

AN OVERVIEW OF TELE PHARMACY: BRIDGING THE HEALTHCARE GAP

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ABSTRACT

Telepharmacy represents a transformative approach to pharmaceutical care, utilizing information and communication technology (ICT) to bridge the gap between pharmacists and patients when physical presence is not feasible. As of 2026, telepharmacy has evolved from a simple remote dispensing tool into a sophisticated, AI-integrated ecosystem that serves as a cornerstone of modern digital healthcare. Current research highlights the integration of **Artificial Intelligence (AI) agents** and **Machine Learning (ML) algorithms** to automate complex clinical workflows, such as predictive medication adherence monitoring, real-time drug interaction screening, and automated medication reconciliation. Beyond addressing the persistent global shortage of pharmacists and the rise of "pharmacy deserts," contemporary telepharmacy models now incorporate **Interoperability 2.0**, seamlessly linking electronic health records (EHRs) with wearable health technology to provide proactive, data-driven patient consultations. While the enforcement of the **Drug Supply Chain Security Act (DSCSA)** has bolstered the security and transparency of the pharmaceutical supply chain, the industry continues to navigate a shifting regulatory landscape and the critical need for enhanced cybersecurity frameworks. Ultimately, the 2026 telepharmacy landscape represents a shift toward a **patient-centric, direct-to-consumer (DTC) model**, where virtual pharmacist engagement is no longer a secondary alternative but a primary, high-efficiency standard of care.

KEYWORDS: Communication Technology (ICT), Artificial Intelligence (AI), Machine Learning (ML), Drug Supply Chain Security (DSCSA), Electronic Health Records (EHRs).

TELEPHARMACY

INTRODUCTION

Telepharmacy is the movement of medication care through media correspondences to patients where they probably won't have direct contact with a medical practitioner. It is an event within the broader scope of telemedicine, as practiced in the specialized field of pharmacy.



Figure 1: Communication between patient and Practitioner/Pharmacist.

Telepharmacy organizations includes

1. Drug treatment noticing
2. Patient coordinating
3. Prior endorsement
4. Refill endorsement for doctor supported medications
5. Monitoring of model consistence with the aid of somewhat organizing or videoconferencing.

The use of media transmission development has exploded, and drug distribution via telepharmacy is critical, particularly in rural areas. (Paudel et.al.)

In this the pharmacist prepare/audit and make a record the report and cases of investigation through telephonic conversation, email and helpline portals.

Advantages

- Essential consent to clinical thought associations in remote and rural areas.
- Through various approaches, social distancing and no-contact therapy are achieved through verbal communication.
- Patient fulfillment because of medicine access and data in a normal locale.
- Productive patient admonishing.
- Irrelevant absence of adjoining medicine-informed authority and drug store associations.

Disadvantages

- The regulations and laws governing telepharmacy vary by state.
- The potential for extra permitting necessities to participate in telepharmacy services.
- Potential on-the-spot visits to the telepharmacy, remote site needed by state laws and rules. (Baldoni et.al.)
- Unsatisfactory status of patient.
- Communication gaps.

❖ The process of telepharmacy

Is a structured workflow that utilizes digital infrastructure to mimic the traditional pharmacy experience while removing geographical barriers. It essentially connects a **central pharmacy** (where the pharmacist is located) with a **remote site** (where the patient or technician is located).

Here is the step-by-step breakdown of how the process typically functions:

1. Prescription Initiation and Digitization

The process begins when a healthcare provider issues a prescription. In a telepharmacy setup, this is usually an **e-prescription** sent directly to the pharmacy software. If the patient has a physical paper script at a remote location, it is scanned into a high-resolution imaging system by a certified pharmacy technician or via an automated kiosk.

2. Pharmacist Review and Verification

A licensed pharmacist at the central "hub" receives the digital prescription and the patient's **Electronic Health Records (EHR)**. The pharmacist performs a clinical review, checking for:

- Correct dosage and instructions.
- Potential drug-drug interactions.
- Allergy contraindications.
- Patient medication history.

3. Preparation and Dispensing

Once the pharmacist approves the order, the medication is prepared at the remote site. This happens in one of two ways:

- **Technician-Led:** A pharmacy technician at the remote location pulls the medication and prepares the label.
- **Automated Dispensing:** An automated machine (similar to a specialized vending machine) selects the correct medication and bottles it.

4. Remote Visual Verification (The "Digital Check")

Before the medication is handed to the patient, the pharmacist must verify the work. The remote site uses high-definition cameras to show the pharmacist the **stock bottle**, the **filled container**, and the **final label**. The pharmacist compares these images against the original prescription to ensure 100% accuracy.

5. Patient Counselling (Tele-Consultation)

This is the most critical step for clinical care. Before the patient leaves with their medication, they engage in a private, real-time video or audio consultation with the pharmacist. During this session, the pharmacist explains:

- How to take the medication.
- Potential side effects.
- Storage requirements.
- Answers any questions the patient may have.

6. Documentation and Follow-Up

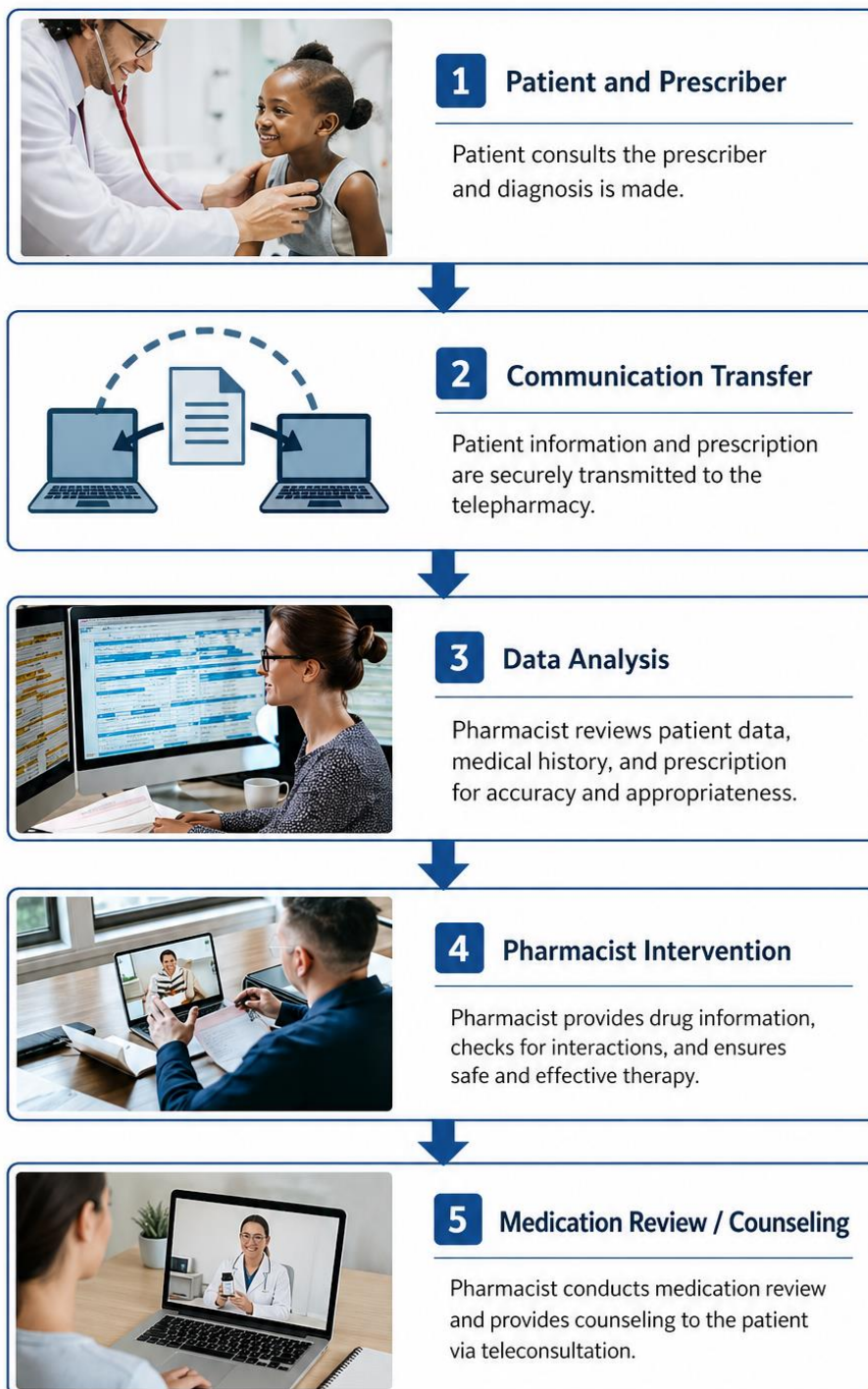
The entire interaction is logged in the patient's EHR. In modern systems, AI tools may also be used to schedule follow-up reminders or monitor adherence data sent from the patient's wearable devices or smart pill-bottles.

(Boonpattharatthiti *et.al*)

Summary of the Workflow

Step	Action	Responsibility
Input	E-Prescribing or Scanning	Physician / Technician
Analysis	Clinical Review & EHR Check	Remote Pharmacist
Action	Filling & Labelling	Technician / Automated System
Safety	High-Def Visual Audit	Remote Pharmacist
Care	Video Counselling	Pharmacist & Patient

Process of Telepharmacy



❖ TYPES OF TELEPHARMACY

I. Inpatient (Remote Order-Entry Review)

Definition

In this, Pharmacist along with the Doctor, working in a remote location to provide remote order requirement for a hospital's inpatient pharmacy. Before the hospital personnel distributes meds with patient, remote pharmacist verifies the prescription orders.

Uses

It provides for a real-time drug order evaluation and verification. Using this, pharmacists can supplement and strengthen the inpatient pharmacy by providing 24/7 report or filling in high working hours.

II. Remote Dispensing (Retail/Outpatient/Discharge)

Telepharmacy, which is most commonly utilised in retail pharmacies OPD pharmacies, provides patients with compatible allow medication regardless of their different areas.

By spreading the figure of a pharmacist over numerous outlets, healthcare organization's can create retail telepharmacies in areas where a traditional pharmacy would be impossible to open. Furthermore, reduces rates by the improvement in adherence of patient category, improves money performance, improves the experience of patients while reaching on your climatic reach.

III. IV admixture

Definition

According to Joint Commission on Accreditation of Healthcare Organizations, "the preparation of a pharmaceutical product that requires the measured addition of a medicine in 50 mL containers of IV fluid" (JCAHO).

Uses

Made to save income, time for hospital pharmacies. A pharmacist can save time by not having to get dressed for entering the aseptic rooms to check the IV admixture remotely.

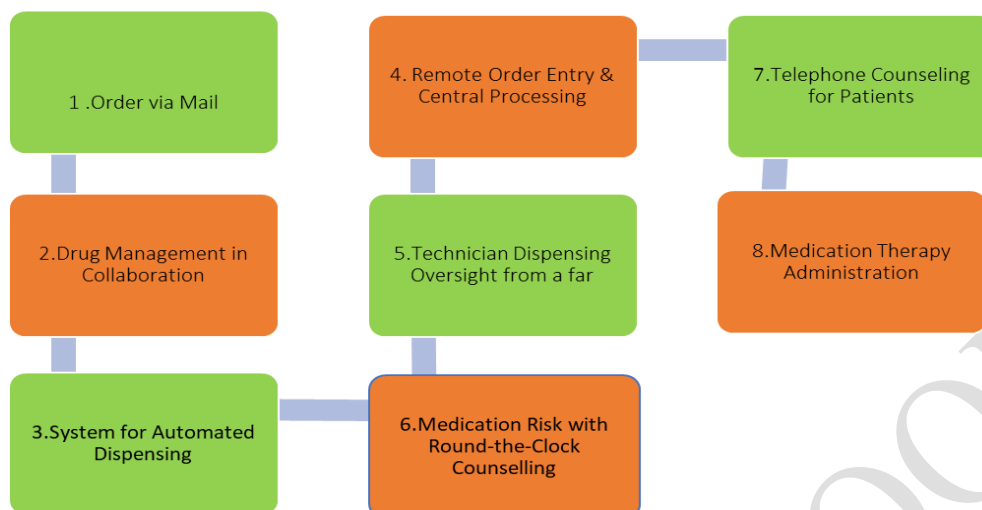
Pharmacists can think on therapeutic activity and other revenue-generating responsibilities when their time is freed up. Implementing an image-based telepharmacy workflow aseptic areas has a extra benefit for allowing us to concentrate on every procedure and reduce errors.

IV. Counseling of Remote Patients

Definition- Pharmacist and the Practitioners allows patient interactions by the help of telecommunications in remote-patient counselling.

Uses

Practitioners and Pharmacists can communicate with patients and convey a category of services and live mode calls using remote patient counselling. Remote counselling gives options for specialist counselling (Diabetics / HIV / AIDS), discharge counselling, and numerous clinical interactions with pharmacists in addition to retail independent pharmacies, community, clinic, and hospital pharmacies benefit.

❖ **Telepharmacy Services are divided into several Categories.****Applications of Telepharmacy****I. Community Pharmacy in a Retail Setting**

Independent community pharmacies can use telepharmacy to increase their pharmacists' reach and collect more prescriptions. Due to technological advancements, pharmacy owners can now build retail telepharmacies on their existing business to serve more customers and supply better pharmacy access.

Medication compliance and health outcomes can be improved by confirming pharmacy and a pharmacist in a convenient location. (Le et, al.)

II. Hospitals and Health Care Systems

Telepharmacy provides to improve patient care.

Remote order input review (inpatient) allows for 24-hour (think overnight and/or extended) pharmacy coverage at rural hospitals and clinics, while retail telepharmacy may be used in-house or as an outpatient pharmacy extension to clinics throughout the region.

TeleCounsel TM, a live-and-interactive video counseling service, allows health systems to connect with specialists throughout the network, allowing them to actually collaborate.

III. Pharmacies caring specialized patients

According to the NCPA, is that the fastest enlarging portion of the pharmacy industry. Telepharmacy may be employed by healthcare organizations to help patients in oncology, HIV, and hepatitis clinics. A convenient on-site telepharmacy is an alternative choice available to specialized patients.

Using telepharmacy, a residency-trained HIV pharmacist can consult patients at clinics across the network via live-video counseling. Patients can be assured that their medicines prescribed after clearance from hospital will be started right away, and specialists can educate them on the importance of staying on track. (Kimber et, al.)

IV. Mental Health Centers

An increased focus on mental health around the world, pharmacists are in a good stage for helping the patients with mental diseases.

Including a pharmacist within the psychological state equation provides good understanding of patients the importance while taking the medication exactly as prescribed. Telepharmacy allows for adherence friendly point-of-care dispensing, and this type of patient-pharmacist relationship provides better results.

Mental health companies can also use remote-video therapy to connect professionals to clinics across the network. This connectedness enables companies to make the best use of their specialists, resulting in better patient outcomes and quality of life.

V. Senior Living Centers

Telepharmacy with on-site dispensing can also aid independent living centres. Having a low-cost telepharmacy on site allows seniors to get emergency medication quickly. With one (or more) qualified pharmacy technicians on staff and a remote pharmacist in charge, this type of remote dispensing location works similarly to a regular retail telepharmacy. Patients in long-term care may also like remote-video technology, which allows them to own counselling sessions with pharmacists at their bedside using tablets.

VI. Doctor's Offices

We can also virtually place a pharmacist during a physician's office to target patient issues and adherence using telepharmacy. This is a win-win situation for all sides. Patients' adherence is used to evaluate physicians, and it's difficult to assure adherence while filling the prescription elsewhere.

A physician and a retail independent pharmacy owner can team to open a licensed telepharmacy site within the doctor's office. The telepharmacy owner will must store medication, obtain licenses, and found reimbursements rather like a conventional pharmacy.

Patients benefit from this use of telepharmacy since they have easy way with a pharmacist and point-of-care dispensing.

VII. Healthcare Organizations' Language Barriers

Regular people may find it difficult to urge the care and prescription medication they have to measure a healthy life because of language barriers. Telepharmacy software can assist connect patients with healthcare professionals that know exactly what's wrong and how to remedy it in an increasingly diverse society. Language obstacles in healthcare are more common in cities than in rural areas, however this type of barrier causes the same problems with access to care as a rural resident.

Patients who only communicate using ASL (American sign language) now face barriers to care since ASL-speaking pharmacists are few and far between.

Patients using language of sign can also get access to pharmaceutical care through interactive video counselling sessions.

SGPGIMS, LUCKNOW is currently running a telemedicine department which may flourish the Telepharmacy too.

VIII. Employer Campuses and Schools

Employer-based pharmacies are a comparatively new telepharmacy application, but they're becoming more common as many large companies employ thousands of individuals on a day to day. (Kimber et, al.)

Employer-based telepharmacies don't seem to be only cost-effective, but they also help employees stay healthy, reduce sick days, and economize on the conditioning of both patients and the company.

Students, teachers, professors, and others may obtain prescription medication from the campus-based remote dispensing facility. (Uric et, al.)

❖ Examples of Telepharmacy

- I. **Remote Counseling:** Pharmacists provide patient counseling via live-and-interactive video sessions. They can discuss medication instructions, side effects, chronic illness monitoring (like diabetes or HIV), and lifestyle recommendations.
- II. **Inpatient Remote Order-Entry Review:** A pharmacist located remotely reviews medication orders for an inpatient pharmacy at a hospital before the hospital staff administers the drugs to the patient. This allows hospitals to have 24/7 coverage and real-time verification without needing a pharmacist on-site at all times. (Saeed et,al.)
- III. **Remote Dispensing (Retail/Outpatient):** A retail community telepharmacy is staffed by certified pharmacy technicians, while a remote pharmacist supervises the technicians and reviews prescriptions via a live video feed or images. Automated dispensing machines can also be used, where a pharmacist authorizes the machine to dispense the medication after reviewing the prescription and consulting with the patient over the phone or video. (Omboni et,al.)
- IV. **Rural Pharmacy Support:** In rural areas that cannot support a full-time pharmacist, telepharmacy connects patients and local pharmacy technicians or nurses to a central pharmacist. This ensures that patients in isolated locations still receive expert pharmaceutical care and medication access.(Peterson et,al.)
- V. **Admixture Review:** In hospital pharmacies, remote pharmacists can review the preparation of intravenous (IV) solutions using image-based workflow systems. This saves the time needed to suit up and enter the cleanroom, allowing them to focus on clinical activities.

❖ Examples of some company which promotes telepharmacy services

Here are a few leading examples of companies promoting telepharmacy services

1. **Teladoc Health** A global leader in telemedicine, Teladoc integrates telepharmacy by allowing patients to consult with healthcare providers and have prescriptions sent directly to their local or preferred mail-order pharmacies. Their platform emphasizes seamless continuity of care between remote diagnosis and pharmaceutical fulfillment.
2. **PillPack (by Amazon Pharmacy)** PillPack revolutionized remote pharmacy dispensing by pre-sorting medications into single-dose packaging sorted by time and day. While technically a mail-order pharmacy, it operates heavily on telepharmacy principles by providing 24/7 access to remote pharmacists via phone, email, or chat for counseling and medication management.
3. **Tata 1mg** A major player in the Indian digital health space, Tata 1mg combines e-pharmacy services with teleconsultations and lab tests. Their platform allows patients to upload prescriptions, consult with registered medical practitioners remotely, and receive pharmaceutical guidance from their network of pharmacists before medications are delivered. (Uric et,al.)

4. **Pharm Easy** Another dominant force in India, PharmEasy connects patients with local pharmacies and diagnostic centers. They utilize telepharmacy concepts by facilitating teleconsultations to validate prescriptions and ensuring that a registered pharmacist reviews the order before dispatching it to the patient's location.
5. **Tele Pharm (A Cardinal Health Company)** Focused specifically on retail and clinical telepharmacy solutions, TelePharm provides the software that allows remote pharmacists to verify prescriptions and conduct video counseling with patients at remote dispensing sites. They are instrumental in helping rural communities maintain access to pharmacy services when a full-time pharmacist cannot be physically present (**Peterson et.al**)

❖ **The Current Status of Telemedicine in India is as follows:**^[6]

- ✓ Health care infrastructure was not properly established, and it was unable to fulfil the expectations of the patients as well as, the availability of resources, doctors, employees and equipment.
- ✓ In India, rural areas account for 68 percent the population, while urban areas with secondary and tertiary care services account to 32 percent.
- ✓ Telemedicine allows medico and practitioners with specialist who are unable to build in rural locations to provide service.

❖ **Telemedicine Challenges and Opportunities in India**

1. This system is accepted by the general public, patients, family doctors, administrators, and, most significantly, the government.

Patients may sense a lack of emotional connection with clinicians and specialists, whereas new or inexperienced physicians may find it difficult to persuade patients about their difficulties and fear that their information may be compromised.

2. The Affordability Problem

For individuals with low financial means, the cost of adopting technology is excessively high, and installing a telepharmacy is prohibitively expensive for many companies and institutions.

3. The number of lettered people with their languages spoken, i.e. only 65 percent of Indian population is educated, implying that many people in India are illiterate.

For the uninitiated, (without special knowledge) this communication mechanism can be difficult to comprehend.

4. Government support

As telemedicine is still in its early stages in India, it requires financial support and implementation from the government, which have the opportunity to improve the country's health-care system. (**Le et.al.**)

5. For the use of telemedicine's, there should be ongoing medical education and discipline programmed for professionals, patients, and users.

SGPGIMS, LUCKNOW is currently running a telemedicine department which may flourish the telepharmacy too.

- ❖ **During the COVID-19 pandemic, telepharmacy was successfully employed as a substitute for consultation.**

- During the COVID-19 pandemic, India used over 60% of Telepharmacy techniques. Tele-pharmacy is also a brand-new way to teach healthcare providers a way to provide high-quality medication-related advice and services to COVID-19 patients. Pharmacists are to blame for identifying and documenting adverse drug reactions.
- Pharmacists can use Telepharmacy technology to supply clinical pharmaceutical services to patients with diabetes (DM) who require frequent treatments while preventing distance and minimizing face-to-face interactions.

How Telepharmacy is Helping During the Pandemic-

1. Telepharmacy has given major benefits during a pandemic.
2. Recommended by the Centres for Disease Control and Prevention (CDC).
3. Telepharmacy is gaining popularity in several Indian states.
4. Telepharmacy is, policy recommendations and implications made by pharmacy associations.

Telepharmacy's Operation

A patient brings their prescription to a licenced pharmacy technician, who checks it and advises them on how to take their medication. The pharmacist also gives the patient advice on the way to take the proper medication.

In other circumstances, the technician acknowledges fully the prescription through a video or audio conference, which includes dose, dose regimen, route of administration, fed/fast state administration, interactions, and contraindications.

The current scarcity of health staff, particularly pharmacists, is a difficult health issue must deal with. The utilization of modern technologies, such as telepharmacy, may be a viable solution to these issues. However, unresolved issues (such as legal consequences) that make widespread use of telepharmacy problematic.

• Telepharmacy-Related Research

- ❖ Patients in remote locations were more satisfied with telepharmacy services, and patients in general were happy with them.
- ❖ Most residents in rural region have to proceed more than 40 miles to acquire their medications, according to reports (**Boonpattharatthiti et.al**).
- ❖ Allows patients to see pharmacists via a telepharmacy system.
- ❖ The spread and adoption of Telepharmacy may be a multi-actor challenge; achieving meaningful results and effective healthcare improvement requires collaboration comparison in the public and private sectors, as well as research organisations and academics.

Is the Drug Enforcement Administration (DEA) about to regulate Telepharmacy?

- ✓ On November 16, 2021, (DEA) filed an advance notice of proposed rulemaking to work out whether governing new federal regulation the practise of Telepharmacy must be created.
- ✓ The receipt of prescriptions, the dispensing of controlled medications by pharmacists practising in various jurisdictions would be governed by these regulations. The DEA hopes that such laws will bring uniformity and standardisation to a healthcare business that is increasingly relying on technology and multistate geographic footprints to cut costs, improve patient access, and facilitate pharmaceutical distribution to patients.
- ✓ The DEA's notice gives the sector a chance to offer input and feedback that could help define the future laws. (**Boonpattharatthiti et.al**)

CONCLUSION

Telepharmacy has emerged as a transformative force in modern healthcare, effectively bridging the geographical and infrastructural gaps that have historically limited access to pharmaceutical care. By leveraging advanced telecommunications and digital health platforms, it extends the clinical reach of pharmacists beyond traditional brick-and-mortar settings. This ensures that patients, particularly those in rural and medically underserved communities, receive expert clinical oversight, timely medication dispensing, and vital therapeutic counseling.

The integration of practices such as remote order-entry review, virtual patient consultations, and automated remote dispensing has not only streamlined clinical workflows but also significantly enhanced medication adherence and patient safety. As healthcare systems increasingly pivot toward patient-centric and decentralized models, telepharmacy plays a crucial role in facilitating continuous chronic disease management, reducing medication errors, and alleviating the burden on primary and tertiary care facilities.

However, the widespread optimization and adoption of telepharmacy are not without challenges. Regulatory inconsistencies across different jurisdictions, data privacy and cybersecurity concerns, the necessity for robust IT infrastructure, and the initial capital investment remain significant hurdles. Addressing these barriers requires a coordinated approach among policymakers, pharmaceutical bodies, and technology providers to establish standardized, secure, and legally compliant operational frameworks.

Ultimately, telepharmacy is no longer merely a supplementary service or a contingency measure; it is a fundamental component of the evolving healthcare ecosystem. As technological innovations—such as artificial intelligence, predictive analytics, and integrated electronic health records—continue to advance, telepharmacy is poised to become an indispensable tool. It holds the potential to redefine the standard of pharmaceutical care, optimize therapeutic outcomes, and foster greater health equity on a global scale.

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