

Evolving Roles in Modern Pharmacy: Functions and Duties of Pharmacists and Pharmacy Support Staff

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Abstract

Contemporary pharmacy practice now includes many new tasks, including caring for patients, promoting public health, deciding on medication and working with other health workers. Health professionals rely on pharmacists for their involvement in monitoring drugs, treating chronic illnesses, giving immunizations and watching for side effects. At the same time, pharmacy technicians are now essential members, helping maintain an efficient pharmacy, keep inventory well-managed and prepare medicines correctly. This broadening area of work fits with changes in healthcare that center on making services accessible, safe and focused on results. Also, with electronic prescribing and telepharmacy becoming more common, the way pharmacy professionals function has been transformed. Moving ahead, both pharmacists and pharmacy technicians work to meet new expectations and talents thanks to continual changes in education and laws. In this work, we examine how these experts' roles have shifted in the modern pharmacy environment and highlight the benefits of flexible models, ongoing professional growth and collaborative ways for reaching the best results for patients.

Keywords: *Pharmacy practice, Pharmacist roles, Pharmacy technicians, Patient-centered care, Clinical pharmacy, Healthcare team, Medication management, Digital health, Interprofessional collaboration, Professional responsibilities.*

1.Introduction

Pharmacists now work where tradition meets new advances because medical science, healthcare systems and the expectations of patients are changing so fast. The profession started by primarily distributing and mixing medicines, but now is committed to a wide approach that centers on a patient's needs, focuses on medications, disease prevention and teamwork with other health experts. Because of this transformation, more attention is put on prevention and early management of disease, with pharmacists being considered important players on healthcare teams.

In essence, modern pharmacy is concerned with ensuring that medicines are handled safely, work correctly and are used appropriately for managing disease. God has equipped pharmacists so that they can optimize the use of medications. Then pharmacists can study complicated treatment schedules, predict and handle any medicine interactions or side effects and offer treatments adjusted to what each patient requires depending on their age, health conditions, genes and habits(1).

Pharmacists now play a larger role than they have in the past because of changing expectations. They don't just give the medicine; they also offer advice, help and information to patients and caregivers dealing with many different drugs. They help people understand their health by giving customized advice that handles language, culture and financial problems which leads to better compliance and better health. Because of this increased duty, pharmacists should have diverse skills such as a knowledge of treatments, strong communication abilities, cultural understanding and capabilities in using the latest technology.

As part of this shift, more notice is given to how important pharmacy technicians are for pharmacies. Taking on many responsibilities such as filling prescriptions and managing the stock means technicians help pharmacists dedicate more energy to patient care. Developing pharmacy technicians and awarding them credentials are now vital in helping pharmacies handle a growing range of services and use medication properly.

The growth of serious illnesses and fresh developments in biotechnology has boosted pharmacists' tasks in supporting patients. Chronic diseases typically mean patients must take many drugs, so it is important for healthcare groups to manage these treatments closely. In these populations, pharmacists guide monitoring, teach and help manage treatments, connecting patients with their prescribers.

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As well as taking care of patients, pharmacists are important to the running of health systems and public health. They play a role in creating drug lists, setting guidelines for using drugs and improving the way medication use affects a large group of patients(2). In addition to providing care to one patient at a time, pharmacists take part in healthcare research, develop policies and help enforce rules, thus contributing in many ways.

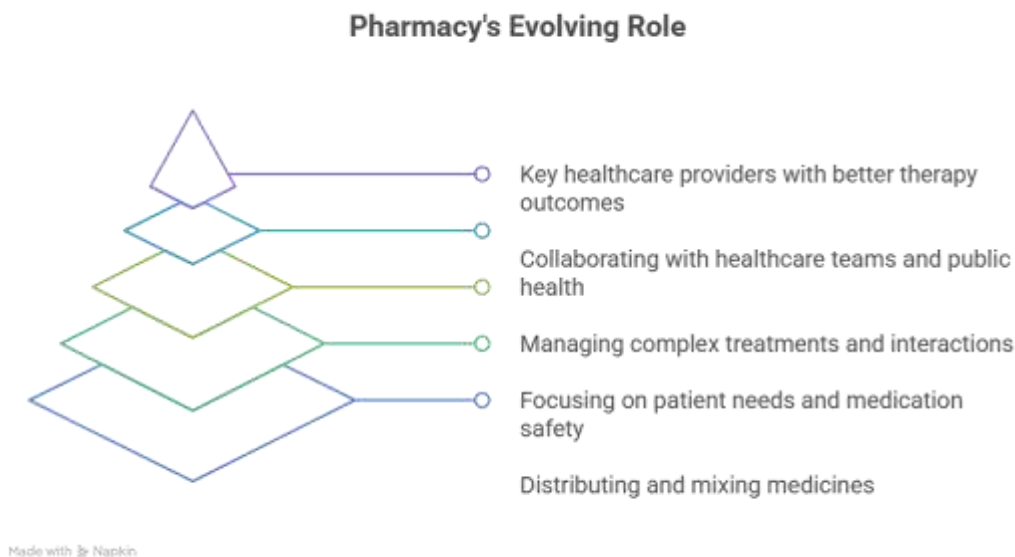


FIGURE 1 Pharmacy's Evolving Role

With new reforms and system of credentials, pharmacists now have the chance to meet higher demands. With the Doctor of Pharmacy (PharmD) as the standard degree, there is now consistency in how clinical, patient care and group collaboration are taught in the curriculum. Through different specialty residencies and relevant certifications, pharmacists can fine-tune their skills in oncology, geriatrics, infectious diseases or medication care outside a hospital.

The vision for the profession considers pharmacists to be key healthcare providers whose work results in better medication therapy. At both national and international levels, pharmacy organizations seek to ensure pharmacists are fully incorporated into healthcare teams, valued for their skills and paid properly for everything they do. As a result of this integration, patients fare better while challenges in healthcare such as lowering medication-related hospital stays and controlling chronic diseases, are being solved.

However, the practice of pharmacy must deal with differences in regulations, restricted reimbursements, not enough experts available for some fields and the challenge of upgrading knowledge as science grows and changes. It takes constant learning, raising awareness and research to show policymakers and the public why pharmacy services are important(3).

It introduces the main themes that the following chapters will cover: the present scope of pharmacy practice, what pharmacists and pharmacy technicians do, the foundations for their education and certification and the trends guiding future progress in the field. Understanding what pharmacy professionals do is important for healthcare administrators, educators, regulators, healthcare workers and patients.

2.Expanding Roles and Responsibilities of Pharmacists and Pharmacy Technicians in Patient Care

Today's pharmacists have to handle a complex healthcare environment that keeps the skills they need changing. Before, pharmacists were mainly occupied with distributing and blending medications, but now their work includes seeing patients, helping with medication therapy, promoting community health and joining in on healthcare team efforts. The expansion of duties for pharmacists is due to a belief that their pharmacotherapy knowledge helps ensure patient safety, good use of medicines and correct spending.

The primary focus in pharmacy practice is ensuring all medication management services are delivered. Pharmacists look at medication orders, test the appropriateness of what is prescribed and see how patients respond to therapy for better results. This means checking for interactions, checking contraindications, watching out for side effects and acting to prevent errors or subpar treatment when needed. Acting as experts in medication, pharmacists team up with doctors, nurses and other professionals to see that patients get the most effective and safe drug treatments.

Community pharmacies are an important place for pharmacists to provide treatment to patients. Here, pharmacists take care of prescriptions for both serious and long-term health problems, guide patients on how to use medications and give preventive care by offering immunizations and screening tests. Pharmacists are convenient to see because patients visit them several times every year(4). By interacting so often, pharmacists can build faith in their patients, watch for early signs of illness and suggest or arrange proper care.

In hospitals and long-term care facilities, pharmacists begin to join clinical rounds with the team, help staff determine which drugs to keep and guarantee safe handling of all medicines. They use the results from testing and lab work to set the correct medication doses for critically ill patients, the elderly and children. Hospital pharmacists support the medical team by teaching about drug use and latest drug policies.

In many places now, pharmacists are able to modify, initiate or discontinue medications according to regulations when taking part in collaborative drug therapy management (CDTM). It has been demonstrated that using the model lets patients have better control of chronic diseases, increases how compliant they are with their meds and lessens the workload on primary care providers. With the help of CDTM, pharmacists offer ongoing care, making sure patients with diabetes, hypertension, asthma and heart problems receive the best, optimized medications.

By handling many duties, pharmacy technicians make it possible for pharmacists to concentrate on practicing pharmacy. They should accurately handle prescriptions, carefully make up medications, take care of storing them and monitor the necessary paperwork for keeping the business in compliance. Today, technicians in many places can help with tasks such as confirming a patient's medicines, recording data for clinical systems and aiding in billing and insurance claims as a result of changes in pharmacy practice.

For safety and quality, pharmacy technicians must finish education and certification programs that bring their skills and knowledge up to the same standard. Having certified pharmacy technicians on board helps improve work procedures, decreases medicine dispensing mistakes and allows pharmacists to spend more time with patients. Having pharmacy technicians on the healthcare team helps ensure good management of medicines and better patient results(5).

Within healthcare, both pharmacists and pharmacy technicians should improve their skills besides the technical ones they already have. Care that values diversity and provides equal opportunities for everyone in healthcare depends greatly on strong interpersonal skills, a focus on cultural differences and ethical judgment. Pharmacists must teach patients from different cultures, overcome health literacy barriers and help patients join actively in managing their medicines.

Progress in technology has greatly changed the way pharmacy works. They rely on electronic health records, CPOE, automated systems for dispensing and telepharmacy services to improve the accuracy, speed and convenience of what they offer. With these resources, pharmacists review medicines thoroughly, back up decisions made by doctors and extend health support to people in remote areas.

Pharmacists participate in strengthening population health by helping to design and apply policies that aid with safe use of drugs, sound medical treatment and disease prevention. As part of their duties, they join committees choosing drugs, monitor the use of antibiotics and lead public drives for quitting smoking and getting vaccinated. Seeing things this way, pharmacists are expected to serve as advocates for their patients and watch over public well-being.

In order to remain current, pharmacists look for updated education, special certifications and training opportunities. Those who have earned specialty credentials in oncology, geriatrics, infectious diseases and pharmacotherapy are better equipped to handle the needs of those patients. Residencies after pharmacy school help pharmacists gain advanced clinical skills so they are ready for specific or top positions in healthcare(6).

All in all, pharmacists and pharmacy technicians now take on many more jobs than only dispensing medications. This growth demonstrates how the profession is working to make medication use safer, improve results for patients and be part of the interdisciplinary team in healthcare. Thanks to ongoing development in education, professional

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qualifications and technology use, pharmacy professionals are ready to face the healthcare challenges of both present and future times.

3. Medication Therapy Management: Enhancing Clinical Outcomes through Pharmacist-Led Interventions

Today, Medication Therapy Management (MTM) is a major part of pharmacy practice, helping patients achieve better results from their medicines. Using this strategy, the changing needs of patients with several chronic conditions, multiple diseases or particular medicine regimens are managed effectively. MTM services are a sign of the pharmacist's knowledge and importance in securing safe, sensible and affordable drug use.

MTM describes a unique range of services pharmacists can provide to patients, both individually and partnering with other doctors and nurses. All the medications a patient takes, including those bought over the counter and those from drugstores, are reviewed systematically to ensure all problems are addressed. Some of these problems are inappropriate use of medicines, incorrect dosing, danger from side effects, risk of adverse interactions and obstacles to consistency in taking medicine. MTM works to solve these issues so the quality of medication use and patient health outcomes are both improved(7).

MTM pharmacists usually use a patient-centric model to learn about each patient's health goals, medications and personal circumstances. This way of working helps patients obtain correct information, gives them feedback and tips and motivates them to participate in managing their own treatment. Pharmacists recommend plans for patients that address their particular needs by adjusting their medicines depending on changes in health or blood test outcomes.

Widespread acceptance of MTM is being promoted by policy updates, including Medicare Part D now including MTM as a service that it covers. Payers have shown that medication management by pharmacists plays a key role in both reducing the risk of expensive problems and controlling chronic illnesses. Chronic patients on complex medication regimens are often the main focus of MTM, as they are prone to problems resulting from their medical treatments.

MTM services use several approaches, for example, consultations in person, over the phone and now more commonly, on digital tools. They open up more possibilities for patients in rural or poorly reached places to get healthcare. With telepharmacy and digital health applications, pharmacists can keep an eye on how people take their drugs, offer information and help as soon as problems are noticed, taking pharmacy help to a larger audience.

Typically, comprehensive MTM handles the following: MTR, PMR, MAP, intervention and/or referral and follows up with documentation. A pharmacist uses the MTR to examine if a drug is suitable, effective, safe and if patients are likely to use it properly. The PMR straightforwardly details everything the patient is taking. MAPs explain what the patient should do such as making lifestyle adjustments or remembering to follow the treatment plan, for best results. Pharmacists keep in touch with doctors or other healthcare team members to help coordinate care when it is needed. It is important to record progress and use that information to update your child's therapy as it changes.

Many studies have exposed the medical and cost advantages of MTM services(8). Those following MTM treatment have improved their blood pressure, blood sugar and lipid levels, along with a drop in visits to hospital and the emergency room. People are said to be more compliant with their medicine and more satisfied with care when MTM is applied. It has been shown by experts that the cost benefits and safety gains of disease control and adverse event reduction in MTM usually offset the cost of the service itself.

Clinical pharmacists should know about different drugs, how to communicate with patients and also practice on current evidence. All health professionals involved in MTM are encouraged by programs and accreditation to improve their abilities in these competencies to upkeep quality and success. Extra certifications in medication therapy management or equivalent fields are earned by many pharmacists to help them give better care.

MTM also has an important part in assisting public health actions. By joining in on MTM, pharmacists aid in chronic disease prevention, manage them where needed, advocate for vaccinations, help patients quit smoking and promote medication safety. MTM works to reduce health risks from medicines which helps overall healthcare achieve its aim to lower disease and death rates and reduce inequality in health care.

There are still obstacles when it comes to making MTM part of standard healthcare practice. Barriers are things like different ways of getting reimbursed, limited access for patients and problems with sharing information and

communicating between different professionals. To handle these challenges, we need to keep advocating for pharmacists, build new technology and develop healthcare models that make sure pharmacists play a key role.

All in all, Medication Therapy Management has changed pharmacy practice from focusing on products to focusing on people. MTM achieves better results, assures patients are safe and lowers healthcare costs by providing thorough medication reviews, personal education and cooperative care. While healthcare expands and improves, MTM counts on pharmacist knowledge to enhance both the quality and the way medications are used by those different groups of patients.

4. Pharmacy Education and Credentialing: Building Competence for Advanced Practice

Now that pharmacy is a people-centered, clinical field, it is necessary for educators to train pharmacists properly and for credential bodies to check their qualifications. Learning and certification in pharmacy are necessary for both pharmacists and pharmacy technicians to offer quality medical services, cooperate with various healthcare professionals and undertake various important roles.

Until recently, pharmacy programs mainly focused on scientific aspects of making and providing drugs. At the same time, due to the growing duty and complexity of treating patients, educational programs have been revised considerably. In most countries now, the Doctor of Pharmacy (PharmD) program has replaced previous Bachelor-level degrees as the basic qualification for pharmacists. The PharmD program mixes education in biomedical sciences, pharmacology, therapeutics and clinical skills with practice in patient communication to help students become ready for direct patient care(9).

The Accreditation Council for Pharmacy Education (ACPE) and many other groups like the American Association of Colleges of Pharmacy (AACP) continue to make and update necessary educational standards and outcomes to meet the needs of changing practice. They underline three main areas of expertise: patient care, handling systems and public health. They are taught to oversee treatment with medications while also knowing about healthcare administrations, how to use money wisely and how to assist health in their community.

It is now essential for pharmacists to learn together as a team since it helps improve patient care. During their studies, PharmD students join forces with medical, nursing and allied healthcare students to perfect their teamwork, communication skills and develop a similar vision of everyone's tasks in healthcare. The experience helps future pharmacists work well with others in healthcare and support the best use of medicines.

Advanced training is important for getting expertise in one field after learning the general knowledge in entry-level programs. Such programs are usually structured into one year of clinical work (PGY1) and give trainees the chance to practice in managing medicine use and caring for patients facing different diseases and conditions. Such programs encourage students to strengthen their clinical judgment, improve patient evaluation skills and cooperate with other health professionals.

Pharmacists after completing PGY1 can enter PGY2 residencies or fellowship programs to specialize in oncology, infectious diseases, geriatrics, pediatrics, pharmacotherapy or ambulatory care. With advanced learning, pharmacists are skilled to care for patients with many health issues and operate in research, teaching and leadership positions in healthcare.

Certification and credentialing systems demonstrate the competence of pharmacists and reward them for practicing at an advanced level. BPS, a recognized organization, issues certifications for pharmacotherapy, oncology, nuclear pharmacy, nutrition support, psychiatric pharmacy and additional areas. You have to pass a difficult exam and always keep your skills up to date to maintain your board certification.

Having a certification benefits patients and pharmacists by guaranteeing similar knowledge and capacity for good care. It helps you get recognized in your field, move upward in your career and usually results in better outcomes for patients. Employers and those who pay for healthcare are now acknowledging that certified specialists are helpful members of any health team, especially in settings where patients often need many medicines(10).

Advances in education and certification have been seen by pharmacy technicians as well. From structured programs, you learn how to distribute drugs, know legal rules and understand proper ethics and certification exams show that you can apply that knowledge safely as a pharmacist. Such programs ensure that everyone in the field meets the

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same standards and support technicians in growing their careers by undergoing special training to assist pharmacists with expanded work.

You should always be learning to ensure you can keep up with developments in pharmaceuticals, therapeutics, technology and healthcare delivery. Continuing education for pharmacists and technicians may come from attending formal courses, taking part in professional conferences, using online information or being part of research or improvement tasks. Many regulations dictate that a person renew their license only after proving they have taken part in CPD activities.

Bringing emerging technologies and informatics into pharmacy education is now extremely important. Students and professionals are prepared to handle electronic medical records, decision-making systems, telemedicine options and analyze data in order to boost medication safety and make better therapy choices. A good understanding in these topics helps pharmacists succeed when using advanced technologies and support new approaches in healthcare.

In addition, being ethical, aware of cultural differences and focusing on patient advocacy is made important throughout a pharmacist's training and licensing. Pharmacists are knowledgeable about often-encountered patient groups, lack of health literacy among some and factors outside the doctor's office that can change how medicines are used and result can change. By taking this whole approach, pharmacists treat patients equally, kindly and help them trust their decisions.

To conclude, pharmacy education and credentialing form the solid base required as the profession undergoes fast change. When pharmacists and pharmacy technicians learn strong skills in clinical care, management, public health and ethics, they become capable of meeting today's healthcare needs. Having trained extensively, gained expertise and continued to learn, pharmacy professionals are ready to handle advanced medication therapy and work as leaders with other health experts.

5. Specialized Pharmacy Practice: Expanding Expertise to Meet Complex Patient Needs

While healthcare continues to grow in complexity, the pharmacy profession has grown by including many specialized roles that deal with special groups of patients and the issues they face. Pharmacists who focus on specific areas of medicine can give patients better and safer medication care.

A pharmacist may specialize by working with a particular disease, group of patients or work environment. After they graduate, many of these pharmacists pursue extra advanced training and pass exams to receive board certification from acknowledged authorities.

Often, oncology pharmacy is a main area for specialists and these pharmacists handle medications for cancer treatment, as many cancer patients take complex combinations of chemotherapy, immunotherapy and supportive care agents. Oncology pharmacists have to handle risks of drug-drug interactions, protect against toxicity and adapt dosing plans according to each patient to manage both drug benefits and risks(11). Thanks to their expertise, the cancer care team can deliver medicine made just for each patient's specific type of cancer.

Geriatric pharmacy plays a key role by focusing on enhancing the way drugs are used in elderly adults who tend to have several chronic conditions, use many medicines and have physiology that changes with aging. Geriatric pharmacists make sure patients get the correct medication, manage dosages and create plans to improve their willingness to take medicine, all while preventing any negative events caused by multiple medicines. What they do greatly helps seniors live better and prevents many admissions to hospitals.

Pediatric pharmacy concerns itself with medications and their effects on infants, children and adolescents. When treating children, a pediatric pharmacist has to consider how their development changes drug absorption, metabolism and elimination, as well as the need for the proper dosage form. They help keep mistakes from happening when giving medicine, because these mistakes tend to occur more often in children due to dosing by weight and prescription of drugs in new ways.

Antimicrobial stewardship programs rely on infectious disease pharmacists to choose the right antibiotics, decide on the proper dose and select the right duration to address resistance and boost patient success. It is important for physicians to contribute in hospitals and out in the community to stop the overuse of microbials and make sure people stay healthy.

The main role of a psychiatric pharmacist is to direct the use of psychotropic drugs for people with mental health problems. They help by creating the best treatment plans for depression, bipolar disorder, schizophrenia and anxiety,

watching for side effects, possible drug interactions and making sure people stick to their medications. Typically, they cooperate with psychiatrists and mental health teams to look after their patients' needs.

More specialized fields are nuclear pharmacy, where radioactive drugs are prepared for imaging and treating disease, nutrition support pharmacy which deals with patients' nutritional needs and ambulatory care pharmacy which helps manage chronic diseases in outpatient areas.

The involvement of specialized pharmacists on healthcare teams has produced several advantages, for example, better results for patients, low rates of medication mistakes, satisfied patients and lower healthcare bills. Such pharmacists give advice, set up guidelines and contribute to research that improves the field of pharmacotherapy.

Pharmacists in different areas of practice can now adapt medicine recommended to patients thanks to precision medicine and the use of genetic and biomarker clues. Today, more and more pharmacists specialize in using genetic test reports to best treat oncology, cardiology and mental health disorders.

Specialized pharmacy practice is being changed by advances in technology. With advanced informatics tools, staff can constantly monitor patients for changes and side effects and telepharmacy gives more people in remote areas access to special care. The future may include using artificial intelligence and machine learning to improve the design of clinical decision support and better personalize drug management.

Although there have been major improvements, the field of specialized pharmacy practice continues to deal with shortages in different pharmacy specialties, unpredictable credentialing and stable funding for services. Reducing these barriers will depend on persistent support, more education and training and having specialized pharmacists take part in healthcare.

All in all, practicing in a specialized area is key to how pharmacists support more complex patients. After advanced training, being certified and joining forces with other healthcare workers, specialized pharmacists help ensure healthy and safe medicine use. With the development of healthcare, more people will depend on specialized pharmacists for personal, helpful and proven care.

6. Conclusion and Future work

Medical science, new approaches to healthcare and the rising complexity of handling medication are bringing major changes to the profession of pharmacy. From originally dispensing medications, pharmacy practice covers many areas and helps make sure drugs are used well, that patients improve and public health is improved. Because of this, it is clear that the role of a pharmacist includes being an expert on medications, offering clinical care and being an important part of many healthcare teams.

Nowadays, pharmacists are involved in many activities, for example, helping patients, offering medication therapy management, preventing illnesses, encouraging health and handling health systems. They handle thorough medication reviews, give patients information, work closely with doctors and are involved in making decisions about patients' care. The work of pharmacy technicians adds to this by taking care of operational duties, ensuring everything runs smoothly and helping make sure medication is prepared and dispensed correctly. Thanks to their efforts, the use of medications in healthcare is made safer, safer and more useful.

The field has grown thanks to its focus on tough education, qualifications and continued development for professionals. The Doctor of Pharmacy is now the common requirement, along with residencies and certifications which helps pharmacists manage the complexities of modern drugs. Likewise, pharmacy technicians gain from taking part in training and certification that standardizes their skills and improves their work. Through continuing education, pharmacists and technicians stay informed about the latest science, rules and technologies.

Specialized fields in pharmacy have grown to answer the need for experienced care in handling both difficult health conditions and various patients. Personalized care, safer medication and better clinical results are achieved through the efforts of pharmacists practicing in oncology, geriatrics, pediatrics, infectious diseases, psychiatry and many other areas. Using advanced technology from both pharmacogenomics and digital health helps specialized pharmacists deliver more accurate and innovative therapies.

The practice demonstrates the move toward patient-focused pharmacy work by assessing, educating and involving individuals in their healthcare. MTM initiatives have helped reduce errors with prescriptions, lessen hospital stays

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and cut back on health costs. These designs make the most of pharmacists' skills to help patients manage their medications well and use them effectively.

In spite of these improvements, the profession keeps facing new problems. Discrepancies in regulations, restricted payments, a lack of qualified staff and a need to recognize what pharmacists can do in healthcare all create problems for fulfilling the potential of pharmacies. Handling these issues means that professional organizations, teachers, policy leaders and institutions in healthcare come together to promote strong laws, financial resources and new roles for allied health professionals.

Given this, pharmacy practice will soon play a larger role in collaborative healthcare teams, use technology and data to increase quality care and help patients become more involved in their health. Telepharmacy and digital tools will increase how far pharmacists can help people and make it easier to manage chronic illnesses. With the advancement of precision medicine, it will be important for pharmacists to handle and guide the use of information from genetic and biomarker studies.

In short, the progress of pharmacy practice means healthcare depends heavily on pharmacists, who play a key role in keeping patients and the public healthy. Because of their education, official recognition and specialization, pharmacy professionals are ready to manage today's complex medicines and patient needs. With healthcare systems everywhere focused on results, safety and efficiency, including pharmacists and pharmacy technicians in more roles will be key to success. Because pharmacists dedicate themselves to innovation, join efforts and put patients first, they will keep playing an important part in healthcare heading into the future.

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Conflicts of interest

The authors have no conflicts of interest to declare

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