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Special article

[Translated article] Conquering the future in hospital pharmacy: Training as a pillar of success

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ABSTRACT

The training of hospital pharmacists in the coming years must adapt and respond to constant current and future social and technological challenges, without neglecting the basic areas of the profession. It is necessary to acquire knowledge in what is known as digital comprehensive health: artificial intelligence, technology and automation, digital skills, and new forms of communication with patients, such as telemedicine and telepharmacy that are already a reality in many hospitals.

We must provide knowledge in automated systems for the distribution and dispensing of medicines, robots for preparing sterile preparations, traceability systems, the use of drones in clinical care, etc. as well as training in the application of technology in pharmaceutical care, through devices and applications that help identify patients who require specific care early and effectively. In this digital scenario, new risks and challenges must be faced, such as cybersecurity and cyber resilience, which makes the training and education of healthcare professionals in general, and hospital pharmacists in particular, inexcusable.

On the other hand, the appearance of increasingly complex and innovative therapies has a great impact not only on health population but also on economic and environmental issues, which makes new competencies and skills essential to develop and implement disruptive and competent financing, equity, and sustainability strategies.

In this demanding and hyper-connected environment, it is understandable that the well-known "burned out worker syndrome" appears, which prevents the correct personal and professional development of the team and highlights the importance of quality training for its prevention and management.

In short, in the next decade, the training of hospital pharmacists must be aimed at providing knowledge in innovation and in basic skills needed to adapt and succeed to current demands and changes.

Conquistando el futuro en farmacia hospitalaria: la formación Como Pilar del éxito

Palabras clave:
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RESUMEN

La formación de los farmacéuticos especialistas de hospital en los próximos años debe adaptarse y dar respuesta a constantes retos sociales y tecnológicos actuales y futuros, sin descuidar las áreas básicas de la profesión. Es necesario adquirir conocimientos en lo que se conoce como salud integral digital: inteligencia artificial, tecnología y automatización, competencias digitales y nuevas formas de comunicación con los pacientes, como la telemedicina y la telefarmacia que ya son una realidad en muchos hospitales.

Dotar de conocimientos en sistemas automatizados para la distribución y dispensación de medicamentos, robots de elaboración de preparaciones estériles, sistemas de trazabilidad, el uso de drones en la asistencia clínica, etc., sin olvidar incluir, la capacitación en la aplicación de tecnología en la atención farmacéutica, a través de dispositivos y aplicaciones que ayuden a identificar pacientes que requieren atención específica de forma temprana y eficaz. Ante este escenario digital, aparecen nuevos riesgos y desafíos que afrontar, como la ciberseguridad y la ciberresiliencia, que hace inexcusable la capacitación y formación de los profesionales sanitarios en general, y en particular, de los farmacéuticos especialistas de hospital.

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Por otro lado, la aparición de terapias cada vez más complejas e innovadoras, tienen un gran impacto no sólo sanitario sino también económico, y medioambiental, que hace imprescindibles nuevas competencias y habilidades que nos permitan desarrollar e implementar estrategias de financiación, equidad y de sostenibilidad disruptivas y competentes.

Ante este entorno tan exigente e hiperconectado, es entendible que aparezca el conocido *"burnout"* o también llamado «síndrome del trabajador quemado» que impide el correcto desarrollo profesional y personal del equipo, y que pone de manifiesto la importancia de una formación de calidad para su prevención y abordaje.

En definitiva, en la próxima década, la formación de los farmacéuticos especialistas de hospital debe estar orientada a proveer de conocimiento la innovación y adaptarse a las demandas y cambios actuales.

Introduction

The profession of hospital pharmacy (HP) cannot and should not evolve in isolation from the profound social, demographic, institutional, and philosophical changes currently taking place. Among other factors, digitalisation, sustainability, precision work, humanisation, and social mobilisation significantly impact our lives and profession. It is essential to identify those changes or areas where social evolution is already inevitable. Hospital pharmacists must be trained to adapt to these changes and to improve their relationships with patients, other healthcare professionals, public administration, the media, and private companies.

Just 10–15 years ago, topics such as artificial intelligence (AI) and sustainability were barely discussed in society, let alone in the context of specific professions. Today, they are part of our everyday conversations. The use of smart devices with access to interconnectivity and multiple information systems is a reality that would have been unimaginable just 2 decades ago.

In the coming years (Initiative 2030), hospital pharmacist training must be geared toward providing knowledge for innovation, in addition to the traditional tasks at the core of our profession, such as manufacturing, dispensing, safety in all drug-related processes, assessment, selection and therapeutic positioning, patient care and information, and in-depth pharmacotherapeutic knowledge and validation. Fortunately, the profession has expanded remarkably in all these and other processes. High-level basic and specialised training have enabled us to respond effectively to new demands and innovations. In all of these areas, basic training is, and always will be, the foundation of all knowledge; hence, there is a need for continuous retraining and reinforcement. Specialised training (and super-specialised training) must complement the basic framework with the unique aspects that enable progress and innovation in therapeutics, whether in terms of medications, processes, models, or systems, all from a multi-professional perspective. We need to be open to collaborating with experts from other professions, even outside the healthcare field, in order to be able to design and develop new comprehensive care and treatment strategies.

It is vital to assess current needs and identify areas for improvement in our training, with a forward-looking perspective, to successfully meet the challenges of our role. Of course, it should be remembered that these enhancements are essential additions to the core processes that form the essence of our profession. The objective of this paper is to outline the training needs relevant to our profession in the near future across various areas of interest.

Technology and automation: robotisation, automatons, and drones

The new challenges facing the profession can only be met by reducing the time spent on activities that add little value to the care process. HP must continue to evolve in parallel with emerging technologies. These technologies provide excellent support systems that can qualitatively and quantitatively optimise performance across various activities, leading to diverse and innovative approaches.

Hospital pharmacists need to be proactive in seeking technology to incorporate into pharmaceutical processes. Proper training is needed to identify technological innovation and leverage/optimise its potential. The SEFH, in collaboration with the TECNO group[1] and the Teaching Activities Evaluation Committee (CEAD), should promote the design, evaluation, and implementation of training activities. These initiatives ought to facilitate the acquisition of knowledge needed for the effective incorporation and proper use of new technologies. Specifically, training should be promoted in the following areas:

- Global and comprehensive knowledge of all pivotal strategic and support processes of the pharmacy service (PS), as well as those of the hospital that are related to pharmacotherapy, traceability, and information systems.
- Identification of key technologies to improve results in any process.
- Knowledge of quality standards in healthcare technology and quality assessment methodology, in order understand their applicability and safety.
- Training in basic process automation for technical personnel, which must go beyond learning specific processes. Appropriate handling of Automated Dispensing Systems (ADS), outpatient robots, robots for the preparation of hazardous and non-hazardous sterile preparations, and the effective use databases for recording activities.
- Training in prescription support software and integration with medical records.

To date, technology has mainly been integrated into technical–pharmaceutical support processes, such as the ADSs located in PSs and in hospitalisation units.[2,3] However, non-healthcare technology can also be applied in the field of health and medication processing. For example, during the COVID-19 pandemic, remote-controlled drones showed their value as useful tools for the aerial transportation of small devices, medications, and samples (ALE-HOP Project). This advance could be extended to the distribution of medications in specific hard-to-reach locations and situations.

Robots for processing and packaging medications and sterile preparations are available to several PSs to semi-automate activities and enhance safety. Secure traceability systems are in place for the entire drug process, from the identification of starting materials and preparation to administration to the patient. Automated systems, such as horizontal and vertical carousels and outpatient robots, are also available for preparation and storage logistics.

However, there is potential to further integrate technology into pharmaceutical care activities. Applications, websites, gadgets, and

even automatons could potentially use a range of parameters and alerts to identify patients who require specific, urgent, and individualised care. There is an increasing selection of devices, smart pumps, implantable sensors, apps, and websites to help patients and health professionals correctly monitor drug administration and adherence. In many cases, existing alert systems can enable customised parameterisation and provide records of variables that make it easier to monitor the effectiveness of treatments and implement timely modifications. These are excellent support systems, and training in the appropriate healthcare technology skills will enable hospital pharmacists to participate in their design and development.

However, without a true digital transformation, simply understanding healthcare technologies and integrating them to automate or semi-automate processes is less than sufficient. This transformation requires understanding new channels of communication with patients and fostering changes in organisation, culture, training, and attitudes. In this regard, SEFH has taken a strategic approach to training via its working groups on Digital Hospital Pharmacy (FHusiON) and Tutors, which have developed the Digital Competences for Internal Pharmacist Residents (CODIFIR).[4] These initiatives provide structured and standardised training aimed at fostering digital innovation and enhancing digital competences, which benefits our specialty as well as other health sciences.

With varying degrees of urgency, hospital PSs are integrating technology and digital health solutions, which requires comprehensive training programmes. In addition to the necessary basic competences, we must remain committed to more advanced cross-disciplinary training. This will empower our profession to further develop technological and digital skills. Multidisciplinary working is an area for improvement in the training process for pharmacists specialising in HP work, as is the importance of establishing good interprofessional relationships.

Such cross-disciplinary training in automation and digital technologies will complement clinical pharmacy and pharmaceutical technologies training, enabling pharmacists to address current challenges and scenarios within the Spanish Health System in a creative, contemporary, and efficient manner.

Artificial intelligence: Digital health and big data

AI is a technology that has been for years in the making in many sectors. Tools such as ChatGPT and Bard are easily accessible to the public and are having a significant social impact.

In healthcare, machine learning and deep learning have driven advances in personalised medicine. These technologies go beyond simple algorithms, revolutionising fields such as disease diagnosis, predictive analytics, surgical procedures, and drug development. In the field of HP, AI represents both an evolution and a challenge that we must adapt to. Safe, effective, and efficient medication management involves medication reconciliation, pharmacotherapeutic validation, patient information and education, and pharmacokinetic and adverse events monitoring.

AI studies show promise in several areas and applications that are key in our profession[5]: (1) the detection of adverse effects and predictive models as clinical decision tools; (2) clinical decision-support tools using real-time clinical data; (3) electronic prescription systems with aids and alerts, as well as self-validation systems; (4) personalised drug dosage adjustments, which change dynamically to patient response while maintaining efficacy and safety; (5) large databases of drug–drug interactions; (6) identification of patients with potentially inappropriate drug prescriptions based on comorbidities and polypharmacy; (7) drug adherence analysis technology; and (8) optimising drug management, stock control, and traceability.

AI systems are developed through a process involving data collection, efficient data analysis, drawing conclusions, and subsequent corrections and adjustments. These systems mimic human cognitive development to make very precise analyses and interpretations. However, we must remain aware that any new technology can be a source of new errors. Some risks must be highlighted: (1) privacy and security concerns involving sensitive data; (2) biases introduced by data used in AI training models; (3) irrelevant or inaccurate responses caused by training data overload; (4) training with wrong or inaccurate data; and (5) ethical aspects, such as liability in the case of serious errors.

A final challenge for AI is the lack of prospective clinical trials demonstrating its benefits with the same level of evidence that is typically required for other pharmacological or therapeutic innovations. Most of the evidence comes from retrospective trials. Hospital pharmacists must have the knowledge to assist in the evaluation and validation of AI tools, implement guidelines and recommendations for their use, and support multidisciplinary teams in assessing the ethical aspects involved. Our training in AI should not only be limited to the use of the tools themselves, but should extend to validating this technology to guarantee its effective and correct use.

Patient relationships and education demand that we are both aware of and use new technology and social networks. Knowledge of what tools patients use and the responses they provide will enable us to adapt our pharmaceutical care strategies and to guide the patient on where or how to use these resources.[6] Remote follow-up systems will also be needed. This involves developing the tools for initial screening, such as bots, followed by a more complex approach with AI and machine learning-trained tools to refer queries to pharmacists. This will be supported by the development of telemedicine and telepharmacy tools.

AI systems are becoming increasingly integrated into clinical practice and pharmacists must have in-depth knowledge of them. These transformative tools should be used as a means to add value to people's quality of life, and not just as an end in themselves.[7]

Financial systems and equity: Accessibility and stock-outs

Increasingly, more effective, safer, and targeted medications are being brought to market. We are in the era of personalised medicine. Gene therapy, vectors, and CAR-T will continue to become increasingly commonplace. Recently, a drug emerged that lowers cholesterol levels using mRNA technology: what sounded like science fiction 5 years ago is now a reality. However, these major advances have high economic costs that must be addressed if we are to maintain a sustainable health system and equity of access for all patients. Medications are constrained by principles of efficacy, safety, and equity, and are supported by innovative payment systems. These systems include financial agreements such as expenditure ceilings, price–volume arrangements, and flat rates, as well as outcome-based payments like pay-for-performance and conditional continuation.[8]

More complex therapies create more opportunities for hospital pharmacists, given their critical role. Consequently, the importance of specialisation and pharmaceutical care focused on these patients is increasing. The growing therapeutic complexity of these treatments requires experts for their administration, especially for the appropriate selection of patients and the correct use of innovative medications. Super-specialised training in very specific fields will be one of the cornerstones of our future profession. Personalised

medicine requires the efforts of experts in many fields, working together with a common goal: to achieve greater efficacy and lower toxicity in therapy.

Despite these unprecedented therapeutic achievements, stock-outs are a growing problem, even in medications that are considered essential. It is very concerning that patients cannot find basic drugs for common treatments, such as corticosteroids or certain antipsychotics. Close to a thousand drugs, almost 4.6% of the medications authorised in Spain, are to some extent out of stock.[9] Thus, the importance of hospital pharmacists and their pharmacotherapy expertise is unquestionable in this area. Their role in minimising the impact on patients involves making substitutions, sourcing medications from abroad, engaging in therapeutic interchange if primary options are unavailable, and even manufacturing medications when necessary.

Telemedicine and telepharmacy

The technological revolution we are experiencing is having a significant impact in our daily lives in terms of healthcare, while creating new opportunities, such as the development of telemedicine and telepharmacy. This situation has provided an ideal breeding ground for telepharmacy to become a healthcare reality in the setting of PSs, while at the same time posing a significant challenge to our profession against a background of the increasing number of chronic patients and the need for efficient healthcare systems to meet the extensive demands of patients and critical situations, such as the recent COVID-19 pandemic.

The digital transformation of HP is one of the "20 challenges of 2030" proposed by the SEFH. The aim is to implement digital technologies in hospital PSs to improve clinical practice and knowledge management, as well as to provide value to patients, the healthcare system, and society as a whole.

In recent years, hospital pharmacists have made significant progress in integrating telepharmacy into day-to-day care. Notable initiatives include the SEFH Positioning Document on Telepharmacy,[10] and the 2023 + SOStenible project's "Enciende la tele" initiative, which aims to promote the use of technological tools to facilitate remote pharmaceutical care and remote work.[11] The Telepharmacy Guide for Professionals and the Telepharmacy Guide for Patients are pioneering efforts to provide guidelines for developing and implementing telepharmacy programmes in a variety of areas, enhancing training, information, and pharmacotherapeutic monitoring of patients, and improving coordination with the healthcare team.[12,13]

As a result of these efforts, telepharmacy has become a pivotal strategy in 80% of the PSs that provide dual pharmaceutical care (face-to-face and digital activity).[13] Developing optimal technology with appropriate tools is essential for implementing telepharmacy effectively. These tools must address the needs of professionals and patients, both globally and specifically for each healthcare centre. This technological development requires specific training for hospital pharmacists, which should cover tools and solutions that ensure the confidentiality, safety, and traceability of the entire pharmaceutical care process. It should also promote research and innovation, while developing specific indicators to evaluate the clinical and technological effectiveness, health impact, and returns on investment of these tools.

Finally, we should bear in mind the importance of training in non-face-to-face communication and motivational interviewing via computer screens. Apart from technical skills, we should also be trained in these "soft" skills, which are also of great relevance in our daily work and in communicating with patients and other professionals.

Cybersecurity

Digital security is a core issue in our increasingly digital society. We must be able to ensure data protection, the right to confidentiality for all citizens (patients, professionals, etc), and the security of basic daily work circuits and processes. Everyone is aware of the existence of cybercriminals who, through various strategies, hijack, encrypt, and block information systems, steal data, demand ransoms for the recovery of systems, and prevent the publication of data. They may also maliciously alter computer algorithms to disrupt automated production processes. A study published in JAMA HealthForum in 2022, which analysed ransomware-type attacks in various American hospitals, reported a substantial increase in these attacks (more than doubling between 2016 and 2021) and an increase in their sophistication over time, often leading to service outages (approximately 44%), with consequent issues with the safety and effectiveness of patient care.[14]

Cyberattacks targeting PSs could have a significant impact due to the cross-disciplinary nature of our work and the extensive use of digital and robotic systems in our workplace. Such disruption can be almost absolute and, of course, last a long time. One such case was the 2023 cyberattack on the CLINIC Hospital in Barcelona, which affected the entire hospital and impacted emergency, laboratory, and PSs.[15]

Minimising this type of attack requires cybersecurity training for all staff (e.g., medical, technical, administrative, support, and general services).

This training will require basic and regular refresher courses on a number of issues:

- The secure handling of e-mail and use of secure passwords needed to reduce "brute force" attacks. One recommended practice is to use passwords incorporating the lyrics of a song or poem, or the initials of a proverb to help remember them. These courses should be mandatory for all staff with access to e-mail.
- Two-factor authentication for accessing programmes and/or processes, significantly increasing security.
- Contingency plans need to be in place to save, to a greater or lesser extent, the minimum data needed to maintain PS healthcare activities in the event of an attack. Designing robust contingency plans in collaboration with experts in IT, systems engineering, and other relevant fields should be a primary objective of our training as hospital pharmacists, tailored to the specific context and needs of each situation.

The SEFH Training Itinerary on Digital Competences[4] for Residents focuses on the digital skills and competences that future HP specialists should be trained. It stresses the importance of digital security in relation to various aspects and consequences, including: (1) security and data protection; (2) security measures to keep information protected; and (3) regulatory framework, security, and privacy. The best training strategy in all these aspects has yet to be determined.

The truth is that there is little we can do in the face of a massive cyber-attack: it is both external and unpredictable! However, training activities aimed at enhancing and expanding our digital skills are fundamental in protecting ourselves as effectively as possible from the consequences of such cyberattacks. We cannot afford to neglect this training in an increasingly automated and digitised world, with rapid and numerous advances in cyber technology. From all this emerges the concept of cyber-resilience, understood as the ability of a system or organisation to withstand and/or recover from attacks or digital incidents. It is essential that all professionals across the entire healthcare system develop and integrate cyber-resilience into their activities.

Sustainable development objectives

Today, we talk about BANI environments (brittle, anxious, nonlinear, and incomprehensible), which recently evolved out of the older VUCA concept (volatile, uncertain, complex, and ambiguous). Concerns over environmental sustainability and the gender perspective are other features shaping the present and future in all spheres of life, including health and healthcare. Environmental awareness is increasingly important and evidence on the environmental impact of pharmaceuticals is mounting. Many drugs are environmental toxins with effects on the ecosystem and on global health. They are currently considered as emerging pollutants, a term to describe substances that are not new to the environment, but have not previously been identified as pollutants, and there is growing concern about their effects.

A first step in resolving these issues is to address them in under- and post-graduate education and research. There is an urgent need to understand the environmental impact of healthcare activity in order to develop solutions and inform decision-making. Examples include measuring the carbon footprint generated by the entire medication supply chain and incorporating these criteria into the selection, evaluation, and prescription of treatments. Looking beyond the 17 sustainable development goals, sustainability must be approached from social, economic, and environmental perspectives. Training future professionals should integrate ethical concepts, a gender perspective, and cross-disciplinary competences in sustainability into their educational pathways.

Natural disasters, pandemics, and cooperation

Healthcare is a fundamental human right and at the same time, it is essential for economic, social, and cultural development. Public health and development cooperation play a key role that must be considered in the training of HP specialists. Recent years have shown us the impact of natural disasters (such as the eruption of a volcano on the island of La Palma), terrorist attacks, and global pandemics, all of which have forced us to change and adapt our work. Nevertheless, there are lessons to be learned, consolidated, and integrated into the training of the professionals of the future.

The contribution of pharmacists to the development of healthcare systems is crucial. It is therefore essential to participate in cooperation programmes aimed at consolidating valuable practices in the pharmaceutical field. These programmes must prioritise local development by training personnel at all stages of pharmacotherapy in order to ensure optimal medication use in all aspects and improve health outcomes for the population. However, staff involved in these programmes should also have the competences necessary for successful cooperation initiatives.

High-pressure society, disconnecting: Stress and burnout

The pressures of today's society are particularly evident in the HP environment, where the lives and health of patients depend on the diligence and dedication of professionals. Hospital pharmacists often face intense workloads that lead to overwhelming pressure.

We find ourselves tasked with keeping up to date with the constant advances in pharmacology, technology, and protocol compliance, while managing and delivering medications, dealing with critical situations, and providing quality care with no margin for error, even during health emergencies such as the COVID-19 pandemic. All of this contributes to stress and worker burnout being commonplace in HP services,[16] making the ability to disconnect or "unplug" a critical skill in this context.

Some strategies to reduce burnout include setting boundaries, delegating tasks, using technology to gain time, and encouraging self-reflection. Promoting work environments that support mental and occupational well-being is essential for cultivating high-performing teams (personal and professional). This, in turn, will directly impact internal functioning, patient outcomes, and the healthcare system as a whole. In this setting, it is essential to find time for self-care, emotional management, savouring a job well done, silence, internal reflection, and dialogue with others.

Quality training in these areas is both necessary and essential. Commitment to this is challenging, and there is a significant training gap in this area for everyone, particularly those responsible for managing human teams. Recently, we have seen the emergence of approaches such as group therapy, coaching and mentoring courses, self-esteem and self-help sessions, as well as workshops, all of which represent a good start in addressing this complex and challenging issue. In short, our high-pressure society can have a significant impact on the health of HP professionals. Thus, the ability to disconnect, practice self-management, and receive support are essential to maintain the quality of care and preserve the well-being of those working in this critical area of public health.

Advanced therapies

In recent years, the use of advanced therapy medicinal products (ATMPs) for the treatment of various diseases has grown significantly and their importance is expected to increase in the future. These new therapies and technologies include recombinant proteins, mRNA technology, and next-generation cell therapies. Regulation (EC)1394/2007 introduced the regulatory framework for these ATMPs in the EU. This regulation governs biological medicinal products that can be classified as gene therapy medicinal products, somatic cell therapy medicinal products, tissue engineered products, or any combination of these 3 categories.

One of the newly developed cell therapies that is having a significant impact is chimeric antigen receptor (CAR) T-cell therapy, or CAR-T cell therapy. CAR-T cells belong to the ATMP category "gene therapy medicinal products", as they involve genetically modified T cells as the active substance. In 2022, the European Association of Hospital Pharmacists published its official position on this topic:

- It recommended the rapid development of European educational and training materials in collaboration with scientific societies for healthcare professionals covering the entire ATMP spectrum.
- It called on pharmacy schools and professional bodies offering continuing education to integrate ATMP training into their curricula and training programmes.
- It recognised the importance of further promoting information sharing and communication on ATMPs among patients and patient organisations.

These innovative therapies are specifically tailored to each patient and involve a concept that differs from conventional therapy. The incorporation of these innovative therapies, which involve management practices that are both complex and distinct from conventional therapies, necessitates consideration of the sustainability of the system. In turn, this requires collaboration among all the

stakeholders involved: administration, industry, and healthcare professionals from various fields of practice. The SEFH created the Advanced Therapies Working Group to encourage and promote the scientific, technical, academic, functional, and teaching activities of hospital pharmacists in the field of ATMPs. This group also aims to analyse the current situation in Spanish PSs regarding the use of advanced therapies and identify potential areas for improvement.

Key actions include the following: (1) promoting training in advanced therapies for hospital pharmacists; (2) fostering collaborative networks with SEFH working groups,[17] hospitals, and other scientific societies; (3) disseminating relevant information on advanced therapies; (4) enhancing specialisation in advanced therapies among healthcare professionals, such as hospital pharmacists, oncologists, and neurologists; (5) improving the quality of information available to pharmacists in advanced therapies; (6) designing a comprehensive training plan for CAR-T and other gene and tissue therapies; (7) developing diverse projects in advanced therapies; (8) forging strategic alliances with research groups from various scientific societies; and (9) generating interdisciplinary research contributions in advanced therapies.[18] Hospital pharmacists will need an outstanding scientific training programme to add value to the pharmacotherapeutic process and improve health outcomes.

Conclusion

The profound and inexorable changes taking place in our society are having a significant impact on the current and future development of our profession. We need to align our knowledge with the digital and social transformations we are experiencing, ensuring continuous and high-quality training. We should approach these changes with enthusiasm and motivation, enabling us to leverage them to enhance our professional competence. For this reason, we wanted to highlight the points we believe should be our focus: encouraging necessary changes in the national Pharmacy Residence Programme to incorporate new skills; and implementing short- and medium-term training activities and programmes. Naturally, this should always complement the basic and specialised training in the core areas that form the foundation of our profession as hospital pharmacists.

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Ana María Cordero-Cruz: Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Investigation, Formal analysis, Data curation. **Edurne Fernández de Gamarra-Martínez:** Validation, Methodology, Investigation. **Manuela Florencio:** Investigation. **Eva González-Haba:** Methodology, Investigation. **José Antonio Marcos:** Investigation. **Teresa Molina García:** Investigation. **Andrés Navarro Ruiz:** Investigation. **Jan Thomas de Pourcq:** Investigation. **Javier Sáez de la Fuente:** Investigation. **Dolors Soy:** Writing – original draft, Validation, Supervision, Investigation.

Declaration of competing interest

None declared.

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