conduct follow-up and receive cross-referrals from other services, and document interventions.
4. Industry	Conduct research and development of new formulations, registration and production of drugs and cosmetics, quality control, and quality assurance; and participate in the promotion and marketing of pharmaceutical and cosmetic products.
5. Analytical laboratory	Extract, identify, and quantify chemical and biological substances in different matrices; interpret and report results obtained, in accordance with valid and relevant analytical procedures.

Based on these domains, four curricular areas of competency can be established for **graduates** (who are recently titled, but without professional experience), progressing from level 1 to level 3 (1 = minimum, and 3 = maximum).

2.9 Assessing generic or cross-cutting competencies

Competency assessment requires different procedures and techniques, depending on the purpose of the evaluation. Knowledge assessment tools are well known and used by the vast majority of academics; however, evaluating attitudes, values, behavior, and competencies, requires techniques that have become a great challenge in higher education[13].

The assessment of attitudes and values requires the use of observation techniques, self-evaluation tests, attitudinal scales, etc. Assessing competencies—how to apply knowledge to specific situations, or how to develop different types of thinking (analysis, synthesis; critical, comparative, etc.)—

involves assessment tools such as portfolios, laboratory reports, task performance tests, and specific group and individual work.

Developing an adequate model to measure competencies requires these to be defined clearly in advance, so that previously established levels of achievement are measured. Furthermore, knowledge is needed to develop competencies, since these have an essential cognitive component. One of the most important elements of an evaluation is coherence between what is being evaluated and the procedure followed. The evaluation of competencies, including generic ones, is essential in order to establish the validity of the teaching-learning process, since the result depends on how the evaluation was made and what was assessed or measured. A poorly focused evaluation will produce results that are not valid for decision making. It is, therefore, fundamental for academics to receive technical training. This requires institutional support and recognition, meaning that time must be systematically and progressively devoted to this activity, as well as formal assessment of teaching performance.

Competency-based learning does not mean fragmented learning; rather, it adds value to a teaching-learning process that integrates knowledge, core skills, and effective behavior.

Table 4. Competency achievement levels, by domain: A proposal[f]

1. Pharmacotherapeutic follow-up		
Achievement level 1: understands drugs, their structure-activity relationship, active mechanisms, and pharmacotherapeutic uses.	Achievement level 1: understands the use of non-conventional therapies based on natural, nutraceutical, and homeopathic products that complement health treatments; and is capable of self-training in this area.	Level 1: recognizes the role of pharmaceutical chemists as specialists in the use of drugs and biologically active substances, enabling them to participate in training the health team.
Achievement level 2: analyzes pharmacotherapy for the rational use and safe dispensing of drugs, respecting current legislation.	Achievement level 2: distinguishes between different non-conventional therapies based on natural, nutraceutical, and homeopathic products that complement health treatments; and is capable of self-training in this area.	Achievement level 2: prepares, summarizes, and explains specific material on the use of drugs and biologically active substances, and prepares training material.
Achievement level 3: collaborates in the design of pharmacological therapies and comprehensive health programs and projects, collaborating as a member of the health team and providing clinical opinions when problems related to pharmacotherapy are identified.		Achievement level 3: participates in the planning of training for the health team and staff under his/her responsibility on subjects related to the use of drugs and biologically active substances, thereby contributing to efficacy and therapeutic safety.
2. Drug and cosmetic production		
Achievement level 1: understands the processes involved in the production of drugs, food, and cosmetics, respecting the provisions of current legislation.	Achievement level 1: recognizes drug and cosmetic registration as one of the activities of a pharmaceutical chemist, ensuring drug effectiveness, quality, and safety.	Achievement level 1: selects topics related to drug, food, and cosmetic production in order to prepare staff training material.

[f] Levels of achievement refer to the level of complexity to reached in a given competency, where 1 = low, 2 = intermediate, and 3 = absolute maximum for a pharmacy student.

Achievement level 2: carries out drug and cosmetic production processes, taking into account methods and technologies that ensure compliance with quality standards and that respect the provisions of current legislation.	Achievement level 2: identifies the requirements for drug and cosmetic registration.	Achievement level 2: prepares and explains specific topics related to drug, food, and cosmetic production and prepares staff training material.
Achievement level 3: solves problems in drug and cosmetic production, using new methods and technologies to ensure quality standards respecting the provisions of current legislation.	Achievement level 3: prepares reports for the dossier to obtain drug and cosmetic registration.	Achievement level 3: participates in planning the training of staff under his/her responsibility on subjects related drug, food, and cosmetic production.
3. Pharmaceutical management		
Achievement level 1: describes administrative processes, human resources and financial management, and inventory management.	Achievement level 1: is aware of regulatory frameworks for the operation of pharmacies and drugstores, and laboratories that produce pharmaceutical products, food for medical use, cosmetics, and hygiene products.	Achievement level 1: selects topics related to the management of human and financial resources, and products, in order to prepare staff training materials.
Achievement level 2: applies basic elements of administration and management, participating in multidisciplinary teams to optimize human and financial resources, and inventories in his/her areas of professional action.	Achievement level 2: applies current legislation to the operation of pharmacies and drugstores, and laboratories that produce pharmaceutical products, food for medical use, cosmetics, and hygiene products.	Achievement level 2: prepares and explains specific topics related to the management of human and financial resources, and products, and prepares staff training materials.
		Achievement level 3: participates in planning the training of staff under his/her responsibility in order to make organizational performance more efficient.
4. Analysis		
Achievement level 1: understands the quality parameters of	Achievement level 1: selects topics for staff training materials related to the methodology	

analytical methodology.	applicable to quality control of drugs, food, and cosmetics.	
Achievement level 2: applies standards for the validation of analytical methods to the analysis of biological, chemical, and pharmaceutical samples.	Achievement level 2: prepares staff training materials that summarize and explain specific topics related to the methodology applicable to quality control of drugs, food, and cosmetics.	
Achievement level 3: evaluates standards for the validation of analytical methods applicable to the analysis of biological, chemical, and pharmaceutical samples, in accordance with quality standards and current legislation.	Achievement level 3 participates in planning the training of staff under his/her responsibility on topics related to the methodology applicable to quality control of drugs, food, and cosmetics.	

3. Glossary

Instrumental competencies:[13] These involve a function. They imply a combination of manual skills and cognitive capacities that make professional competence possible. They include skillful handling of ideas and human environments, physical dexterity, cognitive understanding, linguistic ability, and academic achievements.

Interpersonal competencies:[13] These involve personal and inter-personal skills. They refer to capacity, ability, or skill in expressing one's own feelings and emotions in the most appropriate way and accepting the feelings of others, enabling collaboration toward common objectives. These competencies are related to the ability to act with generosity and understanding toward others, for which it is a prerequisite to know oneself. These skills involve objectification, identification, and information regarding one's own feelings and emotions and those of others, favoring processes of cooperation and social interaction.

Systemic competencies:[13] These involve skills and abilities related to an entire system. They require a combination of imagination, sensitivity, and skill, making it possible to see how the parts are related and connected within a whole. These competencies include the ability to plan changes that make global improvements to systems, and the ability to design new systems. It is necessary to have previously acquired instrumental and interpersonal competencies.

Generic competencies:[11] These are fundamental to properly carry out or complete teamwork. They are common to and shared by all team members, enabling professionals to adapt to new working conditions, keep up to date, and overcome the problems they face in their respective jobs. Generic competencies include communication, information management, resource management, and public health.

Core competencies:[11] These provide the fundamental understanding of what public health is and what it is for. They should be mastered by all public health workers.

Cross-cutting competencies:[11] These provide general and specific knowledge, aptitudes, and skills in areas that enable the performance of one or more functions. These should be mastered by various categories of public health professionals and technical staff, according to the responsibilities of each.

Critical competencies:[11] These provide the technical know-how, skills, and abilities needed to perform an essential function or take part in a specific program or area of work. Their structure is based on the two previous categories, above. They should be mastered by specific working teams responsible for specific, essential functions.

Specific competencies:[11] These involve functions performed by organizational units such as PHC teams. They are linked to individual and collective knowledge- and skills-based processes and contributions. They are inherent to each profession, with predominantly technical aspects.

Humanistic competencies:[11] These refer to the set of ethical values by which the professional uses and applies acquired knowledge. They are related to professional practice and social responsibility to the community (professional ethics).

Cross-disciplinary approach (to health): A cross-disciplinary team is one whose different members are joined in a single paradigm, forging a theoretical/practical partnership aimed at understanding a problem and taking the appropriate action. This requires that "different theoretical reference points harmonize around certain methodological premises by which procedures and techniques are established for intervention. The latter may be developed by each profession (in this case, neurology, kinesiology, occupational therapy, speech pathology, and psychology), which takes part in the process without entering into conflict with its own postulates" [32].

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