

# From Diagnosis to Medication Management: The Role of Laboratory Professionals, Nurses, and Pharmacists in Patient Care

**Nahhal Naja Ali Hijazi<sup>1</sup>, Abdullah Ali Alghamdi<sup>2</sup>, Fatimah Mohammed Abdullah Alqarni<sup>3</sup>, Zaid Nasser Al Fuhaid<sup>4</sup>, Maha Fayeana Misbbal Alanazi<sup>5</sup>, Norah Nafel Alwabsi<sup>6</sup>, Khaled Abdullah Odhaib Albata<sup>7</sup>, Abdulkareem Nahabah M Aldhafeeri<sup>8</sup>, Hanan Mohammad Basher Alatawi<sup>9</sup>, Abdullah Saad Alzahrani<sup>10</sup>**

*1 Laboratory specialist- Hera'a General Hospital*

*2 Lab specialist - King Fahad Specialist Hospital In Tabuk*

*3 Laboratory -Aziziyah Health Center 2- Riyadh*

*4 Lab technician - Alassyah General Hospital*

*5 Medical laboratory technician - Blood Bank - King Fahad Medical City*

*6 Laboratory technician- King Fahad Specialist Hospital in Tabuk*

*7 laboratory technician - Medical supplies*

*8 Nursing technician- Hafar Al-Batin Central Hospital - Hafar Al-Batin*

*9 Technician-Pharmacy- Assistant Department for Performance and Compliance*

*10 Nursing - ministry of health- Aziziah 2 primary health care center*

## Introduction:

In the continuum of patient care, laboratory professionals, nurses, and pharmacists each play vital roles that collectively enhance diagnosis and medication management. Laboratory professionals are essential for conducting diagnostic tests that inform treatment decisions, ensuring accurate and timely results that directly impact patient outcomes [1] [5]. Nurses provide critical support by monitoring patient conditions and administering medications, while also educating patients about their treatment plans, which is crucial for successful health outcomes [2]. Pharmacists contribute significantly by managing medications, offering counseling, and monitoring for potential drug interactions, thereby optimizing therapy [3]. The synergy among these professionals through interprofessional collaboration fosters improved communication and patient safety, ultimately leading to better health outcomes [4]. This integrated approach underscores the importance of teamwork in addressing the multifaceted needs of patients, ensuring that care is both comprehensive and effective.

To reduce service disintegration, increase efficiency, ensure sustainability, and improve medical outcomes, health systems around the world are undergoing major organizational and legislative changes [1]. In order to maximize the use of limited health resources, synchronize services, and improve treatment continuity, it is recommended that all levels of healthcare be merged (for instance, by combining an integrated service program with a systematic approach) [2].

Over the past 20 years, integration of systems has been extensively studied, and numerous types of integration, including vertical, horizontal, wellness, and operational integration, have been identified. The assessment, implementation, and evidence creation of integrated systems have been complicated by their complex nature. It is concerning that, with a few notable exceptions, authorities and stakeholders appear to be ignoring the part that community pharmacies play in these processes as medical services and networks become increasingly integrated globally [3].

The frequency of incidents is regarded as a serious concern for the protection of patients and the standard of care given on a global scale. According to World Health Organization projections, 10%

of patients in affluent nations get injuries while in the hospital [6].

WHO's proposed International Rating System for Patient Safety (ICPS) offers a clear description of patient safety. According to the ICPS, patient safety means lowering the risk of harm or damage associated with obtaining medical care to a reasonable level. Risk is the potential for an event to occur, whereas error is a mistake, an inadvertent action, or the incorrect execution of a plan. The ICPS defines adverse events as any harm or damage that arises from a patient's encounter with the healthcare team.[7].

Improved surgical safety, safe drug administration, efficient communication, and accurate patient identification to lower the risk of sickness and patient falls were among the six worldwide patient safety goals that went into force in 2016. The IOM organized the Health Sciences Education Workshop in 2002 to explore how to integrate these skills into the education of healthcare professionals. The goals were to ensure patient safety, enhance the quality of healthcare, and fix delivery issues. All prospective medical professionals must possess these five essential skills in order to deliver high-quality treatment. These abilities include delivering patient-centered care, utilizing evidence-based medicine, implementing quality improvement strategies, utilizing the appropriate information technology, and cooperating effectively in an interdisciplinary team. Today's health professionals—radiologists, medical lab technicians, pharmacists, nurses, and others—are not sufficiently prepared during their clinical training to acquire the core skills and knowledge required to deliver high-quality treatment [8].

To strengthen hospital safety culture, monitor and integrate observations and efforts, foster knowledge, support improvement projects, and protect resources, a patient safety committee is required. For the medical community and hospital managers to successfully create a "societal suitability," the committee is essential in creating cultural transformation plans. These two groups' different work cultures frequently make it difficult for them to collaborate effectively within the company. Avoiding misunderstandings on the duties and commitments of physicians in enhancing patient safety is essential. Prominent doctors, nurses, and administrators (including senior medical, nursing, and corporate officers), a safety manager, infection control personnel, and people who are well-known and well-liked by their peers should all be on a successful patient safety committee.

It takes strong the management of hospitals and a shared vision to change a culture, not just a few rules and behaviors. Thus, it is crucial to provide management assistance in order to guarantee patient safety [9].

Because many healthcare professionals work individually and struggle with poor coordination and communication, the traditional healthcare system frequently shows signs of fragmentation. Inefficiencies, service duplication, and subpar patient outcomes could arise from this. In order to address these issues, integrated care models bring together a variety of medical professionals to collaborate on patient care. As a potential solution to improve the caliber and effectiveness of healthcare, integrated care models involving physicians, nurses, pharmacists, and labs have attracted a lot of attention in recent years. By combining the expertise of numerous healthcare experts, these models aim to offer a thorough and coordinated approach to patient care. With an emphasis on the involvement of pharmacists, nurses, and the laboratory, this study aims to investigate how integrated care models affect the effectiveness and quality of healthcare [10].

Because they guarantee the safe and effective use of medications, assess patient progress, and offer medication management services, pharmacists play a critical role in comprehensive healthcare models. Since they frequently operate as their main point of communication for patients and play a critical role in planning therapy and providing patient education, nurses are essential in these models. In order to provide effective patient care, laboratories are essential for providing diagnostic and monitoring services. In patient care, especially when it comes to diagnosis and drug management, the collaboration of laboratory specialists, nurses, and psychiatrists is essential. Through cooperative practices, the distinct knowledge of each professional improves patient outcomes. According to the parts that follow, this collaboration is necessary for efficient healthcare delivery [11].

### **The importance of patient safety as a fundamental aspect of quality.**

Three types of quality issues have been identified by the IOM's previous research: misuse (preventable complications that prevent patients from fully benefitting from a service), excessive utilization (prospective compromise from a service exceeds potential benefit), and underuse (failure for offering a support that ought to have achieved an advantageous result for the patient). Within the given framework, abuse incidents are often addressed in relation to safety concerns. The current understanding of medicine frequently addresses issues related to both overuse and inadequate use [12].

The activities of the external environment can be roughly categorized into two groups: (1) incentives such as money or impediments; and (2) legislative and regulatory acts. Regulation and legislation encompass all types of governmental laws or legal proceedings, including licensing and the liability system. Among the various factors that contribute to financial and other incentives are the shared actions of purchasers and consumers, the moral principles and values of healthcare professionals, and the cultural norms of the local and national communities [13].

There are two different ways that legislation and regulation might affect the caliber of healthcare organizations. First off, it may make it possible for the CEO and governance of healthcare organizations to carry out internal quality improvement initiatives. An internal reaction is required to a call to action prompted by the external environment. Giving a poor response often has predetermined repercussions. In addition, it requires all healthcare facilities to devote a certain percentage of their resources to quality systems, guaranteeing an environment that is just and equal throughout the industry. It's also critical to recognize that rules and laws may sometimes act as a deterrent to upholding high standards, such as when they impose lax or inconsistent requirements [14].

Prescription errors continue to be a major concern, thus the importance of pharmacists will keep changing with a renewed focus on patient safety initiatives. This will increase the likelihood that pharmacists will play a crucial role as catalysts in the endeavor to reduce adverse events and improve healthcare safety. In order to minimize errors that arise prior to laboratory analysis, clinicians play a critical role. Research has demonstrated that training initiatives are a successful way to improve the caliber of specimen collection. Information sharing to improve patient safety is made easier by including laboratory specialists as important participants in clinical sessions, patient security groups, and training sessions. Establishing a thorough and efficient plan of action

is crucial to raising awareness of radiation risks and promoting the spread of knowledge and instruction regarding radiation safety. One of a nurse's main responsibilities is to ensure patient safety. A nurse's critical role in guaranteeing patient safety can be influenced by a number of factors, including their workplace and the level of assistance they receive from their managers. By handling these problems well, nurse leaders can improve clinical outcomes and foster an attitude of patient safety [15].

### **Interprofessional Team-Based Approach**

A cooperative and multidisciplinary collaborative strategy has been acknowledged as an effective method for improving outcomes for people with chronic illnesses for more than a decade. To improve the management of diabetes, working alongside one another is strongly encouraged and recommended. By making the best use of available resources, an interdisciplinary team comprising physicians, pharmacists, nurses, nutritionists, and other medical specialists may offer full medical attention. Furthermore, the collective and reciprocal expertise and abilities of a team like this may successfully address a variety of patient needs, improve their general health, and raise patient satisfaction [16].

Because they provide diabetes education and practical patient care, pharmacists are essential members of diabetes management teams. This improves access to healthcare and empowers patients to manage their own health. The vast body of research shows that pharmacists are becoming more and more involved as essential players on the healthcare team, which improves patient-centered health outcomes. According to research, pharmacists are crucial in improving the efficacy of diabetes therapy and guaranteeing that the American Diabetes Association's (ADA) standards of care are followed. This is seen in a variety of practice contexts, including diverse practice models, where pharmacists offer conversation, education, and/or cooperative medication management (CDTM). Working with physicians or health systems, CDTM practice models allow pharmacists to apply their clinical knowledge to provide direct patient care while adhering to set protocols. There is now more study data available to evaluate the outcomes of these techniques due to pharmacists' evolving obligations to provide direct patient care in collaborative settings [17].

### **Relevance to the integration of pharmacy services and fundamental healthcare**

In order to address the community's healthcare needs, primary health care is essential. It is an essential part of a nation's medical system. Prioritizing primary healthcare has improved the health, economic, and equality outcomes of healthcare systems. Transdisciplinary collaboration, integrated care, preventative services, self-care, and self-management are among the concepts and services that primary healthcare systems around the world are embracing, according to global trends. These components could improve healthcare outcomes and support the system's long-term sustainability [18].

Providing integrated care and integrating systems have become increasingly important due to adjustments to the health care system. Research is done to strengthen primary care services, improve treatment quality, and address the fragmentation issue. However, the term "incorporation" is occasionally used interchangeably with other terms in the literature, such as "integrated care," "interdisciplinary cooperation," "collaboration," or "coordination," which can lead to

misunderstanding [19].

It is suggested that the integration process be an ongoing process with numerous phases to culminate in full integration. Disintegration, linkage/communication, network cooperation, specialist partnerships, cooperation through organizational leadership, and governance procedures and frameworks are the steps that comprise this process [20].

The many layers of the health institution determine the types of integration. Integrated connectivity at the macro level, professional and teamwork at the secondary level, and therapeutic and service integration at the micro level are some examples of these levels. They also suggested using ethical and practical integration techniques to build relationships between the many levels of the healthcare system. The fact that each country has its own healthcare and community pharmacy systems, which have been influenced by a variety of factors like legal, political, economic, cultural, and social circumstances, must be taken into consideration when evaluating the relevance of such kinds of coherence in relation to basic medical services and community pharmacies [21].

For example, Spain and England have national health systems in place where taxes pay for the majority of medical costs. Patients can receive a variety of therapies through this system with little to no out-of-pocket cost. In a similar vein, both Canada and Australia have established extensive primary care programs that cover medical costs whether or not co-payments are required of beneficiaries. Individual coverage is offered by mandatory health insurance companies in Germany through the Government Health Protection program, which is financed by payments based on patients' incomes [22].

The autonomous and independent market-based ideology is the main characteristic of the American health system. With minimal funding from the federal and state Medicaid and Medicare programs, it lacks universal health coverage and mainly depends on commercial health insurance. whoever runs the healthcare system, the majority of local pharmacies are privately owned businesses operated by corporations, small enterprises, pharmacist associations, or individual pharmacists. The laws governing location and ownership vary greatly between nations. Each pharmacy under the Mediterranean method is operated by a single pharmacist, and location-specific regulations are strictly enforced. However, the American model permits 'open' ownership, meaning that there are no restrictions on the quantity or locations of pharmacies that can be owned. The healthcare systems in Canada and Australia demonstrate how these criteria differ from one another. Furthermore, the scope of community pharmacists' duties would vary by country, which would impact the integration process [23].

### **The Role of Pharmacists, Nurses, and Laboratories in Integrated Care Models**

In order to deliver patient-focused, comprehensive, and efficient treatment, integrated care models aim to coordinate and harmonize the resources and services of several healthcare providers. The use of coordinated medical models may enhance treatment outcomes, quality, and access for patients with complex and chronic conditions like diabetes, heart disease, and psychological well-being issues. However, putting integrated care models into practice is challenging and calls for adjustments to the responsibilities and duties of medical professionals, such as nurses, pharmacists, and lab workers [24].

### **Pharmacists' role in enhancing patient safety:**

To increase patient safety, pharmacists are changing their roles in the medical field. Community pharmacists may be able to lower the frequency of problems and the requirement for readmissions to hospitals by offering counseling services and taking part in discussions about dangerous medication combinations. Opioid stewardship initiatives, which try to lower opioid usage and avoid adverse events, are spearheaded by hospital pharmacists. The adoption of novel methods, such as before drug application systems and pharmacist participation in the creation and evaluation of prescription orders, is integrating pharmacists into patient care procedures. Positive patient results and a decrease in medication mistakes could result from this [25].

Pharmacists now have more responsibilities and better medication safety thanks to technology, but they also need to be aware of any threats to patient safety. Hospital automated dispensing cabinets facilitate effective nursing response, yet mistakes can still happen. For accurate medication dismemberment, remote pharmacist evaluation is essential. Pharmacist error checking is necessary for rule-based errors, however CPOE (computerized provider order entry) modules minimize the requirement for pharmacist review. Workload may rise with CPOE systems, so it is important to evaluate their applicability and limitations and put solutions in place to guarantee a secure and effective system [26].

To protect patient welfare, a culture that places a high priority on confidentiality during clinical treatment must be established. Pharmacists are essential to this effort because they improve prescription practices and offer insightful advice to medical professionals. There are opportunities for creative developments in the pharmacy sector, despite the challenges pharmacists confront, including a limited scope of practice, a lack of research on the best practices, administrative complexity, IT compatibility concerns, and patient participation. Pharmacists are expected to be incorporated into the daily patient care team as a result of a renewed focus on a multidisciplinary, group-based approach to patient care. Robotic drug distribution is one example of a technological breakthrough that could reduce errors and free up pharmacists to focus on their work [27].

pertaining to the management of pharmaceutical treatment. The need to improve the effectiveness of clinical decision support and machine learning systems is growing as a result of pharmacists' growing responsibilities. In order to guarantee that these processes are utilized in the most efficient way possible, pharmacists, who are astute consumers of those assets, may be essential in the planning and evaluation of implementation [28].

Pharmacists' primary responsibilities include: Medication Therapy Management: By closely monitoring and modifying prescription regimens, pharmacists help provide the best possible therapeutic results [1]. Patient instruction: By giving patients vital drug information and instruction, they enable them to follow their treatment regimens [2]. Interprofessional Collaboration: In the management of chronic diseases, pharmacists collaborate with doctors and nurses to promote coordination and communication [3].

Pharmacists are experts in drug treatment, and by offering clinical, instructional, and administrative services, they can significantly influence integrated care models. Pharmacists can collaborate with other medical specialists to improve medication use, prevent and address drug-related problems, educate and counsel patients, monitor and evaluate the outcomes of drug therapies, and participate in initiatives aimed at conducting research and quality improvement [29].

By facilitating coordination and communication between different providers, locations, and care levels, pharmacists can improve the integration of care. When patients go through care transitions, such as being sent to a specialist or being released from the hospital, pharmacists may ensure that prescription medication is administered safely and continuously. Information technology, including telemedicine and electronic health records, can be used by pharmacists to support data sharing and integrated care delivery [30].

### **Contribution of Nurses:**

As the largest and most diverse group of healthcare professionals, nurses can play a significant role in comprehensive treatment models by providing leadership, care coordination, and both immediate and ongoing patient care. People with complex and chronic illnesses can receive comprehensive, patient-centered, and research-backed healthcare from nurses. This is accomplished through determining their needs, developing and implementing suitable treatments, analyzing the outcomes, and advocating for their rights and desires. Nurses have the capacity to plan and direct patient care across a range of healthcare settings, specialists, and care levels. They accomplish this by making sure that referral, collaboration, and communication procedures are effective. Nurses are capable of taking the initiative and participating in research and quality improvement projects. This covers tasks including developing and implementing clinical standards, procedures, and routes in addition to evaluating the outcomes and financial viability of integrated care models [31].

A summary of the role of a nurse is: Patient Advocacy: In order to ensure that care strategies are patient-centered, nurses are essential in advocating for patients' needs and preferences [3]. Following and Evaluation: Both They are in charge of continuing patient evaluations, which help pharmacists make decisions on medication management [4].

### **The role of laboratory professionals in improving patient safety**

Numerous errors that resulted in harm to patients and financial strain on the medical sector were brought to light by the Department of Medicine research on treatment quality. The fact that laboratory error rates are lower than those in other clinical healthcare domains indicates that significant progress has been made in laboratory diagnosis. However, any mistakes made prior to the material's examination are magnified, as being the case in the aforementioned instance, because clinical decision-making systems depend more heavily on accurate laboratory data. Pre-analytical, analytical, and post-analytical errors are the three categories into which laboratory errors fall. Both pre and post analytical abnormalities have been found to account for more than 70% of all laboratory errors [32].

There are three types of pre-analytic errors: those that happen prior to, during, and following specimen collection. While inadequate specimen quantity collection or the use of an insufficient recuperation container present pre-analytical errors occurring during sample collection, incorrectly identified patients and inadequate patient setup are typical pre-analytical errors occurring prior to specimen collection. A pre-analytical inaccuracy that occurs after receiving the specimen and is recorded at a rate of 5% is indicated by specimen mislabeling. easily evade detection [33].

This is probably an underestimation, though, because labeling can be inaccurate, particularly when it happens within the same type of material (blood draws, for example). The patient's hospital stay was needlessly extended in order to set up a follow-up LP and monitor him while he was not receiving antibacterial therapy, even though the identification of an incorrectly labeled CSF sample prevented the inappropriate expansion of antibiotics addressing a polymicrobial bacteriuria.

A protracted hospital stay caused logistical and financial difficulties for the caregivers of the patient, including missed income from absenteeism at work, arranging for transportation to be near their infant, and caring for their other children. The pre-analytical stage is intricate, carried out outside of a lab, and usually carried out by people with different degrees of quality control expertise. Physicians who perform analyses may benefit from instruction and access to documented routines for specimen handling in order to reduce pre-analytic error, much like phlebotomists do when drawing blood [34].

Non-conforming events (NCEs), which are actions taken that are not in accordance with the institution's policies, procedures, or processes and have the potential to jeopardize patient or staff safety as well as affect the efficacy and efficiency of laboratory operations, include labeling errors. Implementing any significant remedial actions requires the creation of an irregularity management system. NCEs are encouraged to be reported by anybody working in a laboratory, from doctors who conduct patient diagnostic procedures to lab staff who interpret results [35].

In order to offer a framework for the analysis of root causes to direct process improvement efforts, standardized forms are utilized to document information on all NCEs. It is unclear in the aforementioned case whether identifying the specimens was a sign of a system issue where the people who performed specimen collection and labeling were different or a knowledge gap caused by an individual not knowing how to label specimens in real-time.

To identify high-priority events for a solution corrective, or preventative measures for process improvement, concise reports of NCE analyses must be reviewed on a frequent basis. After a specific improvement process is put into place, its success is assessed and future improvements are encouraged through the analysis of NCEs. Importantly, everyone involved in laboratory operations, including those who gather and label specimens outside of the laboratory, should have easy access to NCE submission forms, summary reports on NCEs, and implementation methods responding to NCEs [36].

Impact of Laboratory Professionals Worldwide: Clinical Support: Laboratory professionals offer vital diagnostic data that informs treatment choices, allowing nurses and pharmacists to efficiently customize medication management [5]. In order to support clinical decision-making and patient care, laboratory staff are essential in providing accurate and timely diagnostic and monitoring services. By ensuring the quality, consistency, and interoperability of laboratory testing and reporting, laboratory staff can significantly influence integrated care models. In order to select and evaluate appropriate tests, offer feedback and recommendations, and inform and counsel patients, laboratory staff may also work cooperatively with other medical specialists. By employing technological innovations, such as computer systems for laboratories and digital health records, to expedite data transfer and analysis, laboratory staff can further improve healthcare integration [37].

## Conclusion

Laboratory personnel, nurses, and pharmacists are vital members of the healthcare team who can make significant contributions to integrated care models. They may raise the standard, efficacy, and outcomes of medical care for patients with complex and chronic conditions by working and coordinating with other medical specialists. Although the collaborative model improves patient care, obstacles including a lack of resources and hurdles to interprofessional communication can prevent the best possible outcomes. Maximizing the advantages of this holistic strategy requires addressing these problems [38].

In the end, this analysis aimed to give a comprehensive understanding of how integrated care models—which involve labs, nurses, and pharmacists—affect the effectiveness and quality of healthcare. By integrating data that is accessible, the review has contributed to the body of research already in existence and improved our understanding of integrated care models. Additionally, this has given important insights for further study and real-world applications in this area. The analysis's findings have made it easier to pinpoint the essential components that make these models a reality and have guided the development of effective integrated care strategies for a range of healthcare settings.

## Recommendation

The long-term impacts of integrated care paradigms on patient outcomes, cost savings, and healthcare utilization need more research. Studies with a longitudinal design may offer valuable information about the long-term effects of these models. The development of standardized evaluation tools for all care models would facilitate cross-study comparisons and improve understanding of their impact on the effectiveness and quality of healthcare. The findings of this investigation indicate that healthcare institutions should consider implementing seamless treatment models that involve the involvement of labs, nurses, and pharmacists. However, to achieve efficient execution, careful planning and careful assessment of the particular situation and available resources are required.

Stressing interprofessional collaboration and communication among medical professionals, including pharmacists, nurses, and laboratory staff, is crucial to the effective use of integrated care models. Programs for education and training could be developed to encourage teamwork and group decision-making. The benefits of integrating holistic health care approaches into healthcare delivery should be assessed by policymakers, who should also look into ways to promote their adoption. This can entail putting in place payment schemes that recognize and support the important roles that labs, nurses, and pharmacists play in integrated care.

## References

1. Yosef, Houmid, Al, Shammari., Homoud, Awade, Al, Shammari., Talal, Muhammad, Bin, Barak., Bandar, Said, Alharbi., Saud, Tawfiq, Alshammari., Saleh, Abdullah, Alnais., Saeed, Awad, Aljohani., Abdulrahman, Abdullah, Alorf., Meshari, Abdulmajeed, Alnawmasi., Mohammed, Awad, Alshammari., Majed, Farhan, Alharbi., Abdulrahman, Gobile, Al, Enazi., Abdulelah, Mohammed, Mubashir, Alamri. (2022). 1. role of pharmacists in healthcare delivery. International journal of health sciences, doi: 10.53730/ijhs.v6ns9.14840

2. Susi, Afrianti, Rahayu., Sunu, Widiyanto., Irma, Ruslina, Defi., Rizky, Abdulah., Rizky, Abdulah. (2021). 2. Role of Pharmacists in the Interprofessional Care Team for Patients with Chronic Diseases.. *Journal of multidisciplinary healthcare*, doi: 10.2147/JMDH.S309938
3. Susi, Afrianti, Rahayu., Sunu, Widiyanto., Irma, Ruslina, Defi., Rizky, Abdulah., Rizky, Abdulah. (2021). 2. Role of Pharmacists in the Interprofessional Care Team for Patients with Chronic Diseases.. *Journal of multidisciplinary healthcare*, doi: 10.2147/JMDH.S309938
4. Abdul, Latif, Sami., Mohammed, Almansour., Mubarak, S., Aldosary, -, Sarah, Alsubaie. (2019). 5. "Pharmacists' Role in Diabetes Management: A Qualitative Study on Contributions to Patient Education, Medication Management, and Interprofessional Collaboration". *International journal of innovative research in engineering & multidisciplinary physical sciences*, doi: 10.37082/ijirmps.v7.i3.230835
5. Sweaty, Salone. (2019). 3. Clinical pharmacy: Patient care and medication management. *Pharma innovation*, doi: 10.22271/tpi.2019.v8.i1o.25499
6. Thorstensen-Woll, C., Wellings, D., Crump, H., & Graham, C. (2021). Understanding integration: how to listen to and learn from people and communities. *7KH.LQJ-V)XQG*.
7. Rechel, B. (2020). How to enhance the integration of primary care and public health? Approaches, facilitating factors and policy options. *European Observatory on Health Systems and Policies, Policy Brief 10*.
8. Khaira, M., Mathers, A., Benny Gerard, N., & Dolovich, L. (2020). The evolving role and impact of integrating pharmacists into primary care teams: experience from Ontario, Canada. *Pharmacy*, 8(4), 234.
9. Piquer-Martinez, C., Urionagüena, A., Benrimoj, S. I., Calvo, B., Martinez Martinez, F., Fernandez-Llimos, F., ... & Gastelurrutia, M. A. (2022). Integration of community pharmacy in primary health care: the challenge. *Research in Social and Administrative Pharmacy*, 18(8), 3444-3447.
10. Codispoti, C., Douglas, M. R., McCallister, T., & Zuniga, A. (2004). The use of a multidisciplinary team care approach to improve glycemic control and quality of life by the prevention of complications among diabetic patients. *The Journal of the Oklahoma State Medical Association*, 97(5), 201-204.
11. Conley, M. P., Chim, C., Magee, C. E., & Sullivan, D. J. (2014). A review of advances in collaborative pharmacy practice to improve adherence to standards of care in diabetes management. *Current diabetes reports*, 14, 1-8.
12. Codispoti, C., Douglas, M. R., McCallister, T., & Zuniga, A. (2004). The use of a multidisciplinary team care approach to improve glycemic control and quality of life by the prevention of complications among diabetic patients. *The Journal of the Oklahoma State Medical Association*, 97(5), 201-204.
13. Armor, B. L., Britton, M. L., Dennis, V. C., & Letassy, N. A. (2010). A review of pharmacist contributions to diabetes care in the United States. *Journal of pharmacy practice*, 23(3), 250-264.
14. Pousinho, S., Morgado, M., Falcão, A., & Alves, G. (2016). Pharmacist interventions in the management of type 2 diabetes mellitus: a systematic review of randomized controlled trials. *Journal of managed care & specialty pharmacy*, 22(5), 493-515.
15. Fazel, M. T., Bagalagel, A., Lee, J. K., Martin, J. R., & Slack, M. K. (2017). Impact of diabetes care by pharmacists as part of health care team in ambulatory settings: a systematic review and meta-analysis. *Annals of Pharmacotherapy*, 51(10), 890-907.
16. Ramalho, A., Castro, P., Goncalves-Pinho, M., Teixeira, J., Santos, J. V., Viana, J., ... & Freitas, A. (2019). Primary health care quality indicators: an umbrella review. *PloS one*, 14(8), e0220888.

17. World Health Organization. (2016). Integrated care models: an overview. *Geneva: World Health Organization*.
18. UK, N. G. A. (2022). Evidence reviews for effectiveness of approaches to improve access to and engagement with health and social care and joined up approaches.
19. Kodner, D. L. (2009). All together now: a conceptual exploration of integrated care. *Healthcare Quarterly (Toronto, Ont.)*, 13, 6-15.
20. Shaw, S., Rosen, R., & Rumbold, B. (2011). What is integrated care. *London: Nuffield Trust*, 7, 1-23.
21. Bradley, F., Elvey, R., Ashcroft, D. M., Hassell, K., Kendall, J., Sibbald, B., & Noyce, P. (2008). The challenge of integrating community pharmacists into the primary health care team: a case study of local pharmaceutical services (LPS) pilots and interprofessional collaboration. *Journal of interprofessional care*, 22(4), 387-398.
22. Baltaxe, E., Czepionka, T., Kraus, M., Reiss, M., Askildsen, J. E., Grenkovic, R., ... & Cano, I. (2019). Digital health transformation of integrated care in Europe: overarching analysis of 17 integrated care programs. *Journal of medical Internet research*, 21(9), e14956.
23. Bradley, F., Ashcroft, D. M., & Noyce, P. R. (2012). Integration and differentiation: a conceptual model of general practitioner and community pharmacist collaboration. *Research in social and administrative pharmacy*, 8(1), 36-46.
24. Valentijn, P. P., Schepman, S. M., Opheij, W., & Bruijnzeels, M. A. (2013). Understanding integrated care: a comprehensive conceptual framework based on the integrative functions of primary care. *International journal of integrated care*, 13.
25. Urionagüena, A., Piquer-Martinez, C., Gastelurrutia, M. Á., Benrimoj, S. I., Garcia-Cardenas, V., Fernandez-Llimos, F., ... & Calvo, B. (2023). Community pharmacy and primary health care-types of integration and their applicability: a narrative review. *Research in Social and Administrative Pharmacy*, 19(3), 414-431.
26. Dineen-Griffin, S., Benrimoj, S. I., & Garcia-Cardenas, V. (2020). Primary health care policy and vision for community pharmacy and pharmacists in Australia. *Pharmacy Practice (Granada)*, 18(2).
27. Raiche, T., Pammett, R., Dattani, S., Dolovich, L., Hamilton, K., Kennie Kaulbach, N., & McCarthy, L. (2020). Community pharmacists' evolving role in Canadian primary health care: a vision of harmonization in a patchwork system. *Pharmacy Practice (Granada)*, 18(4).
28. Eickhoff, C., Griese-Mammen, N., Müller, U., Said, A., & Schulz, M. (2021). Primary healthcare policy and vision for community pharmacy and pharmacists in Germany. *Pharmacy Practice (Granada)*, 19(1).
29. Beeson, A. C. (2023). *The Patient Experience: Medicare Payor Type and Beneficiary Satisfaction* (Doctoral dissertation, Georgetown University).
30. Stroedecke, N., Lee, J., Stutsky, M., Boothe, K., Tong, K., Luon, S., ... & Renauer, M. (2022). Implementation of an integrated pharmacist collaborative care model in specialty disease state clinics. *American Journal of Health System Pharmacy*, 79(22), 2047-2052.
31. Hayhoe, B., Cespedes, J. A., Foley, K., Majeed, A., Ruzangi, J., & Greenfield, G. (2019). Impact of integrating pharmacists into primary care teams on health systems indicators: a systematic review. *British journal of general practice*, 69(687), e665-e674.
32. De Baetselier, E., Dilles, T., Batalha, L. M., Dijkstra, N. E., Fernandes, M. I., Filov, I., ... & Van Rompaey, B. (2021). 3HUVSHFWLYHV RI QXUVHV·UROH LQ interprofessional pharmaceutical care across 14 European countries: A qualitative study in pharmacists, physicians

- and nurses. *PloS one*, *16*(5), e0251982.
33. Mohiuddin, A. K. (2020). *The Role of the Pharmacist in Patient Care: Achieving High Quality, Cost-Effective and Accessible Healthcare through a Team-Based, Patient-Centered Approach*. Universal-Publishers.
  34. Pande, S., Hiller, J. E., Nkansah, N., Bero, L., & Cochrane Effective Practice and Organisation of Care Group. (1996). The effect of pharmacist(provided non(dispensing services on patient outcomes, health service utilisation and costs in low(and middle(income countries. *Cochrane Database of Systematic Reviews*, *2013*(2).
  35. Weitzel, K. (2018). Patient care shines when pharmacists are part of the team. *Pharmacy Today*, *24*(5), 6.
  36. Slawomirski, L., Auraaen, A. , & klazinga, N. S. (2017). The economics of patient safety: strengthening a value-based approach to reducing patient harm at national level.
  37. Stock-well, D. C., Landrigan, C. P., Toomey, S. L., Loren, S. S., Jang, J., Quinn, J. A., & GAPPS study Group. (2018). Adverse events in hospitalized pediatric patients. *Pediatrics*, *142*(2).
  38. Wang, L., Lu, H., Dong, X., Huang, X., Li, B., wan, Q., & Shang, S. (2020). The effect of nurse staffing on patient-safety outcomes: a cross-sectional survey. *Journal of nursing management*, *28*(7), 1758-1766.