



Original article

[Translated article] Pharmacist access and training process for residency in Hospital Pharmacy in Argentina

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A B S T R A C T

Hospital pharmacy worldwide has proven to be a crucial element in healthcare. In Latin America, it draws inspiration from 2 main models: United States, which promoted clinical pharmacy and later pharmaceutical care, and Spain, which shares similar healthcare practices and the added advantage of a common language. Both models influenced the implementation of hospital pharmacy residencies in Argentina since the 1980s.

Hospital pharmacy residencies in Argentina constitute a paid system of intensive postgraduate training on a full-time basis with exclusive dedication. They are carried out in 11 provinces across Argentina in services with recognized teaching experience. Currently, there are 46 locations with a total of 75 annual vacancies for applicants.

The objective of hospital pharmacy residencies is to train pharmaceutical professionals with the necessary competencies to ensure the care of patients through the optimization of the safe, effective, and efficient use of medications and healthcare products tailored to each patient's individual therapy.

Hospital pharmacy residencies have demonstrated that pharmacists acquire specialized training that can be decisive in influencing healthcare policies related to the safe use of medications and healthcare products. Therefore, actions to promote and encourage interest in this field among pharmaceutical professionals are necessary, involving scientific societies, universities, pharmaceutical associations, and the political sphere.

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Proceso para el acceso y formación del farmacéutico a la residencia en Farmacia Hospitalaria en Argentina

R E S U M E N

La Farmacia Hospitalaria en el mundo ha demostrado ser un elemento de importancia en la asistencia sanitaria. En Latinoamérica toma de referencia dos líneas principales: Estados Unidos quienes promovieron la farmacia clínica y posteriormente la atención farmacéutica y España, quienes presentan similitudes sanitarias y la ventaja añadida del idioma en común. Ambas líneas influyeron para que luego en Argentina a partir de los años 80, se implementen las residencias de Farmacia Hospitalaria.

Las residencias de Farmacia Hospitalaria en Argentina son un sistema remunerado de becas para formación de posgrado intensivo en servicio a tiempo completo y dedicación exclusiva. Se desarrollan en 11 provincias del territorio argentino en servicios de reconocida trayectoria docente. Actualmente existen 46 sedes con un total de 75 vacantes por año para el ingreso de postulantes.

El objetivo de las residencias de Farmacia Hospitalaria es formar a profesionales farmacéuticos con las competencias necesarias para garantizar el cuidado asistencial de los pacientes a través de la optimización del uso seguro, eficaz y eficiente de los medicamentos y productos sanitarios para la terapéutica individual de cada paciente.

Las residencias en Farmacia Hospitalaria han **demostrado** sabido demostrar que el farmacéutico **adquiere** una formación especializada que podrá ser determinante en el impacto de las políticas sanitarias vinculadas al uso seguro de medicamentos y productos sanitarios. Es por esto que acciones de divulgación y estímulo por parte

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de las sociedades científicas, las universidades, los colegios farmacéuticos y el ámbito político son necesarias para poder generar un mayor interés en el profesional farmacéutico para que se desempeñe en esta área.

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The experience accumulated globally in the field of hospital pharmacy (HP), particularly since the beginning of its modernization process in the 1960s, has made it a vital component of healthcare.¹ In Latin America, HP has drawn inspiration from 2 main sources. First of all, American pharmacists who, through the American Association of Hospital Pharmacists, have promoted clinical pharmaceutical practice first and pharmaceutical care later using a different healthcare model from the one prevailing in our region; and, secondly, Spain, where the work of the Spanish Society of Hospital Pharmacists bears many resemblances with our own. This should be added to the fact that all their documents are published in Spanish, which greatly facilitates comprehension.²

Both institutions influenced the drug selection process as well as the development of clinical pharmacy in Argentinian hospitals where, from the 1980's, pharmacist started interacting with patients more and more often, and their participation in multidisciplinary care teams slowly became the norm. A case in point is that of the San Juan de Dios Hospital in La Plata, which pioneered the implementation of HP residency programs in Argentina.³

Fort their part, hospital pharmacy departments (HPDs) carried out their traditional functions, i.e. of drug dispensing, management of medical devices and, in some more visionary centers, pharmacists were responsible for sterilization processes. Things have evolved significantly since then, to the extent that in the year 2000, Resolution 641 was adopted by the Ministry of Health,⁴ which defines HP as “a discipline responsible for meeting the population's pharmaceutical needs through the selection, preparation, acquisition, control and dispensing of medications; the provision of information; and the performance of other activities intended to promote the appropriate and cost-effective use of medications and medical devices to the benefit of the patients admitted to health centers.”

In 2010, the Federal Health Council (COFESA) recognized various specialties within the pharmaceutical profession. Subsequently, Resolution 1186-MSN-2013, approved an official list of pharmaceutical specialties, including HP, emphasizing the importance of HP and legitimizing the residency programs that were already underway in several jurisdictions.⁵

Health system

The Argentinian health system comprises three funding models: public (funded by the state), social security (financed by the compulsory or voluntary contributions of workers), and private (funded directly by policy-holders). Although the public system guarantees free and equal access to health services, it can at times become overcrowded, which may prevent it from providing adequate care. The private system is in general not subject to those difficulties and offers users levels of comfort and convenience not easily available in the public system. The social security system, for its part, provides its services through the so-called *obras sociales*, which either own of their health centers or outsource health services from (federal, provincial, or municipal) state-owned or private centers.

Although HPDs exist across all of this tripartite health system, it must be acknowledged that most of them are located in public hospitals.

Academic training

HP residency programs constitute in Argentina a remunerated grant-based system that provides postgraduate intensive training

requiring full-time commitment over a total of 6000 tuition hours. Residents receive economic compensation for their daily clinical and academic work. The programs are organized on the basis of the principles of autonomy and increasing responsibility, which makes for a gradual development of the participants' knowledge and capabilities that should prepare them to effectively practice their profession. Up to 2023, 11 Argentinian provinces (Fig. 1) offered HP residency programs in centers with long-standing academic traditions. Currently, the total number of centers offering these programs is 46, with the total number of annual vacancies standing at 75 (Table 1).

Apart from the standard HP residency programs, the city of Buenos Aires offers 2 residency programs devoted specifically to medicines compounding and control. These are offered by the National Administration for Medicines, Food and Medical technology (ANMAT) and the Dr. Carlos Malbrán National Administration for Health Laboratories and Institutes, where admission conditions are similar to those of residencies belonging to the unified competitive process system. Some differences exist, nevertheless, regarding the types of exams applicants must sit as these programs are not specifically for pharmacists but of a more multidisciplinary nature.⁶

Entry requirements

To enter an HP residency program, applicants must be in possession of a pharmacist's degree. There is a wide variation between venues and provinces in terms of the maximum time that may have elapsed since the candidate obtained their graduate degree (e.g., in the city of Misiones, the time limit is 5 years from earning one's degree) and the applicant's age at the start of the residency program (e.g., in the city of Tucuman, the age limit is 36 years as of May 31 of that year). Most venues require applicants to sit an entry exam, the result of which is combined with the mean grade earned during their graduate studies to calculate an overall score that will decide whether they can be admitted.

Admission to public residency programs in the city of Buenos Aires, the Buenos Aires province and in centers under federal control in other parts of the country is determined by a unified competitive process. Under this system, implemented in 2018, the Argentine Ministry of Health and Social Development and the respective ministries of health of the different provinces, offer vacancies in basic and post-basic residency programs. The competitive process includes an entry exam, a rank order assessment, and a vacancy assignment process, and must comply with the norms specified in the regulations adopted by each jurisdiction. In other provinces, although registration, rank-order assessment, and vacancy assignment are carried out in much the same way as in the aforementioned unified competitive process, entry exams have so far been administered independently. In private centers, admission conditions are set independently by each institution. Moreover, some venues (particularly private ones) make it compulsory for candidates to participate in a pre-admission personal interview, and military residency programs require applicants to take a 3-month military instruction course before starting their residency.

Curriculum

The curriculum of HP residency programs is structured around a series of competencies closely related to clinical practice:^{7,8} management of the HPD, acquisitions, dispensing and medications distribution



Fig. 1. Provinces (in yellow) with active residency programs in 2023.

Table 1
Hospitals offering hospital pharmacy residency programs in 2023 in Argentina.

Province	Hospital	Type	Number of vacancies per year	Type of funding	
CABA	Dr. Juan P. Garrahan Children's Hospital	Public	3	2 Federal 1 GCBA	
	Carlos G. Durand General Acute Care Hospital	Public	1	GCBA	
	Parmenio Piñero General Acute Care Hospital	Public	1	GCBA	
	Dr. Ricardo Gutiérrez Children's Hospital	Public	1	GCBA	
	Dr. Cosme Argerich General Acute Care Hospital	Public	1	GCBA	
	Dr. Julio Méndez Clinic	Public	1	GCBA	
	José de San Martín General Teaching Hospital	Public	3	UBA	
	Buenos Aires Italian Hospital	Private	3	Private	
	Güemes Clinic	Private	2	Private	
	Buenos Aires British Hospital	Private	1	Private	
	Central Military Hospital	Military	3	Federal	
	Central Aeronautical Hospital	Military	1	Federal	
	Buenos Aires	Dr. José Penna General Acute Care Hospital (Bahía Blanca)	Public	2	PBA
		Evita General Acute Care Hospital (Lanus)	Public	1	PBA
Luisa C. Gandulfo General Acute Care Hospital (Lomas de Zamora)		Public	1	PBA	
Presidente Perón General Acute Care Hospital (Avellaneda)		Public	1	PBA	
Evita Pueblo Hospital (Berazategui)		Public	1	PBA	
HIEMI Victorio Tetamanti (Mar del Plata)		Public	2	PBA	
Dr. Oscar E. Alende General Acute Care Hospital (Mar del Plata)		Public	1	PBA	
Sor María Ludovica Children's Hospital (La Plata)		Public	2	PBA	
San Roque General Zonal Acute Care Hospital (Gonnet)		Public	2	PBA	
José de San Martín General Acute Care Hospital (La Plata)		Public	2	PBA	
Dr. Rodolfo Rossi General Acute Care Hospital (La Plata)		Public	2	PBA	
Mario Larraín General Zonal Acute Care Hospital (Berisso)		Public	2	PBA	
Paroissien General Acute Care Hospital (Isidro Casanova)		Public	2	PBA	
San José Acute Care Hospital (Pergamino)		Public	1	PBA	
Vicente López y Planes Acute Care Hospital (General Rodríguez)		Public	1	PBA	
Héctor Cura Municipal Hospital (Olavarría)		Public	2	PBA	
El Cruce - Nestor Kirchner Referral Hospital (Florencio Varela)		Public	2	Federal	
Dr. A. Posadas Hospital (El Palomar)		Public	2	Federal	
Cuenca Alta «Néstor Kirchner» Referral Hospital (Cañuelas)		Public	2	Federal	
Austral Hospital		Private	1	Private	
Córdoba	Cordoba Aeronautical Hospital	Military	1	Cordoba	
	Misericordia Hospital	Public	1		
Mendoza	Alfredo Ítalo Perrupato Hospital	Public	1	Mendoza	
	Dr. Humberto Notti Hospital	Public	1	Mendoza	
	Central Hospital	Public	1	Mendoza	
	Regional Military Hospital	Military	1	Federal	
	Del Carmen Hospital	Social Security	1	Private	
Tucumán	Niño Jesús Hospital	Public	3	Tucuman	
Misiones	Central Pharmacy Unit	Public	3	Misiones	
San Luis	San Luis Hospital	Public	2	San Luis	
Neuquén	Neuquen Provincial Hospital	Public	2	Neuquen	
Corrientes	Cardiology Institute	Private	1	Private	
San Juan	Dr. Guillermo Rawson Hospital	Public	2	San Juan	
Salta	San Bernardo Hospital	Public	2	Salta	

CABA: Autonomous City of Buenos Aires; GCBA: Buenos Aires City Government; PBA: Buenos Aires province; UBA: University of Buenos Aires.

systems, compounding, sterilization, medical devices, clinical management of drug therapy, and pharmacovigilance. All of these contents are covered every year at increasing levels of complexity.

All HP programs include both clinical and academic activities, which are evenly distributed throughout the day. The morning is typically devoted to clinical activities, whereas the afternoon is dedicated to covering the academic contents and to providing a theoretical background to the most common situations found in clinical practice. Clinical activities are key to ensure proper training of resident pharmacists. The degree to which each venue develops the different parts of its residency program depends on the extent to which the different areas are developed in their HPD. If a venue cannot cover all the training modules by itself, rotations can be organized to other units capable of cover those modules to their full extent.

In addition to technical competencies, there are a series of so-called cross-curricular competencies, which are promoted throughout the length of residency programs. These include organization, professional relations, teaching and research, risk management and patient safety, multidisciplinary work, communication, adaptation, and professional ethics with a law-based approach.^{7,8} Moreover, great emphasis is laid on multidisciplinary work, which is the cornerstone of all residency programs, and on knowledge transfer between professionals,

which has now started to be introduced at graduate level in some universities.

Academic activities include theoretical sessions, participation in multidisciplinary studies, literature reviews; reflections on clinical practice; attendance at seminars, conferences and symposia; and performance of research work. This in many cases encourages residents to take their first steps in scientific writing. In 2016, various residential programs joined forces to organize virtual talks on different aspects of HP. These sessions, held weekly from a venue made available by the Argentinian Association of Hospital Pharmacy, provide residents with a great opportunity to come together, thus contributing to building a sense of community among the resident pharmacy from the different regions of the country.

Lastly, residency programs contemplate the possibility of participating in external rotations (extracurricular rotations) in both Argentinian and foreign hospitals. These provide residents with the opportunity of acquiring new knowledge and get to know different realities that may contribute to their personal and professional development.

Residency programs are 3 years long and extend from September 1 of one year to August 31 of the next.

As regards the certification as a HP specialist, students at present do not obtain their certificate on completion of their residency program but

are rather required to sit exams set by scientific associations,⁹ take post-graduate courses at a university, or make an application with a pharmaceutical association, which require the fulfillment of certain requirements, including having completed an HP residency program.

Knowledge and skills

The goal of residency programs is to provide pharmaceutical professionals with the skills they need to ensure appropriate patient care through the optimization of a safe, effective, and efficient use of medicines and medical devices. The idea is to develop the residents' expertise on the basis of their own practice, in the course of a continuous learning process. Currently, efforts are being directed to gear the discipline toward primary care so that hospital pharmacist can provide pharmaceutical care in a cross-curricular way throughout the patients' journey, i.e., during their hospital stay and then, by means of their work in various care networks extend the care provided to the discharge phase and, subsequently, to the home care setting.

In this regard, several hospitals in Argentina have in the last few years reported successful experiences thanks to the incorporation of activities and processes led by HPDs:

- Drug selection.
- Active participation in pharmacy and therapeutics committees.
- Implementation of single-dose distribution systems.
- Implantation of sterile medicine formulation units with reconstitution of cytostatic and non-sterile drugs.
- Ward pharmacy activities: pharmacotherapeutic follow-up and pharmaceutical intervention programming. Pharmacovigilance and detection of medication errors.
- Introduction of automatic drug dispensing systems to HPDs.

Current situation of hospital pharmacy programs

Although Argentina theoretically offers the right conditions to ensure homogeneity of hospital pharmacy residency programs, notable technical, structural, and technological differences exist between the different venues offering such programs, which results in pharmacists preferring to be trained in some of them rather than in others. At an academic level, there are marked differences between provinces. For example, both in the city of Buenos Aires and Buenos Aires province, both medical and non-medical degree programs share a common core of subjects, a situation not found in other areas of the country.

As regards vacancies, although there has been an increase in the supply in the last few years, occupancy never reached 100%. In Buenos Aires province, there has been a reduction of 25% in the last 5 years, a trend that has also been observed in other provinces such as Mendoza and Tucuman, where some years no applications were received. Factors such as the economic situation, the lack of publicity, the wide availability of jobs, an interest in other projects and, the occurrence of the COVID-19 pandemic have resulted in a reduction in the number of vacancies filled. This problem is not new and has seen ups and downs over time, 2008 having been a particularly dire year in terms of filling of vacancies.²

The future

Since the creation of the HP Advisory Committee in 2016, the National Directorate for Human Talent and Knowledge has been working on a reference framework for the HP speciality, with the support of Argentina's Health Ministry. The framework of reference defines the professional profile of HP graduates, as well as the skills required and the activities to be performed. Furthermore, it defines certain standards that training centers must meet for their license as accredited venues to be renewed. Implementation of the said reference framework should make it possible to define a standardized training program for the

whole country as well as a set of common standards for the accreditation of residency programs wherever they may be offered. This would allow providing new hospital pharmacists with high-quality training and establishing a common set of competencies for hospital pharmacists around the country, which would guarantee equal training standards across Argentina. In turn, this must be accompanied by the introduction of a single exam for the whole country, on the basis of whose results all vacancies available could be distributed. At present, only disciplines such as medicine, biochemistry, and nursing have this kind of system.

After this step, which should be a priority for the next few years, 2 other initiatives should be undertaken. Firstly, promoting the development of HP residency programs in all the provinces in the country, as only 40% of provinces have one (Table 1). Secondly, the subspecialization of pharmacists should be encouraged.

With respect to graduate education, a significant achievement was accomplished by the University of Buenos Aires in 2008¹⁰ when it introduced a specialization in hospital pharmacy in the curriculum of its pharmacy graduate program. However, this initiative should be replicated by other universities in the country, whose pharmacy degree curricula exhibit wide variations. Effective publicizing of the new specialization by the authorities of the University of Buenos Aires will be key in motivating students to work in the hospital setting. Although progress has been made in this direction in city of Buenos Aires and in Buenos Aires province, the rest of the country still has a long way to go.

Final thoughts

The current degree of development of HP in the different regions in Argentina is markedly heterogeneous, with cities boasting HP residency programs being far better off than those who do not. Despite the growing demand of pharmacists in the country's hospitals, the distribution of these professionals is uneven, many institutions suffering from a dire scarcity and with existing pharmacists doing mainly medication management tasks rather than on more specialized pharmaceutical activities.

HP residency programs provide an invaluable opportunity to mitigate the aforementioned inequalities and close the gap with regard to the provision of high-quality pharmaceutical services throughout the country. Graduates from HP residency programs are equipped with the skills and the knowledge required to make a significant impact on the public policies related to the safe use of medicines and medical devices. It is essential for scientific societies, universities, and pharmaceutical associations to foster actions aimed at stimulating the interest of pharmacists and encouraging them to embrace HP.

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CRedit authorship contribution statement

Matías Francisco Quiroga: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources,

Investigation, Data curation, Conceptualization. **Andrea Valeria Massa:** Writing – review & editing, Writing – original draft. **Antonella Milano Gil:** Writing – review & editing, Writing – original draft.

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