The New Era of Pharmacists in Ambulatory Patient Care

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Article Synopsis

Pharmacy is evolving from a product-oriented to a patient-oriented profession. This role modification is extremely healthy for the patient, the pharmacist, and other members of the health-care team. However, the evolution will present pharmacists with a number of new challenges. Now, more than in the past, pharmacists must make the acquisition of contemporary practice knowledge and skills a high priority, to render the level of service embodied in the concept of pharmaceutical care. Pharmacy educators' organizations and regulatory bodies must all work together to support pharmacists as they assume expanded health-care roles. Pharmacy and the health-care industry must work to ensure that the pharmacist is compensated justly for all services. But before this can happen it will be necessary for pharmacy to demonstrate value-added to the cost of the prescription. Marketing of the purpose of pharmacy in the health-care morass and of the services provided by the pharmacist is needed to generate an appropriate perceived value among purchasers and users of health-care services. Pharmacists should view themselves as dispensers of therapy and drug effect interpretations as well as of drugs themselves. Service components of pharmacy should be identified clearly to third party payers and be visible to consumers, so that they know what is available at what cost and how it may be accessed. In the future, pharmacy services must be evaluated on patient outcome (i.e., pharmaceutical care) rather than the number of prescriptions dispensed, and pharmacy must evolve toward interpretation and patient consultation, related to the use of medication technologies.

ABSTRACT

Ambulatory care pharmacy practice is defined as the provision of integrated, accessible healthcare services by pharmacists who are accountable for addressing medication needs, developing sustained partnerships with patients, and practicing in the context of family and community. This is accomplished through direct patient care and medication management for ambulatory patients, long-term relationships, coordination of care, patient advocacy, wellness and health promotion, triage and referral, and patient education and self-management. The ambulatory care pharmacists may work in both an institutional and community-based clinic involved in direct care of a diverse patient population.

A variety of specialty clinics are available for allergy and immunology, pulmonology, endocrinology, cardiology, nephrology, neurology, behavioral health, and infectious disease. Such services for this population may exist as a primary care clinic or an independent specialty clinic, typically in a PCMH, which is instrumental in coordinating care between various providers. Once a practice site is identified, it is important to establish a strong, trusting, and mutually beneficial relationship with the various decision-makers (e.g., administrators, providers) involved with the clinic. If pharmacy services are currently in existence, the pharmacy director may be able to identify and initially contact the appropriate person. If another pharmacist is providing clinical services, this person would be a resource to help determine areas for expansion of patient care and to whom to direct the proposed business plan. Additional individuals to consider as an initial point of contact include the clinic manager, clinic medical director, or administrative assistant to either of these persons. If the clinic setting is affiliated with a medical school, it may be necessary to contact the Department of Family Medicine head.

Purpose of the study: Discussion and projection of pharmacists' roles and responsibilities in ambulatory care settings.

Methodology: The research is conducted through secondary data search from several sources from books, technical newsletters, newspapers, journals, and many other sources. The present study was started from the beginning of 2018. PubMed, ALTAVISTA, Embase, Scopus, Web of Science, and the Cochrane Central Register of was thoroughly searched. The keywords were used to search for different publishers' journals like Elsevier, Springer, Willey Online Library, Wolters Kluwer were extensively followed.

Findings: Ambulatory Care Pharmacy addresses the provision of integrated, accessible healthcare services of ambulatory patients transitioning from the hospital to home or another care facility. Given the focus on ambulatory care as an option for health system renewal, it is important to evaluate the provision of home care services to ensure that care is optimized and meets patient needs.

Limitation of the study: There are too many information available regarding ambulatory pharmacists' roles and responsibilities, superiorities in healthcare arena among others in healthcare profession. Information only available from reputed journals are added here.

Practical Implication: Students, researchers and professionals of different background and disciplines pharmacists, doctors, nurses and health regulatory authorities have to acquire much from this article.

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Abbreviations: Patient-Centered Medical Home (PCMH); Communication Accommodation Theory (CAT); Medication Therapy Management (MTM); Transitions Of Care (TOC); Home Medicines Reviews (HMR); Medication Management Review (MMR); Pharmaceutical Care (PC); National Association of Pharmacy Regulatory Authorities (NAPRA); Interprofessional Collaboration (IPC); Drug-related problems (DRPs); Joint Commission of Pharmacy Practitioners (JCPP); Medication Reconciliation (MR)

INTRODUCTION

Ambulatory refers to patients not occupying beds in hospitals or other inpatient settings. Ambulatory patients are noninstitutionalized patients who have the responsibility for obtaining their medication, storing it, and taking it. They may or may not be outpatients, depending upon where they receive their treatment. They may even be in a wheelchair and, strictly speaking, not ambulatory, but if they are not institutionalized, they will have the same basic responsibility for their medication as walking patients. Various designations are used to categorize patients: institutionalized, noninstitutionalized, inpatient, outpatient, bedridden, and ambulatory. Ambulatory patients may be inpatients of an institution, such as a hospital or extended-care facility, if they are not confined to bed. However, the term ambulatory patient has become more restrictive in its modern usage simply to mean a noninstitutionalized patient. Whether patients consult a physician who may prescribe medication or whether they decide to treat themselves, the community pharmacist more than likely will come in contact with them. It is important, therefore, for the pharmacist to have an understanding of these patients so that as a pharmacist and member of the health-care team, the best possible health care for ambulatory patients may be provided through proper use of knowledge and judgment.

Scope of Ambulatory Care Practice

Healthcare reform has created a demand for change in the delivery of healthcare services. Encouraging the introduction of the medication expert in providing patient-centered care is an important element in the advancement of delivering quality clinical services. The ambulatory setting is where most individuals in the US receive health care [1]. Consequently, ambulatory care is a growing field of pharmacy practice. Employment of registered pharmacists is projected to rise dramatically in physician offices and medical center outpatient clinics within next 10 years. The literature also supports the positive effects of pharmacy practice in ambulatory care settings, such as decreased benzodiazepine use, improved anxiety scores, improved cardiac outcomes, and improved compliance [2]. Healthcare payment reform will have far-reaching effects on health-system behavior, including a shift of resources from inpatient care to ambulatory care. Health systems will give renewed attention—well beyond lip service—to classical public health initiatives (i.e., disease prevention and health promotion). They have higher expectations for leadership by pharmacists on a broad array of medication-use issues that affect institutional success. Given the focus on ambulatory care as an option for health system renewal, it is important to evaluate the provision of home care services to ensure that care is optimized and meets patient needs. A nearly 85% affirmative response obtained that nearly all health systems will have strong financial incentives to keep their patients healthy and not in need of high-cost healthcare services, particularly inpatient care, reinforces the importance of keeping "at-risk" populations healthy. A major implication of this prediction is that health-system pharmacy must embrace ambulatory care [3]. Pharmacy Forecast 2016–2020, published by the American Society of Health-System Pharmacists Research and Education Foundation predicts that health care payment reform will result in a significant shift of health-system resources from inpatient to ambulatory care. Health care delivery and financing will move assertively to expand pharmacist services in ambulatory-care clinics [4,5]. The forecast is the fourth annual report the foundation has produced for hospital and health-system pharmacists. Other highlighted topics include:

- The need to optimize the deployment of pharmacy talent.
- An emerging oversupply in some regions of pharmacists for entry-level positions.
- New tools to measure and improve pharmacist and departmental performance.
- Continuing attention to "meaningful-use" requirements for information technology.
- Implications of the patient empowerment movement for pharmacies [6].

Optimizing pharmacy workforces over the next five years will involve placing greater emphasis on ambulatory care. Three-fourths of the forecast panelists believe that at least a quarter of health systems will require patient-care pharmacists to be responsible for both inpatients and outpatients. Also, at least a quarter of health systems are expected to shift 10% or more of their inpatient pharmacy positions to ambulatory-care positions. This shift towards ambulatory care is expected to result in a vacancy rate of at least 10% for ambulatory-care pharmacy leadership positions [7].

Pharmacists in Ambulatory Care

All people who take medications are at risk of actual or potential drug therapy problems. These problems are a significant source of morbidity and mortality when left undetected and unresolved and drive huge costs across the health system. As drug therapy experts, pharmacists provide drug therapy management services built around a partnership between the pharmacist, the patient (or his or her caregiver), physicians and other members of a patient's health care team. As ambulatory care pharmacy practice grows, there has been

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an ongoing effort to identify the desired role of the staff pharmacists in outpatient care and to provide linkages to preferred outcomes. In at least 25% of health systems, patient care pharmacists will have umbrella responsibilities, encompassing both inpatients and outpatients, for pursuing the best outcomes from drug therapy [4]. Their vision is to be a reliably standard setting in its provision of direct patient care and to continuously develop methods that improve this practice. They facilitate safe, effective, efficient and economical use of medications with the aim of optimizing patient care by qualified and trained staff. Pharmacists play an essential role in the safe, quality and effective use of medications in improving patient's physical and mental wellness [8]. They are instrumental in managing medication-related issues to complement the holistic care for patients throughout the organization. Pharmacists provide education to patients and caregivers on the safe and appropriate use of medications, counsel on medication compliance, monitor and manage medication side effects, as well as screen for dangerous drug interactions [9]. In addition, they specialize in recommending optimal medication therapy for concurrent medical problems, with the aim of enhancing treatment outcomes and facilitating the continuity of care as patients integrate back into the community [10-14].

Expertise in Therapy Management

The goal of pharmacy service is to identify and resolve actual and potential drug therapy problems for patients and to promote the safe and effective use of medications and enable patients to achieve positive, targeted therapy outcomes. The medication management framework includes the following:

A. **Assessment**: The pharmacist assesses each patient through observation, dialogue and consideration of clinical indicators. Medication counselling opportunities are key times for pharmacists and patients to discuss medications and patients' concerns about their therapy. Communication Accommodation Theory (CAT) describes behavioral, motivational and emotional processes underlying communication exchanges. Five CAT strategies (approximation, interpretability, discourse management, emotional expression and interpersonal control) permit identification of effective communication. In most European countries, feedback is embedded in education, training and daily professional activities. It is a valuable tool for indicating whether things are going in the right direction or whether redirection is required. Treatment alternatives are assessed for appropriateness, effectiveness and safety (including interactions), to prevent and resolve medication-related problems [15-17].
B. **Care plans**: The pharmacist creates a plan in consultation with the patient and, when necessary, other members of the health care team. The care plan includes goals and actions to achieve the patient's personal health goals through optimal drug therapy. Patient participation means involvement of the patient in decision making or expressing opinions about different treatment methods, which includes sharing information, feelings and signs and accepting health team instructions [18]. Actions include patient and/or caregiver education about chronic disease, writing a prescription to continue care, initiating new treatment and disease prevention such as immunization and lifestyle modification programs. There is a huge opportunity for pharmacists to have a significant impact on reducing healthcare costs, as they have the expertise to detect, resolve, and prevent medication errors and medication-related problems [19]. Care plans also include medication support systems such as compliance packaging and medication reminders.
C. **Monitoring compliance and evaluating effectiveness**: Adherence to therapies is a primary determinant of treatment success. Failure to adherence is a serious problem which not only affects the patient but also the health care system. The pharmacist monitors the patient's compliance with and response to drug therapy through regular follow-ups [20,21]. Tertiary hospitals manage patients with complex care needs. Hospital pharmacists frequently dispense medicines when there is limited global experience with use, but where local prescribers feel their benefit outweighs the risk. These allow for progress evaluation and support and early detection of adverse effects, drug misuse or abuse [22].

Committed Relationship with Patients

Many patients interact with the health system at multiple points. Medication therapy may be started, altered or adjusted at any point along this continuum of care by multiple providers. But pharmacists are the health professionals with the best potential to effectively coordinate medication across the continuum. As important members of the health care team, pharmacists work collaboratively with patients' other health care providers in all types of patient care settings ranging from community pharmacies to hospitals and long-term care facilities [23]. In particular, community-based pharmacists are accessible and uniquely positioned to support a continuum of primary care, the challenges of living with chronic disease, assisting people to remain in their homes as they age and assisting people living with mental illness or chronic diseases [24]. The first step in the provision of pharmaceutical care is the establishment of a committed relationship with the patient. To that end, pharmacists must seek and be granted authority by their patients to intervene on their behalf. Pharmacists also may need to secure permission from other health-care providers and patient caregivers (e.g., in cases in which the patient is a child or unable to visit the pharmacy in person) to provide pharmaceutical-care services. The key to doing so in all instances is effective communication. Building a committed relationship cannot occur at a distance. The pharmacist-patient relationship has changed over the past 30 years from one in which pharmacists focused solely on filling prescriptions without questioning a physician's order to one in which pharmacists recommend drug therapy to prescribers and offer

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personalized advice to patients on how to maximize the benefits of their medication [25]. In addition, by its very nature, pharmaceutical care is an iterative and ongoing process, as long as the patient has unresolved medication-related problems. Therefore, once a rapport has been established, the pharmacist must interact regularly with the patient to strengthen the relationship and to collect additional data necessary to ensure that the patient's pharmaceutical-care needs continue to be met [26].

Provision of Pharmacy Services

In the initial organizational plan or proposal, it is important to detail the individual who will be providing services, the services to be provided, the entity (e.g., patient, caregiver, health care team) to whom services will be provided, the time required for the services, the expected outcomes, and a proposed workflow. Ultimately, the goal would be to implement the Pharmacists' Patient Care Process as defined by the Joint Commission of Pharmacy Practitioners (JCPP). In such a process, the pharmacist is integrated into the delivery of care for the patient in an interprofessional setting [27]. Services to consider implementing include medication reconciliation, MTM, preventative services, and patient-specific medication education and behavioral counseling. However, outpatient pharmacy basic services and functions may include:

A. Medication Dispensing

The fundamental concept of medication is to give the right medication to the right patient after proper identification. Drugs should be dispensed at the right dose, route of administration, form and duration of treatment. For patients, the prescription container label may be the only source of instructions on how to take their medicines. In the United States, the legal requirements for a prescription label are set by federal law and state statutes. The container should be comparable to that which manufacturers use to package drug products and should preserve a product's identity, strength, quality, and purity and prevent contamination. Safety features such as a child-resistant closure should be provided. Pharmaceutical products purchased from international online pharmacies are not approved by the FDA and may not meet US guidelines for labeling and packaging. Pharmacy staff works in close collaboration with the different medical departments, nursing services and dietary department to meet customer needs. This is particularly useful with complex patients who have multiple prescribers and more than one condition requiring treatment. Medication dispensing databases are increasingly available for pharmacists on large populations, particularly in countries that provide universal coverage for medicines [28-30].

B. Delivery of transition care medications

Usually home care prescriptions are dispensed and refilled from the ambulatory pharmacy as a service to this patient population. Medicare beneficiaries are covered by the US Social Security Amendment, passed in 1965 and then amended in 1972, which extended health care services to all persons 65 years of age or older. Medicare Part A covers inpatient hospital care, hospice care, and home health care, with deductibles and limits placed on each type of care. Beneficiaries are also eligible for Medicare Part B coverage, which, for a relatively small health insurance premium, allows senior citizens to obtain extended coverage for physician services, outpatient hospital services, home health care services, and a limited number of outpatient drugs (e.g., hepatitis B vaccine, immunosuppressant drugs, pneumococcal and influenza vaccines, and some oral cancer drugs). Optimizing the TOC process, reducing medication errors, and preventing ADEs are important focus areas in the current health care system, as emphasized by The Joint Commission and other health care organizations. Providing a complete and accurate medication reconciliation (MR) at the time of transition is important and improves TOC, especially since most AEs that occur during TOC are adverse drug events. Another study determined that nearly 50% of patients experienced at least one outpatient medical error caused by failure to implement the intended discharge plans for recently hospitalized patients. Ambulatory pharmacists have the unique opportunity and skillset to develop and participate in TOC processes that will enhance medication safety and improve patient care [31-34].

C. Pharmacists-led medication reconciliation

Medication discrepancies arising at care transitions have been reported as prevalent and are linked with adverse drug events (ADEs) (e.g. re-hospitalization) [35]. More than 25% of errors can be attributed to incorrect medication histories, demonstrating that this is an error-prone process. Gleason and colleagues found that more than 33% of patients had at least one medication discrepancy at admission, and 85% of these originated from the medication history. Obtaining an accurate medication history during transitions of care has been shown to reduce errors that could lead to patient harm and is the foundation of the medication reconciliation process. Reconciliation involves building a complete list of a person's medications, checking them for accuracy, reconciling and documenting any changes. Pharmacy personnel can play a key role in medication safety and prevention of discrepancies upon hospital admission. Buckley and colleagues discovered that greater than 97% of medication histories documented by health care providers other than pharmacists were associated with at least one medication discrepancy [35-40].

D. Patient counseling and education

In the counseling process, a multi-cultural competence of dispenser is among the key factors affecting his/her successful communication with patients for achieving optimal use of medications. Patient counseling by dispenser is a key competency element in the medication treatment process. To this end, it is critical for the dispensers to provide desirable and understandable

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information to patients about their dispensed medications. The dispenser is in a critical position to answer whatever concerns and enquiries of patients toward their medications and even alternate therapeutic approaches they may seek or hear from others. Accordingly, the Australian Pharmaceutical Advisory Council outlines the type of information and resources that should be delivered to patients. Moreover, list of medicines provided on exit from the healthcare facility should be prepared in communication and collaboration with the patient for ease of improving adherence to treatment regimens and patient outcomes. However, for a non-teaching facility, the addition of clinical pharmacy services may alter workflow pace because the practitioner may be accustomed to moving from one patient to the next without stopping to discuss the treatment plan with the health care team. It may be more challenging to provide recommendations and interventions for each individual patient, and as such, an alternative workflow may be necessary. This may include a pharmacist-specific patient and family education visit, which may reduce the time the practitioner needs to spend with each patient, thus allowing a potential increase in provider patient volume. Crowd and noisy hospital environment, over-loaded physicians, and innumerable patients limited hospital staffs to supply more professional services. Counseling people were increased 4 folds in 2015 compared to in 2013. On the one hand, with the development of the pharmaceutical counseling center, more and more people realized the importance of drug safety and accuracy. [41-46].

E. HMR

MMRs are an excellent example of optimal pharmaceutical care delivery. MMRs were originally conducted by pharmacists and have been a prime component of the expanded clinical services provided by pharmacists worldwide. Home medication reviews are a subtype of MMRs in which patients are interviewed by a health professional in their own home. This was originally designed for pharmacists to recover relevant information from the patient's home that is of value and could otherwise be overlooked by health care professionals. It is intended for the pharmacist to observe the patient's management of their medications and to educate the patient so that the quality use of medicines can be achieved. The HMR has the potential to be a useful tool in patients' management of their medications. There are clear benefits when per-formed well. HMR is an Australian initiative introduced in 2001 to improve quality use of medicines. The pharmacist reviews the patient's drug therapies for drug interactions, adverse effects and inconsistencies with the current published views on therapies. GPs plays a vital role in determining whether patients are likely to benefit from this service as HMRs require a referral from a GP. Studies show that GPs believe HMRs potentially improve medication safety, awareness and management. Home medicines review can:

1. Clarify and assure patients about proper use of their medications.
2. Increase the patients understanding of their physicians' clinical intentions.
3. Promote co-operation between the patient and his clinician.
4. Promote better patient compliance with medication regimens and dosages.
5. Maximize health outcomes from treatment provided [47-51].

Barriers to Pharmaceutical Care

A variety of factors have impeded pharmacists' ability to implement pharmaceutical care and can be grouped into four general categories.

A. Individual pharmacist characteristics

Studies have been conducted to establish the challenges to Pharmaceutical care implementation in community and hospital pharmacies in developed countries. The pharmacists' attitudes such as the lack of understanding of the concept, misconception such as patients' unwillingness to pay, fear of changing roles and lack of personal motivation reported. Pharmacists who commit to managing the pharmacotherapy of their patients must be familiar with current advances in the treatment of common diseases and with literature resources/ databases that are available to assist them to make sound therapeutic decisions. The attitudes are characterized by conflicts and egos resulting from differences in status/authority, responsibilities, and training. Finally, oral and written communication skills are central to the provision of pharmaceutical care. Pharmacists need to be trained in applying general affective communicative strategies, listening and reflecting, and responding to uttered cues. Combined with non-specific verbal behavior techniques, such as social talk, these techniques are especially important in addressing patient concerns. Pharmacists should refine their communication styles and patterns constantly to ensure patients receive the information they require for effective treatment. They not only create a safe and inviting atmosphere between the pharmacist and patient but also encourage patients to disclose their emotions and concerns. Furthermore, changing the consultation dynamic may also help; from a professional "coolness" approach at the beginning of the consultation to becoming warmer and avoiding non-verbal cut-offs at the end. Incorporating more open-ended questions and follow-up questions throughout the home visit could increase the flexibility of the protocol and might invite patients to express their concerns. [46], [52-56].

B. Practice-Setting Constraints

There are numerous constraints involved, consisting of supply-side (e.g. workforce shortages), demand-side (e.g. obstacles of access to healthcare) and healthcare system constraints (e.g. regulatory constraints). Resource

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constraints and other factors associated with a particular practice setting also are mentioned frequently as barriers to the provision of pharmaceutical care. For example, pharmacists often complain that they do not have time to provide pharmaceutical care in addition to their normal responsibilities. A lack of financial resources also is mentioned often as a barrier to the provision of pharmaceutical care. Under constrained financial conditions, healthcare services need to demonstrate that they remain cost-effective, given the investment in their provision. Purchasing additional equipment, hiring and training additional personnel, and redesigning the pharmacy can be quite expensive. A further complication exists when the management of the pharmacy organization is not committed to the provision of pharmaceutical care. In that situation, support for even minor modifications of the practice environment may be completely absent. Most pharmacists should be able to offer pharmaceutical care to a limited number of patients without incurring large expenses. Then, as the number of patients receiving care is expanded, pharmacists can gradually modify the environment to be more conducive to patient-oriented services [19], [57-60].

C. Intra-professional Barriers

A fragmented system can be defined as one lacking the integration required to achieve unity of effort. Each part of the system tends to focus on internal tasks and resources overlooking the system as a whole. Fostering IPC has become one of the core demands of policymakers, funding parties, and health care professionals in practice worldwide. Patients benefit when pharmacists work together. Good team functioning is associated with improved patient outcomes, heightened staff satisfaction, and reduced burnout. In contrast, poor team functioning is associated with poor patient care through adverse events, lack of coordination, and spiraling costs. The NAPRA highlights the importance of collaboration in pharmacist practice. This standard applies not only to pharmacist collaboration with other health care professionals but also to pharmacist collaboration with other pharmacists. Thus, pharmacists from all practice settings and the organizations that represent them must work cooperatively to develop a common agenda for the implementation of pharmaceutical care if this new mission is ever to be fully realized by the profession [60-64].

D. Compensation Benefits

Expansion of scope of practice and diminishing revenues from dispensing are requiring pharmacists to increasingly adopt clinical care services into their practices. Pharmacists must be able to receive payment in order for provision of clinical care to be sustainable. However, the body of evidence supports the feeling that pharmaceutical care services add value to patient care by enhancing patient compliance, improving patient outcomes, and reducing healthcare costs. A Canadian strategy for improving the provision of patient-centered care by pharmacists, identifies obtaining remuneration for professional services as a key area of action to support such activities. The cost of the prescription then is based upon the cost to the pharmacy plus a handling charge. As the pharmacy practice literature reporting the clinical benefits of pharmacist cognitive services continues to grow and pharmacy revenues from dispensing alone decrease in light of generic drug price reductions and other factors, the profession is advocating for appropriate payment for clinical services. Pharmacists also, with some success, has billed insurance companies for pharmaceutical care services that were provided to his patients. Indeed, lack of remuneration for services has been cited by community pharmacists as a key barrier preventing the greater provision of clinical services [59], [65-67].

Medication risk management

Different medication review procedures are internationally used in both outpatient and inpatient settings. The accurate medication history recording and the medication chart is the basis for safe pharmacotherapy and a starting point for medication reviews. strategies to prevent ADRs and drug-related hospital admissions are urgently needed, particularly for elderly patients. In addition to other medication safety initiatives, national and international organizations recommend including pharmacists on health care teams to improve medication safety [68,69]. For each DRP, a specific recommendation should be addressed to the health care team. Each recommendation should be discussed with the healthcare team, and the physician decided if he followed the recommendations. The medication should be checked again and registered, if the recommendation is partly or fully followed.

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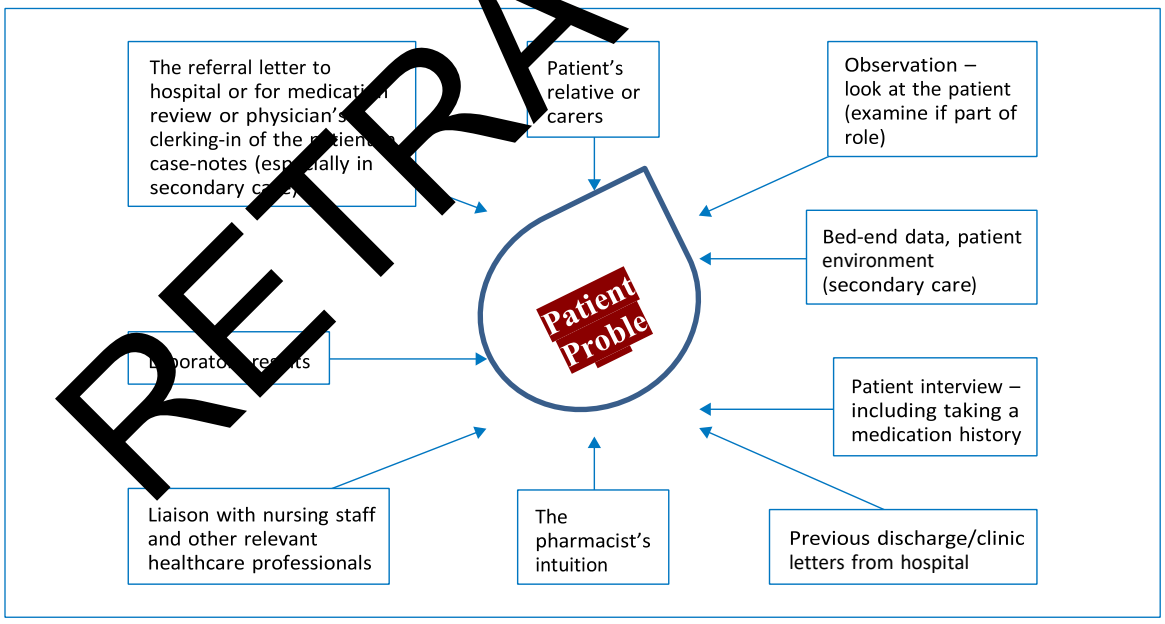
Exhibit 1. Potential Drug Therapy Problems [70]
▪ Use of drug when no drug is necessary
▪ Medical condition which is self-limiting itself
▪ An inappropriate therapy for a specific condition
▪ Incomplete vaccination
▪ Inappropriate dose, dosage regimen, dosage form, dose schedule, route or method of administration
▪ Therapeutic duplication
▪ Hypersensitivity of patient to component of a drug
▪ Adverse drug or devise related events or potential for such event
▪ There are clinically significant drug-drug, drug-disease, drug-food or drug-reagent interaction (during diagnosis)
▪ Drug or non-drug therapy has been affected by social, recreational or non-traditional drug use by the patients or others
▪ Patient is not receiving the full benefit from the prescribed drug or non-drug therapy
▪ Drug or non-drug therapy affected by the financial condition of the patient
▪ Patient's lacking in understanding/misconception of the drug/therapy
▪ Patient non-adherence to drug/therapy

High prevalence of polypharmacy in older adults has been widely reported1. Multiple studies have mentioned that polypharmacy increases the risk of adverse drug reactions, hospitalization, falls, mortality, and other adverse health outcomes in elderly patients. Pharmacogenomics allow identify how hereditary profile affects an individual response to drugs. As a strategy for optimizing medication usage, pharmacogenomics became an important element of precision medicine. A recent study has demonstrated that precision medicine has significant potential in people with polypharmacy, particularly in older adults with history of urgent care utilization [72].

Figure 1. Common sources for deriving the problem list [71]



Poor medication management during or immediately after hospital admission increased the risk of readmission in the next month by 28%. Hospital admissions and discharges, interdepartmental transfers, or care shared between a specialist and a GP, are often dangerous times for patients, especially those with long-term conditions or taking multiple medicines. Patients may take a number of medicines in complex regimens so there is a high potential for drug interactions, particularly given the substantial comorbidity and mortality rates in this population. There are significant discrepancies between the medicines people take at home, the medicines GPs think they are taking at home, medicines listed in GP referral letters, medicines people obtain from pharmacies, the medicines recorded when they are admitted to hospital, and when they leave hospital, and the medicines detailed in their official discharge summary.

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Exhibit 2. Drug-Related Problems Encountered by Pharmacist Monitoring [72]
▪ Untreated condition ▪ Improper drug selection ▪ Under-dose ▪ Failure of patient to receive drug ▪ Overdose ▪ ADR ▪ Drug-food interaction ▪ Drug without indication ▪ Nonadherence ▪ Duplicate therapy ▪ Allergies ▪ Requiring renal or hepatic adjustments ▪ Poly-pharmacy

Pharmaceutical care focuses on activities that lead to positive patient outcomes, and accepting end results of medication therapy remains important in providing such services. A pharmacist must be a scientific problem solver, a good communicator, educator and learner. Primary activities involved in pharmaceutical care include: obtaining a medication history, identifying real and potential DRPs, developing a pharmacy care plan to include implementing and monitoring parameters to resolve and prevent drug-related problems, and evaluating the plan to determine if clinical outcomes have been achieved through documentation, patient consultation follow-up to determine if the desired clinical outcomes have been achieved. Future trends in drug development will increase the pharmacist's role in drug selection, in an effort to ensure both safety and cost-containment. All this is achievable through competent skills and knowledge gained to provide reliable coordinated services. There was a trend for the number of pharmacist-hours containing at least one potentially serious dispensing error to increase as the prescription-filling rate accelerated. Outpatient pharmacies with high volumes should set a limit to the number of prescriptions filled by their pharmacists and should experiment with quality assurance systems to reduce dispensing errors and subsequent legal liabilities [72-74].

Outpatient service through telemedicine

Telemedicine refers to the delivery of clinical services using technology that allows two-way, real time, interactive communication (including telemonitoring and video including follow-up telephone calls) between the patient and the pharmacist at a distant site. In the United States, the increasing shortage of primary care providers and specialists represents an opportunity for pharmacists to assume a more prominent role managing patients with chronic disease in the ambulatory care setting. However, lack of reimbursement may pose a barrier to the provision of care by pharmacists using telemedicine [75]. Generally, telemedicine modalities fall into one of two categories: synchronous or asynchronous. In synchronous telemedicine, a confidential, interactive, two-way audio and video connection replaces the in-person, face-to-face visit, using specialized equipment to perform an accurate and reliable history and physical exam. Synchronous telemedicine models are typically used to manage acute and chronic diseases that rely significantly on a real-time patient interaction or the physical exam, such as the management of chronic infectious diseases, pulmonary medicine, diabetes management and telepsychiatry [76].

Exhibit 3. Terminologies Associated with Telehealth [77-79]	
Term	**Definition**
Telehealth	The term telehealth is used to encompass a broader definition of remote healthcare that does not always involve clinical services.
Telemedicine	Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve patients' health status. Telemedicine is the use of two-way real-time interactive audio and video between places of lesser and greater medical capability or expertise to provide and support health care, when distance separates participants who are in different geographical locations.
Telecare	Telecare is the term that relates to technology that enables patients to maintain their independence and safety while remaining in their own homes. This technology includes mobile monitoring devices, medical alert systems, and telecommunications technology like computers and telephones. Continuous remote monitoring of patients enables telecare to track lifestyle changes over time as well as receiving alerts relating to real-time emergencies.
Teleconsultation	Consultation between a provider and specialist at distance using either store and forward telemedicine or real-time videoconferencing.
Tele-mentoring	The use of audio, video, and other telecommunications and electronic information processing technologies to provide individual guidance or direction.
Telemonitoring	The process of using audio, video, and other telecommunications and electronic information processing technologies to monitor the health status of a patient from a distance.

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Exhibit 3. Terminologies Associated with Telehealth [77-79]	
Term	**Definition**
Telepharmacy	Telepharmacy is defined as the provision of pharmaceutical care to patients through the use of telecommunications and information technologies.
Store-and-Forward "Asynchronous Communication"	Type of telehealth encounter or consult that uses still digital images of patient data for rendering a medical opinion or diagnosis (e.g. in radiology, pathology, dermatology, ophthalmology, and wound care). Store and forward includes the asynchronous transmission of clinical data from one site to another (e.g. email).

In US 20% of the total people are rural based, only 9% of their physicians have posting there. It is estimated that as of 2016 at least 20% of the US population did not have equal access to health care. In addition to rural areas, telemedicine services have also expanded into prisons, military bases, and school systems. Among 110 million medical visits were conducted in 2015, 59 million were conducted on-line, over the internet, or by using mobile devices, accounting more than 50% of patient visits. Since pharmacists are not recognized by CMS as healthcare providers, they cannot be reimbursed for services rendered under most traditional fee-for-service arrangements. In conclusion, pharmacists have a unique opportunity to use telemedicine models as a means to improve access to care and chronic disease management in both rural and urban populations within the ambulatory setting. Electronic health (eHealth) tools incorporate many opportunities for patients to increase their engagement through focused disease-specific learning, options to receive regular feedback and frequent reinforcement (e.g., peripheral monitoring devices). Additional inbuilt support functions that assess progress, provide goal setting and problem solving aim to increase the patient's skill and confidence in managing their health problems. Supplementary motivational interviewing and cognitive behavioral components can also be provided via the internet, mobile device or telephone [80,81]. Micro-hospitals are 24-hour, small inpatient facilities with an average of 2 to 10 beds, designed to provide a diversity of healthcare services consistent with community demands. In addition, they seek to combine a cost-effective healthcare vehicle with potential time-dependent triage/transfer capabilities to a nearby large medical center. This smaller cost-effective entity represents an ideal vehicle for telemedicine, whereby specialists are always on hand for interpretation and consultation, with minimal patient waiting [82].

Challenges of chronic health management

There are significant differences between acute and chronic disease that require different approaches to care. The American health care system is built on an acute care paradigm; in general, acute care problems have a rapid onset, are short in duration, and result from a single cause. Chronic care problems are slower to develop, longer in duration, and have multiple causes, some of which occur years before the onset of symptoms. These differences limit the current system's ability to deal effectively with a number of unique challenges in managing chronic disease:

- The social, behavioral, and psychosocial elements associated with chronic disease (e.g., the often-unrecognized elements of self-image related to being a person with disease).
- The need for continuous care, often throughout the remainder of the patient's life.
- The influence of chronic disease on the patient's extended family and the very real need for the family's ongoing support for long-term success.
- The influence of lifestyle factors in both the causation and long-term management of chronic disease.

Caring for the population of patients with chronic conditions requires a new paradigm—one that encompasses longitudinal care and unplanned episodes of care. To a large extent, the development and implementation of such a system will hinge on addressing 4 specific challenges17:

- Realigned Reimbursement—In general, payment for health care services is triggered by acute care episodes. There must be a mechanism whereby providers are compensated to manage a broad range of chronic conditions that never resolve and that are not characterized by episodes of care.
- Team-Based Care—An adequate number of nonphysician health care team members in disciplines such as nursing, social work, community health coaching, and pharmacy must be trained and available to coordinate proven team-based care.
- Patient and Family Engagement—Expanded opportunities for patient and family engagement in self-management programs are essential for improving patients' ability to manage their conditions and adhere to treatment plans.
- Information Sharing—The current acute episode-focused medical record system must be redesigned to improve clinicians' ability to share information regarding patients with chronic disease and facilitate the use of evidence-based decision support in their care [83].

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Epilogue

In most countries, existing health care systems do not optimize the practices of all health professionals and cost an increasing amount without comparable increases in quality and accessibility. Numerous proposals have been made on how to address these shortcomings. Achieving these goals require different health professionals to work in collaboration with each other to meet the health needs of patients. In order for that to happen, governments must work with all key professional groups to use all available resources of the system most effectively and, importantly, pharmacists must be recognized as the professional that coordinates drug therapy management. In addition, governments must put in place policies and a regulatory and funding environment that facilitates team-based care and acknowledges and supports the professional competencies of all health professions.

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