



## **INTEGRATION OF PHARMACISTS, NURSES, AND PUBLIC HEALTH PROFESSIONALS IN HEALTHCARE: ENHANCING COLLABORATIVE CARE, SUSTAINABILITY, AND PATIENT OUTCOMES.**

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### **Abstract:**

Collaborative healthcare among pharmacists, nurses, and public health professionals has emerged as a critical strategy for improving patient outcomes and advancing population health. This collaborative model involves the integration of diverse healthcare professionals working together in multidisciplinary teams to deliver comprehensive, patient-centered care and address the complex healthcare needs of individuals and communities. Pharmacists, with their expertise in medication management, play a key role in ensuring safe and effective drug therapy, while nurses provide skilled clinical care and patient advocacy. Public health professionals contribute by focusing on preventive measures, health education, and community interventions to address social determinants of health. The collaboration among these healthcare professionals enables the implementation of evidence-based practices, coordination of care across settings, and engagement of patients in proactive health management. This collaborative approach is particularly important in managing chronic conditions, addressing complex health issues, and promoting health equity among diverse populations. Despite its benefits, collaborative healthcare faces challenges such as structural barriers, professional silos, and communication gaps. To overcome these challenges, efforts are needed to foster a culture of collaboration, enhance interprofessional education and training, and implement systems-level changes to support interdisciplinary care delivery. In conclusion, collaborative healthcare among pharmacists, nurses, and public health professionals is essential for achieving better patient outcomes, advancing population health, and creating a more integrated and patient-centered healthcare system. By working together synergistically, healthcare teams can overcome barriers, drive innovation, and improve the health and well-being of individuals and communities.

**Key Words:** Public Health, Pharmacist, Nursing, Healthcare Professionals, Collaboration.

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## **Introduction:**

Over the past decade, healthcare reform efforts have often emphasized the importance of the patient-centered medical home (PCMH) as a strategy for enhancing patient outcomes and cutting down healthcare expenses. Various PCMH demonstration projects and research studies have shown enhancements in public health, disease prevention, healthcare accessibility, and patient satisfaction. However, while the PCMH model shows potential for enhancing patient experiences and refining care processes, current evidence does not consistently support its beneficial effects on many clinical and economic outcomes. Recent data from the Federally Qualified Health Center Advanced Primary Care Practice Demonstration have even revealed notable increases in emergency department visits, hospital admissions, and Medicare Part B expenditures [1].

Pharmacist-led interventions, both in hospital and community settings, have played a role in improving clinical outcomes for patients with various acute and chronic conditions, such as diabetes mellitus, hypertension, and hyperlipidemia. These interventions involve medication therapy management (MTM), comprehensive medication management (CMM), and/or chronic disease state management (CDSM). Recent meta-analyses and systematic reviews have shown significant improvements in meeting clinical targets with these care management models. However, there is limited evidence documenting the impact of pharmacists' provision of MTM or pharmacist-led CDSM beyond standard care on hospitalizations, emergency department visits, and healthcare costs [1].

Globally, healthcare systems strive to deliver services aimed at promoting, restoring, and enhancing population health indicators. However, they operate within the framework of numerous social challenges, including inequitable resource distribution and rising healthcare demands. Within this context, social sustainability emerges as a pivotal measure of quality. Despite the increasing focus on relevant policies and ethical considerations in the research on effective healthcare systems, there remains a dearth of studies addressing organizational factors conducive to the development of socially sustainable healthcare systems. It is imperative to explore healthcare models that incorporate principles of social sustainability more effectively [2].

Healthcare systems involve various stakeholders, including professionals (both clinical and non-clinical), managers, patients, healthcare product

providers, scientists, and policymakers. The multi-stakeholder nature of healthcare systems underscores the necessity for collaborative models. Aligning stakeholders' interests in defining policies, strategies, and objectives presents an opportunity for enhancing social sustainability. Collaboration among multiple stakeholders enhances credibility, commitment, accountability, support, and legitimacy within healthcare institutions. However, the healthcare literature indicates a prevailing culture of low trust and limited collaboration at both individual and organizational levels. Introducing collaborative healthcare aims to address these challenges and elevate the quality of care [2].

Collaborative healthcare models play a significant role in sustainable development. Sustainability serves as a unifying force, rallying healthcare stakeholders around the common objective of sustainability development. While sustainability encompasses economic, social, and environmental dimensions (the triple bottom line), existing research has predominantly focused on the economic dimension, particularly the impact of collaborative healthcare models on financial performance. Despite the importance of social sustainability in healthcare systems, research in this area remains relatively scarce and nascent. Therefore, this study seeks to expand this emerging research trajectory by proposing collaborative healthcare as a viable model for enhancing social sustainability. To achieve this, we developed a conceptual framework based on a comprehensive literature review of collaborative healthcare and social sustainability, with a specific emphasis on the social dimension of sustainability [2].

## **Healthcare Professionals Collaboration:**

Collaborative care, described as a joint communication and decision-making process aimed at meeting the holistic healthcare needs of patients while respecting the distinct expertise of each professional, has the potential to enhance patient care, safety, and alleviate workload issues contributing to burnout among healthcare practitioners. Despite conflicting reports suggesting minimal or negative effects of pharmacist care on patient outcomes, recent studies and systematic reviews have consistently demonstrated the positive impact of pharmacist-provided care on patient outcomes. This growing body of evidence underscores the value of interprofessional teamwork in healthcare [3].

There is a notable trend towards promoting collaborative practice among pharmacists, physicians, and nurses, evidenced by the adoption

and evaluation of new collaborative practice models in primary care settings across various countries, including several continental European nations, the United Kingdom, and various regions in the USA and Canada. In Alberta, Canada, collaborative practice initiatives have extended to educational and organizational levels, emphasizing the importance of interdisciplinary collaboration in improving patient care [3].

While teams of healthcare professionals, including pharmacists, have long been established in inpatient medical settings at certain institutions, clinical pharmacists have traditionally not been integral members of the core patient care team in many institutions. To address this gap, the COLLABORATE study was conducted to assess the impact of integrating clinical pharmacists directly into the medical team on patient and process of care outcomes. This initiative provided insights into the dynamics of interdisciplinary team care and the factors influencing effective team functioning [3].

While collaborative working relationships between nurses and physicians have been extensively studied, relatively little research has explored the integration and nature of collaborative relationships between pharmacists and other healthcare practitioners. Most existing studies have focused on physician satisfaction with specific aspects of pharmacy practice or identified perceived barriers between physicians and community pharmacists. Our study aimed to fill this gap by examining the integration process of clinical pharmacists within healthcare teams, the experiences and perceptions of healthcare professionals working as a team, and the continuous professional learning needs arising from the establishment of collaborative interdisciplinary care teams [3].

### **Roles of Pharmacists:**

Since its inception, the field of pharmacy has undergone significant expansion in both scope and complexity, evolving to encompass various facets of healthcare. The role of pharmacists has likewise evolved over time, with contemporary pharmacists assuming pivotal roles in ensuring the efficacy and safety of medical products. Despite this evolution, prevailing perceptions of pharmacists often fail to acknowledge the diverse scope of contemporary pharmacy practice. Pharmacists are frequently stereotyped as mere dispensers of medications or entrepreneurs, overlooking their roles as medication experts directly involved in patient care [4].

In reality, the responsibilities of pharmacists, particularly in community and hospital settings, extend far beyond dispensing medications. Community pharmacists, for instance, routinely engage in activities such as addressing concerns about drug side effects, recommending therapeutic alternatives, evaluating patient drug histories, and providing guidance on over-the-counter medications. Similarly, hospital pharmacists are involved in tasks such as drug information dissemination, medication management, preparation and supply of medications, patient counseling, and the formulation of pharmaceutical care plans [4].

The evolution of pharmacy practice has shifted towards a patient-centered and outcome-oriented paradigm. Pharmacists now offer a range of additional services beyond medication dispensing, allowing for a more comprehensive assessment of patients' overall health and contributing to improved pharmaceutical care and outcomes. In regions like Nigeria, where patients often bear the cost of medications themselves, the perceived value of pharmacy services becomes particularly crucial [4].

Amidst the global healthcare landscape undergoing transformation due to events like the COVID-19 pandemic, pharmacists are increasingly recognized for their potential to assume expanded roles in delivering healthcare services. Pharmacies, being widely accessible and often the first point of contact for minor ailments and health advice, serve as essential healthcare facilities within communities. The accessibility and unique characteristics of pharmacists position them to play a significant role in chronic care management. With pharmacies being widely distributed and accessible without appointments, pharmacists interact with patients frequently, potentially offering valuable opportunities for counseling, education, and health screenings [4].

Contemporary pharmacists are equipped to provide a broader range of services compared to a decade ago. Embracing the concept of pharmaceutical care, pharmacists engage in medication therapy management (MTM) to improve drug utilization processes, reduce medication errors, and enhance patient adherence through counseling. Additionally, pharmacists collaborate with primary care physicians on medication optimization, polypharmacy management, preventive interventions, and chronic disease management, underscoring their value as integral members of the healthcare team [5].

Pharmacist involvement in patient care activities has the potential to enhance patient outcomes, yet it also poses challenges for physicians, particularly those in community-based practices. While physicians in hospital settings may obtain medication advice with minimal disruption to their duties, physicians in community-based practices may face more significant time-management issues when collaborating with pharmacists. Decisions regarding the allocation of time for pharmacist collaboration must be made based on practical considerations, considering the available resources and workflow within physician offices [5].

Compensation for physicians' collaborative work with pharmacists should be considered, similar to the payment system established for interactions with other healthcare providers such as nurse practitioners and physician assistants. However, any financial arrangements should not involve simply reallocating funds from one provider to another; rather, new revenue sources must be identified. In the current healthcare financial landscape, collaborative practices that demonstrate improvements in health outcomes in a cost-effective manner are more likely to receive reimbursement. Practices that lead to increased costs without corresponding benefits are unlikely to garner support from pharmacy or other funding sources. Nevertheless, resources may be redirected towards professions capable of performing specific activities with greater effectiveness and efficiency, thereby minimizing costs to the healthcare system. The principle of "survival of the fittest" often applies in healthcare environments, where the most efficient and beneficial practices are prioritized for support and investment [5].

### **Roles of Nurses:**

The influence of nurse staffing on patient outcomes is well-documented, with higher levels of nursing human capital associated with improved patient outcomes. Recent studies have highlighted specific characteristics of nurse staffing, including a higher proportion of nurses with a bachelor's degree, increased nurse experience, nurse certification, and a composite measure known as nurse dose (incorporating education, experience, and skill mix) [6].

Research by Aiken et al. (2003) demonstrated that a 10 percent increase in the proportion of baccalaureate-prepared nurses led to a 5 percent decrease in patient deaths and complications. Subsequent studies, such as those by Blegen et al. (2013) and Yakusheva, Lindrooth, and Weiss (2014), further supported these findings, indicating

lower mortality rates, decreased readmissions, and shorter lengths of stay associated with higher proportions of BSN-prepared nurses. Additionally, studies have explored the relationship between nurse staffing levels and patient outcomes. Kane et al. (2007) found that increased nurse staffing was correlated with reduced mortality and complications across various patient populations. Weiss, Yakusheva, and Bobay (2011) demonstrated that higher nurse staffing levels were associated with lower 30-day readmission and emergency department utilization rates [6].

Studies focusing on specific care settings have also highlighted the importance of nurse staffing. Rogowski et al. (2013) and Park et al. (2012) found that inadequate nurse staffing in neonatal intensive care units (NICUs) and adult ICUs, respectively, was linked to adverse patient outcomes such as hospital-acquired infections and failure-to-rescue incidents. The implementation of mandated nurse staffing ratios, particularly in California, has been examined as a potential strategy to improve nurse staffing levels and patient outcomes. Research by Aiken et al. (2010) indicated that hospitals in states with mandated staffing ratios experienced lower patient mortality rates compared to those without such mandates. However, the costs associated with implementing and maintaining mandated ratios must be considered when evaluating their overall impact [6].

While mandated staffing ratios may lead to improvements in patient outcomes, the extent of their net value remains subject to further investigation. Studies by Spetz et al. (2013) suggested that while mandated increases in staffing were associated with certain improvements in patient safety outcomes, the overall impact on net value relative to hospitals with high pre-mandate staffing levels requires additional cost data for a comprehensive assessment [7].

The nature of nursing and its role within modern healthcare systems is a topic of ongoing examination and debate. Despite variations across different contexts, there is a fundamental assumption in the international literature that nursing shares essential core elements globally. This is exemplified by references to influential definitions of nursing, such as Henderson's definition, which underscore the universal nature of nursing's mission to assist individuals in achieving or maintaining health, with dignity and independence. Similarly, international codes for nurses, like the International Council of Nurses Code, reflect a common focus on the principles and values of nursing practice [7].

However, there are voices expressing concerns about oversimplifying nursing into a homogeneous entity. Sellman, for instance, argues against such a reductionist view, highlighting the diverse and multifaceted nature of nursing practice. Nonetheless, there seems to be sufficient common ground in nursing roles and functions worldwide to facilitate nurses' adaptation and practice across different healthcare systems with minimal orientation [8].

Conceptualizations of nursing emphasize the importance of holistic care, recognizing patients as individuals with physical, psychosocial, and spiritual needs. This emphasis is supported by empirical evidence showing the significance of psychosocial support in nursing practice and patient satisfaction. Patients actively participate in shaping their healthcare experiences, seeking both technical competence and compassionate, person-centered care from nurses. However, there can be discrepancies between nurses' and patients' perceptions of good care, with patients often valuing interpersonal skills and emotional support more than nurses might expect. Patients' satisfaction with their healthcare experiences is closely tied to their interactions with nursing staff and their perceptions of receiving compassionate and respectful care [8].

While patients may prioritize interpersonal aspects of care, nursing practice encompasses a range of skills and interventions, including clinical, psychosocial, and care coordination activities. These core elements of nursing practice address a variety of patient needs and problems, reflecting the multifaceted nature of nursing care. In summary, nursing's contribution to healthcare involves a blend of technical competence and compassionate, person-centered care. While nursing practice may vary in specific contexts, there is a shared commitment to promoting health, well-being, and patient autonomy across diverse healthcare settings globally [8].

### **Roles of Public Health Professionals:**

The concept of public health encompasses a broad range of principles and practices aimed at improving health outcomes and reducing health inequalities within populations. Various definitions and frameworks exist to characterize public health, reflecting its multifaceted nature and diverse objectives. According to the Public Health Resources Unit (PHRU), the purpose of public health is to enhance health and population well-being, prevent disease and mitigate its consequences, extend healthy life expectancy, and reduce health inequities. This involves adopting a

population perspective, mobilizing societal efforts, empowering individuals, and communities to promote their health, addressing social, economic, environmental, and biological determinants of health, and ensuring high-quality, evidence-based preventive, treatment, and care services [9].

Different scholars and organizations offer their perspectives on public health. Webster and French emphasize three aspects: population-level health promotion, epidemiological analysis, and health professional training. Naidoo and Willis identify three domains of public health: health promotion for the entire population, health protection to prevent illness and disease, and health service improvement to enhance healthcare delivery. The Faculty of Public Health emphasizes collective responsibility, recognizing the role of the state and addressing socioeconomic determinants of health. Sir Donald Acheson defines public health as the science and art of disease prevention, life prolongation, and health promotion through organized societal efforts. This involves planning and evaluating services, surveillance of diseases, and coordination of disease control measures. Public health practitioners are trained individuals responsible for promoting health, conducting research, advocating for health initiatives, and collaborating with communities on projects to improve health outcomes [9].

Government policies and strategies play a crucial role in shaping public health initiatives. Initiatives like the NHS Plan and government white papers set national agendas for reducing health inequalities, emphasizing areas such as poverty reduction, education, employment, urban regeneration, and healthcare workforce development. These policies aim to strengthen public health infrastructure, empower communities, and promote evidence-based health promotion and disease prevention strategies. Historically, public health has evolved in response to changing societal needs and health challenges. Early efforts focused on sanitation and environmental health, while modern public health initiatives address chronic diseases, health inequalities, lifestyle factors, and social determinants of health. Reforms in healthcare delivery, such as the creation of the National Health Service and Community Care Act, have transformed the delivery of healthcare services, emphasizing community-based care and preventive measures [9].

Overall, public health is a dynamic field that encompasses a wide range of activities, from health promotion and disease prevention to policy development and healthcare delivery. It requires collaboration across sectors, engagement with

communities, and a commitment to addressing the root causes of health disparities. By adopting a comprehensive approach to health and well-being, public health practitioners play a vital role in improving population health outcomes and promoting social justice [9].

#### **Benefits of Collaboration:**

**Quality of Care Benefits:** Collaborative team behavior has been associated with improved health outcomes and intermediary predictors of quality. Studies suggest that collaboration leads to better knowledge transfer, sharing of evidence-based practices, enhanced decision-making, and increased innovation. This can result in tangible improvements such as reduced hospital stays, better compliance with standards, improved quality audit results, and enhanced symptom and psychosocial management [10].

**Patient Engagement Benefits:** Collaboration among healthcare teams can improve patient education and engagement in their care. Effective communication and coordinated efforts among team members enable patients to participate in care decisions, seek information, and engage in self-care. Collaborative patient-clinician interactions foster trust, rapport, and successful adherence to medical care strategies, ultimately reducing patient anxiety and improving health outcomes [10].

**Patient Safety Benefits:** Strong interprofessional collaboration has been linked to reductions in rates of medical errors. When healthcare teams are trained to work safely and cooperatively, gaps in quality assurance measures can be minimized, leading to improved patient safety. Quality assurance and safety procedures, particularly in complex fields like radiation medicine, require coordinated efforts across multiple professional groups to ensure patient safety and quality of care [10].

**Staff and Organization Benefits:** Collaborative cultures in healthcare organizations contribute to higher staff satisfaction, retention, and perceptions of empowerment and recognition. Collaboration fosters horizontal power structures, open communication, role understanding, respect, and appreciation among team members. High-performing teams drive value and process improvement, innovation, initiative, and performance, ultimately leading to more competitive and efficient organizations. For example, interdisciplinary teams like the Palliative Care Inpatient Service at M.D. Anderson Cancer Center have demonstrated effective and cost-

efficient models through daily coordination and collaboration among various healthcare professionals. In summary, collaboration in healthcare teams yields numerous benefits, including improved quality of care, patient engagement, patient safety, staff satisfaction, and organizational efficiency. These benefits highlight the importance of fostering collaborative cultures and practices within healthcare settings to enhance overall healthcare delivery and outcomes [10].

#### **Barriers of Healthcare Collaboration:**

In promoting collaborative practice, management literature highlights various challenges that may arise. These challenges can stem from systemic determinants such as compensation schemes, professional regulations, institutional policies, and the physical environment, factors that might be beyond the immediate control of the team. Within the team itself, members may bring different interests, goals, expectations, styles, and experiences to the table, which can complicate communication and lead to conflicts. Team leaders play a crucial role in managing these diverse interests and leveraging the strengths of the team composition. Interprofessional teams often consist of members with varying levels of authority, prestige, and salary, which further complicates power dynamics and necessitates negotiation. Addressing these challenges requires navigating complex interactions among team members, particularly in healthcare where disciplines have distinct educational backgrounds, roles, responsibilities, and organizational structures [10].

#### **Structural Determinants (Opportunity):**

The physical and organizational environment in which interdisciplinary teams operate significantly influences the degree and nature of collaborative interactions. Elements such as physical spaces, schedules, processes, and communication tools can either facilitate or hinder effective collaboration. For example, designing immersive workspaces in nursing can foster team cohesion and support staff interactions. However, virtual, or asynchronous team setups may limit collaboration opportunities, even within the same building. Organizational structures, both formal and informal, also play a crucial role in shaping collaboration dynamics [11].

#### **Psychological Determinants (Willingness):**

Collaboration is heavily influenced by various psychological factors, including team members' willingness to collaborate, mutual trust and respect, and effective communication. These

factors are shaped by individual and team-level attitudes, experiences, and perceptions. A culture focused on group tasks rather than individual roles promotes collaboration through shared goals, experiences, knowledge, and power relationships. Professionals with greater skill and experience in collaboration, alignment with team goals, and psychological safety are more likely to engage in collaborative practices. However, distinct professional cultures, role boundaries, power differences, and communication challenges can hinder collaboration within healthcare teams [11].

### **Educational Determinants (Ability):**

Education and skills training play a crucial role in promoting collaborative practice among healthcare professionals. Developing competencies related to understanding role boundaries, effective communication, negotiation, and conflict resolution are essential for collaboration. Inclusive language and knowledge of technical terminology are also important for clear communication and building mutual respect. Interprofessional education (IPE) is recognized as a key component in improving collaborative skills and fostering a sense of collective responsibility among healthcare professions [11].

In conclusion, addressing barriers to collaboration requires recognizing and navigating systemic, structural, psychological, and educational determinants that influence team dynamics and interactions within healthcare settings. Effective collaboration hinges on creating opportunities, fostering willingness, and building abilities among team members to work together effectively towards common goals.

### **Strategies for Healthcare Professionals Collaboration:**

#### **Role clarity:**

In successful teams, each member is entrusted with a specific role, akin to the diverse positions in a hockey team like goal scorers, defensemen, and goalies. Similarly, healthcare teams comprise diagnosticians, prescribers, and medication experts, each contributing a unique value to meet patient needs effectively. While clarity in roles is crucial, team members should also be open to some overlap of skills when necessary for optimal patient care. Individual contributions must be valued to foster team success, emphasizing the importance of collective achievement over personal accolades. A team environment that appreciates individual roles while prioritizing overall success enhances both team performance and individual job satisfaction [12].

#### **Trust and confidence:**

Trust is foundational to successful teams but requires significant time and personal interaction to develop. Logistical barriers like rotating schedules in healthcare settings can hinder the development of trust among team members. Proximity and regular interaction, as seen in the Saskatchewan Transplant Program, foster trust among healthcare practitioners. Exposure to diverse healthcare disciplines and collaborative work further enhances trust and appreciation for interprofessional roles. Additionally, individual confidence plays a vital role in team trust, as evidenced by athletes radiating confidence contributing to team confidence. Trust and confidence enable healthcare teams to navigate high-stress situations effectively, akin to athletes performing under pressure, ensuring cohesive performance even in challenging circumstances [12].

#### **The ability to overcome adversity:**

Adversity is inevitable for all teams, whether in sports or healthcare, and underscores the importance of collaboration. Challenges like complex patient cases or staff shortages demand heightened collaboration and reveal a team's true integrity. Rather than succumbing to blame or questioning, successful teams remain committed to the ultimate goal of patient care. Healthcare providers must develop adeptness in handling adversity collaboratively to ensure continued effective delivery of care [12].

#### **The ability to overcome personal differences:**

Differences in opinions and conflicts are commonplace within teams, but how they are managed is critical. Team diversity, akin to varied viewpoints in hockey teams, fosters innovation and problem-solving. Despite disagreements, successful teams prioritize the common goal and maintain a shared vision, leveraging individual differences as strengths rather than obstacles. Working towards a collective goal ensures that personal differences do not impede team cohesion or performance [12].

#### **Collective leadership:**

Collective leadership distributes responsibility across the team, relieving pressure from any single individual. In both sports teams and healthcare, this approach ensures broader engagement and fosters buy-in from all team members. Collaborative leadership, recognized as a crucial competency in interprofessional education,

emphasizes shared decision-making and prioritizes the collective success of the team over individual leadership. This approach cultivates a culture of teamwork and collaboration, driving overall team effectiveness and success [12].

### **Future Directions About Healthcare Professionals Collaboration:**

As healthcare continues to evolve, several emerging trends are shaping the landscape of healthcare delivery, with significant implications for collaborative care models. These trends reflect a shift towards patient-centered, team-based approaches that leverage the expertise of various healthcare professionals to optimize patient outcomes. Here are some key emerging trends and their potential impacts on collaborative care models [13]:

1. **Telehealth and Digital Health Solutions:** The rapid advancement of telehealth and digital health technologies has transformed the way healthcare services are delivered. Telemedicine platforms enable remote consultations, monitoring, and follow-up care, breaking down geographical barriers and enhancing access to care. In collaborative care models, telehealth facilitates multidisciplinary team collaboration by enabling real-time communication and coordination among team members regardless of their physical location. Moreover, digital health solutions such as electronic health records (EHRs) and health information exchange (HIE) platforms promote seamless information sharing and care coordination among healthcare professionals, fostering integrated and patient-centered care delivery.
2. **Value-Based Care and Population Health Management:** The transition from fee-for-service reimbursement models to value-based care models incentivizes healthcare providers to focus on improving patient outcomes and reducing costs. In this value-driven healthcare landscape, collaborative care models play a critical role in achieving better outcomes through coordinated and proactive management of patient populations. Multidisciplinary care teams, including pharmacists, nurses, physicians, and public health professionals, collaborate to address the complex needs of patients, particularly those with chronic conditions or high-risk populations. By leveraging their unique expertise and perspectives, these interdisciplinary teams can implement evidence-based interventions, preventive strategies, and care plans tailored to

individual patient needs, thereby improving health outcomes and reducing healthcare expenditures.

3. **Precision Medicine and Personalized Care:** Advancements in genomics, molecular diagnostics, and precision medicine have paved the way for personalized approaches to healthcare. By integrating genetic and clinical data, healthcare providers can tailor treatment strategies and interventions to individual patients' unique genetic profiles, risk factors, and preferences. In collaborative care models, pharmacists, nurses, and other healthcare professionals collaborate to incorporate genomic information into medication management, treatment selection, and patient counseling, ensuring safe and effective care delivery. Furthermore, public health professionals play a vital role in promoting genomic literacy, conducting genetic risk assessments, and implementing population-based screening and prevention programs aimed at reducing the burden of genetic diseases and improving health outcomes across communities.

Opportunities for Further Integration and Expansion of Roles for Pharmacists, Nurses, and Public Health Professionals in Healthcare Teams [13]:

1. **Pharmacists:** Pharmacists play a crucial role in collaborative care teams, contributing their expertise in medication management, therapeutic optimization, and patient education. As medication experts, pharmacists can expand their roles beyond traditional dispensing functions to provide comprehensive medication management services, including medication reconciliation, adherence counseling, and medication therapy management (MTM) services. In collaborative care models, pharmacists collaborate closely with physicians, nurses, and other healthcare professionals to ensure safe and effective medication use, optimize treatment outcomes, and prevent adverse drug events. Moreover, with the increasing emphasis on value-based care and population health management, pharmacists can actively participate in care coordination efforts, chronic disease management programs, and preventive care initiatives aimed at improving patient outcomes and reducing healthcare costs.
2. **Nurses:** Nurses play a central role in patient care delivery, serving as advocates, coordinators, and educators across various



healthcare settings. In collaborative care models, nurses collaborate with multidisciplinary teams to provide holistic and patient-centered care, addressing the physical, emotional, and psychosocial needs of patients. Advanced practice nurses (APNs), such as nurse practitioners (NPs) and clinical nurse specialists (CNSs), have expanded roles in primary care, specialty care, and community-based settings, where they provide comprehensive healthcare services, including health assessments, diagnosis, treatment, and management of acute and chronic conditions. By leveraging their clinical expertise and leadership skills, nurses contribute to care coordination, care transitions, and quality improvement initiatives, promoting continuity of care and enhancing patient outcomes.

- 3. Public Health Professionals:** Public health professionals play a vital role in promoting population health and preventing disease through community-based interventions, health education, and policy advocacy. In collaborative care models, public health professionals collaborate with healthcare providers to address social determinants of health, reduce health disparities, and improve health outcomes across populations. Public health nurses, epidemiologists, health educators, and community health workers work collaboratively with healthcare teams to design and implement health promotion programs, disease prevention initiatives, and population-based interventions aimed at improving health behaviors, reducing risk factors, and enhancing community well-being. By fostering partnerships between healthcare organizations, community agencies, and local stakeholders, public health professionals contribute to the development of integrated and sustainable healthcare delivery systems that prioritize preventive care, health equity, and population health management.

In conclusion, the future of healthcare delivery relies on collaborative care models that harness the collective expertise and contributions of pharmacists, nurses, public health professionals, and other healthcare professionals to optimize patient outcomes, promote population health, and improve healthcare quality and value. By embracing emerging trends in healthcare delivery and seizing opportunities for further integration and expansion of roles, healthcare teams can adapt to evolving patient needs, advance interdisciplinary collaboration, and drive innovation in care delivery models.

### **Conclusion:**

In conclusion, collaborative healthcare among pharmacists, nurses, and public health professionals plays a pivotal role in improving patient outcomes and promoting population health. By working together in multidisciplinary teams, these healthcare professionals can leverage their diverse expertise and perspectives to deliver comprehensive, patient-centered care and address the complex healthcare needs of individuals and communities. The collaboration among pharmacists, nurses, and public health professionals ensures optimal medication management, holistic patient care, and effective health promotion strategies. Pharmacists contribute their specialized knowledge in medication therapy, ensuring safe and appropriate drug use, while nurses provide skilled clinical care and patient advocacy. Public health professionals focus on preventive measures, health education, and community interventions to address social determinants of health and reduce health disparities.

Furthermore, collaborative healthcare efforts are essential for achieving better health outcomes and advancing population health initiatives. By working together, healthcare professionals can implement evidence-based practices, coordinate care across settings, and engage patients in proactive health management. This collaborative approach is particularly crucial in addressing chronic conditions, managing complex health issues, and improving health equity among diverse populations.

Despite its benefits, collaborative healthcare faces various challenges, including structural barriers, professional silos, and communication gaps. Continued efforts are needed to overcome these barriers and promote effective teamwork in healthcare settings. This requires fostering a culture of collaboration, enhancing interprofessional education and training, and implementing system-level changes to support interdisciplinary care delivery. In conclusion, collaborative healthcare among pharmacists, nurses, and public health professionals is essential for achieving better patient outcomes, promoting population health, and creating a more integrated and patient-centered healthcare system. By working together synergistically, healthcare teams can overcome challenges, drive innovation, and ultimately improve the health and well-being of individuals and communities.

### **References:**

1. Matzke, G. R., Moczygemba, L. R., Williams, K. J., Czar, M. J., & Lee, W. T. (2018). Impact of a pharmacist–physician collaborative care model on patient outcomes and health services utilization. *The Bulletin of the American Society of Hospital Pharmacists*, 75(14), 1039-1047.
2. Maghsoudi, T., Cascon-Pereira, R., & Beatriz Hernández Lara, A. (2020). The role of collaborative healthcare in improving social sustainability: A conceptual framework. *Sustainability*, 12(8), 3195.
3. Makowsky, M. J., Schindel, T. J., Rosenthal, M., Campbell, K., Tsuyuki, R. T., & Madill, H. M. (2009). Collaboration between pharmacists, physicians and nurse practitioners: a qualitative investigation of working relationships in the inpatient medical setting. *Journal of interprofessional care*, 23(2), 169-184.
4. Oladipo, H., Muili, A., Rashidat, Y., & Rokibat, A. (2022). The Role of Pharmacists in Strengthening the Health System in Nigeria. *INNOVATIONS in pharmacy*, 13(2).
5. Patwardhan, A., Duncan, I., Murphy, P., & Pegus, C. (2012). The value of pharmacists in health care. *Population health management*, 15(3), 157-162.
6. Lindrooth, R. C., Yakusheva, O., Fairman, J. A., Naylor, M. D., & Pauly, M. V. (2015). Increasing the value of health care: The role of nurses.
7. Scott, P. A., Matthews, A., & Kirwan, M. (2014). What is nursing in the 21st century and what does the 21st century health system require of nursing?. *Nursing Philosophy*, 15(1), 23-34.
8. Draper, D. A., Felland, L. E., Liebhaber, A., & Melichar, L. (2008). The role of nurses in hospital quality improvement. *Research brief*, (3), 1-8.
9. Nursing Answers (2020). Role Of Public Health Practitioner. Available at Role Of Public Health Practitioner (nursinganswers.net). Last Access on 21 February 2024.
10. Morley, L., & Cashell, A. (2017). Collaboration in health care. *Journal of medical imaging and radiation sciences*, 48(2), 207-216.
11. Bosch, B., & Mansell, H. (2015). Interprofessional collaboration in health care: Lessons to be learned from competitive sports. *Canadian Pharmacists Journal/Revue des Pharmaciens du Canada*, 148(4), 176-179.
12. Vitalari, N. (2015). A Prospective Analysis of the Future of the US Healthcare Industry. *Center of Digital Transformation White Paper Series, UC Irvine*.
13. Ahmad, K. A. B., Khujamatov, H., Akhmedov, N., Bajuri, M. Y., Ahmad, M. N., & Ahmadian, A. (2022). Emerging trends and evolutions for Smart city healthcare systems. *Sustainable Cities and Society*, 80, 103695.