



The Expansion of Pharmacy-Based Test and Treat Programs for Infectious Diseases: Impact, Challenges, and Future Directions

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ABSTRACT

Pharmacy-based test and treatment programs are increasingly transforming healthcare by offering accessible, convenient, and effective care for common infectious diseases. These programs enable pharmacists to provide same-day testing and treatment, particularly for illnesses like influenza, strep throat, and COVID-19. Doing so addresses critical healthcare gaps, especially in underserved or rural areas with limited primary care resources. This article explores the impact of pharmacy-based test and treatment programs on public health and healthcare access, highlighting improvements in patient outcomes, increased healthcare convenience, and reduced burden on primary care providers. However, the need for additional pharmacist training, inconsistent reimbursement policies, and regulatory variability across states could have hindered these programs' expansion. Despite these challenges, advancements in diagnostic technology and the potential for telemedicine integration suggest promising avenues for sustainable growth. Legislative and policy support, such as standardizing pharmacists' scope of practice and ensuring fair reimbursement, is essential to realize these programs' benefits fully. As pharmacy-based test and treatment services continue to evolve, they offer a valuable public health resource that has the potential to reshape healthcare delivery, enhance health equity, and strengthen the healthcare system overall.

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Introduction

Pharmacy-based test and treatment programs are now prevalent healthcare models to diagnose and treat different infectious diseases conveniently, in a timely, and easy manner. These programs permit pharmacists to provide diagnosis tests and immediate treatment for ailments like the seasonal flu, strep throat, COVID-19, etc., under specific conditions. The model builds on pharmacists' working knowledge as readily available niche healthcare subordinates, integrating their deep understanding of infectious diseases, pharmacology, and patients [1].

The advancement of pharmacy-based test treatment schemes has been informed by the growing need for rapid diagnostics for infectious diseases and changing circumstances within the legal framework that acknowledges that the role of pharmacists can alleviate pressure in overstressed healthcare settings. The COVID-19 pandemic, for instance, highlighted the usefulness of other access points since there was a high demand for tests and other treatment services, and many patients could not access the formal facilities. In response, the overwhelming number of state and federal policies were modified to enable pharmacists to be more involved in disease control, ensuring that patients received treatment on short order [2].

This has placed the pharmacies as a convenient and reliable one-stop destination for a rapid diagnostic tool, treatment, stabilization, and referral services where health facility-based healthcare services may not be easily accessible, for instance, in rural or hard-to-reach communities. Focusing on how test and treat services have transformed public health, this article looks for potential challenges and future developments for Pharmacy-based test and treat programs; the topic investigates the adaptability of this model in the context of the current healthcare climate [3].

The Rise of Pharmacy-Based Infectious Disease Services

Historical Background and Drivers for Expansion

Several current pharmacy-based infectious disease services can be traced back to immunization programs, beginning with the critical role of pharmacists in increasing the accessibility of immunizations. As pharmacists proved that they can safely and effectively manage the disease, the policymakers and providers realized there was untapped potential for further involvement of pharmacists in managing other infectious illnesses. Due to their easy availability in terms of access points and longer operating hours, pharmacies emerged as the right places to fill in healthcare voids, particularly in areas with scarce resources [4].

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Some forces that informed this expansion covered increasing healthcare costs and the scarcity of access to primary care physicians. These pressures and patients' expectations of receiving convenient and effective healthcare services informed the perceptions of pharmacy-based services. Pharmacists could take the pressure off conventional healthcare centers by performing testing, diagnosing, and treating infections swiftly and thus transform pharmacists into frontline providers of critical care. These changes comply with public health objectives concerning the provision of accessibility of individual care, decentralization of load on hospitals and clinics, and making the necessary care available on time [5].

Major Infectious Diseases Addressed

Early tests and treatments conducted in the pharmacy setting targeted diseases with well-defined diagnostic algorithms and comparatively uncomplicated treatments. These early conditions included influenza and strep throat, both common diseases that can be treated early to optimize the treatment plan. For these infections, pharmacists carry out Point of Care Testing and, depending on the result, prescribe antivirals for flu and antibiotics for throat infections. This model ensures patients get attended to in plenty, giving them a chance not to become sick or spread the illness further [6].

The movement towards testing and treating infectious diseases advanced with the onset of COVID-19, with pharmacies being well adopted as COVID-19 testing and, in some areas, a treatment point. This expansion proved the function of the delivery of the pharmacies in public health, which is to give treatment to people who are not hospital or clinic overloaded. Evaluations of COVID-19 services positively supported pharmacy-based infectious disease programs and prompted the incorporation of other illnesses into the test and treatment concepts [7].

Infectious disease services provided by pharmacies are becoming more developed; pharmacists increasingly intervene for more infections. As these programs progress, they reflect the transformation of healthcare, the ability of pharmacies to diagnose and treat infectious, and the expansion of the practice of pharmacists in public health [8].

Impact on Public Health and Healthcare Access

Improvement in Accessibility and Convenience

These have immensely transformed how healthcare is delivered because patients can easily access tests and treatment for various STIs and common infections without booking an appointment with an outpatient doctor. Most of the established pharmacies are situated in easily accessible areas. With their flexibility in terms of hours of operation, they provide service at the most convenient time for many customers. This change of focus towards delivering services through the pharmacy outlet has revolutionized health since it has assisted various individuals in accessing the appropriate treatment compared to the hospitals, as shown in Table 1 below.

Table 1: Key Aspects of Pharmacy-Based Test and Treat Programs

S.no	Aspect	Description
1.	Accessibility	Improves timely care access, especially in underserved areas.
2.	Scope of Practice	State regulations vary, limiting some pharmacists' ability to diagnose and treat independently.
3.	Financial Barriers	Inconsistent reimbursement hinders program sustainability.
4.	Clinical Effectiveness	High patient satisfaction and positive outcomes through rapid care.
5.	Training Requirements	Specialized training is needed for infectious disease management.
6.	Future Innovations	Advances in testing and telemedicine could broaden the program's scope.

The mobile application of the "test and treat" model is most effective in situations requiring quick identification of a specific condition such as influenza, strep throat, and other relatively easy-to-diagnose infections. When patients are tested and treated quickly, their health will likely improve significantly and slow the spread of diseases. Because they support same-day testing and instant treatment of cases, pharmacies ensure they considerably reduce the spread during those seasons. This convenience leads to greater patronage of the health facility since patients who could have otherwise opted to stay at home due to issues with timing and organization can now quickly access the care they require [9].

Role in Underserved or Rural Areas

It becomes more apparent why pharmacy-based programs are critical in the underserved and rural populations, as access to healthcare is hampered by geography and resources. Primary care physicians are scarce in many rural territories, and half of rural citizens must travel at least 30 minutes to access primary care. These facilities, however, are relatively diverse in these communities and are often the most readily available pharmacists. Through test and treat approaches across these regions, pharmaceutical stores become the sole source of timely diagnosis and treatment for those affected. In these areas, offering tests and treatments to the pharmacies provides hope for many who would otherwise be forced to wait longer to be tested and treated.

In these areas, health care is often disadvantageous. These programs may help level the playing field for residents in terms of timely access to care, just as their urban counterparts do. For instance, outlets that provide testing and treatment, such as flu and COVID pharmacies, help control outbreaks and prevent the spread of the disease. It can also result in early identification of the different diseases whose treatment, if not commenced, can result in complications and thus expensive hospital admission.

In addition, pharmacy services may enhance community health literacy because pharmacies offer patients educational material and advice, which enhances their ability to manage their healthcare and engage the right healthcare provider once in need [10].

Reduction of Burden on Primary Care Providers

Test and treatment programs run in pharmacies have shifted the burden from PCPs, who usually see many patients in a single working session. When pharmacists diagnose and dispose of superficial infections, this relieves the primary care physicians and enables them to handle challenging diseases and chronic conditions. Such redistribution of healthcare tasks increases the efficiency of the overall healthcare system while allowing the patients to receive the optimal level of healthcare.

Stressed resources In many cases, primary care settings receive a surge of patients, especially during infectious disease seasons like influenza and respiratory illness. Pharmacies have taken care of many such cases, implying that primary care practices receive fewer patients with minor acute illnesses. This takes off the burden and reduces the time patients who seek primary care services for other ailments await. Consequently, chronic disease and multiple comorbidity patients benefit from their PCPs' extended focus on their complex clinical needs, unlike patients whose cases could have been competently managed by a pharmacist.

The key idea is to increase the number of services offered by phosphorylated pharmacies, which means that the healthcare system will be more prepared to respond to increased demand. That is why pharmacy-based test and treatment programs are effective during the pandemic, especially when a lack of resources and a quick response is required. Effectively being able to manage specific infectious diseases cuts down on the flow of patients to E.D. and urgent care clinics, freeing up a lot of resources to handle more severe cases [11].

Clinical Outcomes and Patient Satisfaction

Review of Data and Patient Feedback

Previous test and treatment campaign studies revealed pharmacists could handle flu or strep throat symptoms. As mentioned by several healthcare researchers, fast diagnostic tests and instant treatment offered by pharmacists will decrease the duration of the symptoms, provide quicker recovery, and prevent the development of severe conditions. The delivery of diagnostics point-of-care tests means that pharmacists can diagnose and treat straightforward infections accurately, which may be similar to primary care outcomes. Such outcomes highlight the proper work of pharmacies as worthy centers for specific instructions on infectious diseases.

Patients' responses to pharmacy-based tests and treatment programs have also received positive feedback; the surveys indicate high patient satisfaction due to ease of access, convenience, and timely services. There is evidence that such care is convenient to many patients who prefer no-appointment service and spend more time obtaining the service than going to

a doctor's office or an urgent care clinic. In addition, the primary type of patient communication should also be noted, as it has generally been described as informative. However, other sources indicate that pharmacists can often offer guidance on symptom relief, prevention and pro, and the use of medicines [12].

Comparison with Traditional Healthcare Settings

Test and treat programs in settings other than traditional healthcare facilities, of course, have some benefits when it comes to accessibility and efficiency. As a result of the visits being booked in advance, patients are more likely to spend more time in a physician's office than in an outpatient clinic. While clinic appointments only it is convenient for chronic illnesses, pharmacies provide walk-in testing and treatment services, which means that patients can get treated for acute infections faster. This model is advantageous when managing conditions that can flatmate at any moment, such as the flu, because they would be straightforward to handle if treated early.

All clinical trials prove that pharmacists' rapid diagnostic tests are as practical as in primary care centers. Furthermore, pharmacists' treatment plans are typically protocol-driven and evidence-based evidence-based, thus guaranteeing the patients the best treatment plans. Cost-effectiveness also favors the pharmacy-based test and treatment program for patients who lack insuraPharmacypharmacy may be cheaper to attend for some patients than other health care facilities.

Clinical audits embedded in pharmacy-based programs have shown that such services are both clinical and patient-centric because they are easily accessible and fast. Although not intended by these programs, primary care delivery is nonetheless a feasible and satisfactory option in dealing with LBMID, particularly if viewed as a means for improving patient satisfaction and outcomes for those with common infectious diseases [13].

Regulatory Framework and Legislative Support

Overview of Relevant U.S. Regulations and State-Level Initiatives

Pharmacy-based test and treatment programs have increased primarily due to policy and law innovations that opened up additional ways for pharmacists to approach the treatment of diseases. Laws and rules governing pharmacists in the United States are from federal and state regulations; most of the regulation is performed at the state level by the state boaPharmacypharmacy, which usually outlines the practice remit. This framework entails that although pharmacists have autonomy in administering tests, prescribing treatments, and managing confident infectious diseases, decision-making depends on the state.

Currently, many states have come up with measures that will increase the roles of pharmacists in diagnosing conditions such as flu or strep throat, among others. State-level measures comprise collaborative practice agreements (CPAs) and written engagements between pharmacists and healthcare professionals to facilitate pharmacists' administrative management of stated patient care services. I recall that the state boards of CPAs facilitated the increase of the practice areas for pharmacists,

incredibly where such governors had initially restricted the kind of services that pharmacists could provide. Also, some states have adopted standing orders that empower pharmacists to give specific treatments such as antiviral or antibiotics without physician prescriptions, so there is increased support for test and treatment programs [14].

Key Legislation Enabling Pharmacists to Test and Treat

Several acts and regulations have helped expand the role of pharmacists in test and treatment programs for public health. An example is the Public Readiness and Emergency Preparedness Act, which, during public health emergencies, allows pharmacists independent authority for specific tests and vaccines, particularly in infectious diseases. The COVID-19 preparedness and response efforts of the Trump Administration also proved the potential of pharmacies by exercising the PREP Act across the country to conduct COVID-19 tests and administer vaccines.

Besides federal backing, some states have enacted legislation to support pharmacists. For instance, laws in some states, such as California and Idaho, have recently legalized the practice where pharmacists can diagnose outpatient treatment for specific conditions or diseases known to respond qualitatively to standard therapy. Under collaborative practice agreements, pharmacists in Washington can manage influenza-like illnesses, such as illnesseshroat in Washington-led policies exhibit the effects of legislatively-enabled service extension for pharmacists, who are now taking up frontline rapid testing and treatment roles in society.

Over the years, due to changes in law and legislative support, appropriate pharmacists have been able to deliver timely and convenient patient care, thus acting as intermediaries when there are gaps in healthcare delivery. Such support has solidified the positPharmacyarmacy-based test and treatment programs, improving healthcare and public health service response [15].

Challenges and Barriers

Nevertheless, pharmacy-based test and treatment programs have incorporated several challenges and barriers even if they have expanded; thus, these services still need to be integrated into the health system. One of the critical challenges is the definition of the range of interventions and the predefined regulation within the states. The independence of pharmacists in diagnosing and treating infections has been stressed as a component of professional licensure in some states, with others limiting how much pharmacists are allowed to do and demanding collaborative practice agreements or supervision by physicians. Such discrepancies may make it challenging for pharmacists to address patients' needs, primarily since the pharmacist has to abide by numerous state rules and regulations. However, in some places, there is no legal basis for pharmacists to prescribe some classes of medicines or manage treatment regimens unilaterally. As a result, there needs to be more access and discordance with pharmacy-based test and treatment programs (see Figure 1).

Another challenge that these programs have produced includes Financial constraints, mainly concerning reimbursement. Nevertheless, many pharmacists must be paid more for their testing, diagnosis, and treatment services. Although physicians and other PCP are generally compensated for such services, pharmacists seldom can bill for clinical services beyond medication

dispensing. Such an income pattern means that pharmacists – especially those who own small and independent pharmacies – are under financial pressure when fully developing test and treatment programs. Pharmacies may experience sheer problems in staffing and equipment needed to offer a wide range of services where they lack proper financial support. However, the cost remains a significant issue, which may confine many patients without insurance coverage or patients with very high out-of-pocket expenses from accessing the test and treatment services in the pharmacies, thereby restricting the coverage and equity of these programs.

Another critical issue is pharmacists' training and competency profile to offer test and treatment services as needed. Pharmacists know pharmacotherapy very well; however, more training is required to perform and interpret rapid diagnostic tests and manage infections prudently. Strengthening competencies that pharmacists should be competent in delivering is critical to ensuring quality care but can sometimes translate into a considerable cost implication. Lifelong learning, accreditation, and clinical practice are required to train pharmacists for new roles, including diagnosing and managing infection cases. Secondly, due to financial constraints, small pharmacies may need to be able to afford this specialized training, hence increasing service disparities and geographic imbalances (see Figure 1).

All these challenges combined bring into focus the need to maintain policy backing and reshape the healthcare system to give whole meaning to pharmacy-based test and treatment programs. One opportunity is regarding prospects for reducing regulatory disparities that regulate the extent of practice for pharmacists and enable them to deliver more comprehensive services independently. Claiming for pharmacists to be compensated relatively for clinical services will see reimbursement models for these programs that are financially sustainable and adopted frequently. Moreover, sustaining and expanding test and treatment services will require backing training programs to provide pharmacists with appropriate skills for managing I.D. [infectious diseases]. These barriers are relatively significant, but they illustrate the potential prospects and growth for pharmacy-based programs as an essential healthcare model in the community's primary care system [16].

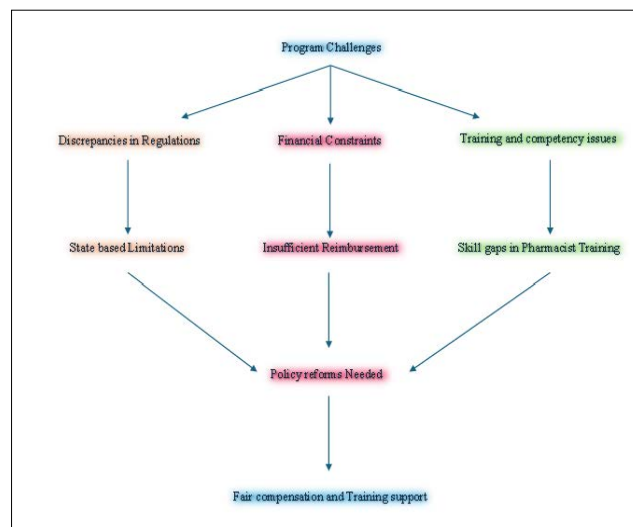


Figure 1: Challenges and Opportunities in Pharmacy-Based Test and Treatment Programs

Future Directions and Recommendations

Following are some innovations and recommendations that may be implemented given that pharmacy-based test and treatment programs are rapidly growing in the future: One central area whereby incremental improvements are expected to occur is in testing technologies that are expected to influence these programs significantly. Pharmacy-based diagnosis of infections is becoming more precise, quicker, and manageable by pharmacists, implying the feasibility of diagnosing a broad spectrum of diseases. For instance, new approaches in molecular diagnostic technologies like portable PCR machines ideal for use in Pharmacy pharmacy could quickly complete traditional procedures beyond fast antigen testing. These technologies would allow pharmacists to deliver results as accurately as a laboratory, thereby expanding their function in monitoring primary respiratory disorders and other forms of infection.

Parapharmaceutical positions are also expected to grow with technological advancement, particularly in the use of telemedicine. Telepharmacy and e-notes reduce the pharmacists' time and effort to communicate with the primary care providers and hence promote interoperability among various practitioners on patient's health status. Using telemedicine; pharmacists could consult with patients remotely, for example, patients in rural areas or areas where access to primary care is a challenge. This would make for a smoother care transition as pharmacists can consult with physicians more often to ensure patients get the best of everything in the pharmacy.

To promote the success of maintaining sustainable growth, there are several strategies that, if implemented, would likely mitigate existing barriers to continued sustainable growth and success. One is writing down a national protocol that outlines the parameters to be followed by each state on test and treatment programs to allow the various states' pharmacists to offer congruent treatment for specific STD/HIV infections. National standards would decrease the range of services and increase the number of people aware of the availability of pharmacy-based care. Also, pharmacists must acquire proper remunerations for clinical services, which is crucial, and appropriate adjustments are required. Policies incorporating pharmacists into the pool of healthcare providers eligible to be reimbursed under a health insurance plan could encourage pharmacies to buy new resources, infrastructure, and training.

The second recommendation is to create achievable training and certification procedures for pharmacists involving diagnostics and infection control and must initiate patient interaction. There is a role for continuing education for pharmacists, and collaboration with professional organizations and public health could sustain the pharmacists' current knowledge of diagnostics and practices in I.D. medicine. Patient recognition and confidence are also crucial for program sustainability in pharmacies for expansion of the services; hence, patients need to understand the importance of getting tested or treated for sexually transmitted diseases whenever they visit pharmacies.

Thus, supported by innovation, the ability to tackle the issues of regulation and financing, and investment in education, the pharmacy-based test and treatment programs can and should grow into a valuable asset in the development of more robust, more effective healthcare, built on the principles of convenience, accessibility, and systematic support [17].

Conclusion

Pharmacy-based test and treatment programs have revolutionized delivery systems as they offer efficient, convenient, and timely help to people in acquiring an early diagnosis for most of these infections. These programs have brought accessibility to healthcare since primary care facilities in regions or areas such as rural areas may be scarce. In the following sections, the rationale for test and treat programs shows that although they are valuable in contributing to public health, several questions arise. Constraint-resulting factors such as scope include laws that remain unchanged from state to state and final-related constraints like reimbursement that remain irrelevant to the expansion of these services. Training requirements also support the necessity of formal education about continuing pharmacology education so that pharmacists may meet clinical benchmarks for testing and care.

In the future, advances in point-of-care testing technologies, better telemedicine integration, and favorable legislation will allow for more extensive services amidst independently owned Pharmacies. New and more efficient diagnostic tests also expand the spectrum of diseases a pharmacist can treat. At the same time, the national guidelines and reasonable reimbursement would enhance the overall standardization and feasibility.

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