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Research Paper

Enhancing diabetes management through pharmacist involvement: a community-based multisite evaluation of health outcomes

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ABSTRACT

Background: Diabetes mellitus is among the largest and fastest growing chronic disease burdens worldwide. The International Diabetes Federation estimates that 589 million adults currently have diabetes, rising to 853 million by 2050. Community pharmacists, as the most accessible health care professionals, are increasingly involved in chronic disease management through collaborative practice, medication therapy management and structured self-management interventions.
Objective: To summarize findings from multisite, community-based assessments of pharmacist-led diabetes management and to evaluate its effects on clinical, humanistic and economic outcomes.
Methods: Systematic reviews, meta-analyses and multisite demonstration programs were identified and synthesized narratively. Programs included the Asheville Project, the Diabetes Ten City Challenge, the Pennsylvania Project and an eleven-pharmacy South Korean program (2026) using continuous glucose monitoring.
Results: Pharmacist-led interventions were consistently associated with clinically significant reductions in glycated hemoglobin compared with usual care (pooled standardized mean differences approximately -0.67 to -0.71). Improvements were also observed in blood pressure, lipid profile and medication adherence. Multisite programs produced similar results across varied settings, with per-patient health care cost savings of up to 7% and a return on investment sufficient to sustain program funding. Systematic reviews of economic evaluations generally found pharmacist involvement to be cost-effective or cost-saving, although the quality of reporting varied.
Conclusion: The findings support an expanded role for pharmacists within collaborative, team-based diabetes care, particularly in underserved communities, and support reimbursement for this expanded role. Future research should prioritize standardized outcome reporting, long-term multisite randomized evaluations and integration of digital monitoring technologies.

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1. INTRODUCTION

Diabetes mellitus is one of the most common and expensive of all chronic diseases and the burden is still increasing after decades of clinical and public health efforts. The International Diabetes Federation (IDF) Diabetes Atlas 2024 estimates that 589 million adults aged 20-79 years had diabetes by 2024 (11.11% of the global adult population) and that prevalence will increase to 853 million by 2050, due to ageing and urbanisation of the population . This is a projected growth of almost 45% in about 25 years as demonstrated in Figure 1. In 2024 alone, diabetes is estimated to have caused the death of 3.4 million people and contributed to more than one trillion USD in costs of global health expenditure, an increase of 338% from the last 17 years [1]. A large proportion of this burden–especially complications associated with poorly controlled glycemia, hypertension and dyslipidaemia–is preventable with continued and high-quality chronic disease management, but health systems around the world are still struggling to fill positions with physicians and diabetes educators who can provide this sustained, high-quality care.

Team-based care, in which non-physician health care providers, such as pharmacists, nurses, dietitians and community health workers, extend the reach of the primary care physician, is recognized as a key component of effective diabetes management in the American Diabetes Association's Standards of Care in Diabetes [2]. Of these team members, the community pharmacist is in a position like no other: patients likely spend more time with a pharmacist than with any other health care provider; there is no need to make an appointment to access a pharmacy; and pharmacists have extensive education in optimizing drug therapy, drug-drug interaction detection, and counseling patients, which is directly applicable to the multi-drug regimens that are common within diabetes care team interactions. In the last 30 years, such access has spurred significant research and practices innovations on the potential effects of structured pharmacist participation, from medication counseling during a single visit to complete collaborative practice agreements (CPAs) that allow pharmacists to prescribe medications.

The scale and replicability of the most policy-relevant evidence in this arena, compared to smaller, single-site pilot studies, is that demonstration programs are implemented at the same time across a number of community pharmacies, cities, or employer groups, giving a better test of the generalizability of pharmacist-led diabetes care beyond a single highly motivated programmatic context. Certain multisite initiatives were developed specifically to address this question, for example, the Asheville Project and the Diabetes Ten City Challenge (DTCC), which involved the recruitment of community pharmacists to dozens of participating pharmacies and several U.S. states to provide services under a standardized care model and outcome-measurement framework. This model has been expanded to other sites and expanded globally more recently, including digital health tools like continuous glucose monitoring (CGM) which are continuing to evolve as pharmacist-led diabetes care.

This review combines information from these community-based, multi-site assessments of pharmacists' role in diabetes management into three questions. What clinical, humanistic and economic results have been reported with multisite pharmacist-led diabetes programs, and are there consistency with the results from smaller studies and systematic reviews? Second, how do these programs have an effect? How do they do this? Do they do this through medication therapy management, patient education, collaborative prescribing, or a combination of all? Thirdly, what are the practical, economic and policy implications for health systems, payers and for health system practice in general? The rest of this paper is

organized as follows. Chapter 2 summarizes the previous studies on pharmacist-led diabetes care. This evidence is described in Section III, which outlines the methodology employed in identifying and synthesizing this evidence. The results and discussion are presented in Section IV and illustrated in comparative tables and a conceptual model of the pathway of the care process involving the pharmacist in multiple sites. Directions for practice and future research are given in the conclusion of Section V.

2. RELATED WORK

A huge systematic-review and meta-analysis literature has validated that pharmacist interventions are effective and reliable in enhancing glycemic control in adults with type 2 diabetes. In a systematic review, Al Assaf, Zelko, and Hanko were able to identify 41 studies of community pharmacist interventions in primary care from the years 2010–2020; the most common intervention components were patient education and patient counseling, with the majority of the studies included in the systematic review demonstrating improved therapeutic adherence and reduced HbA1c [3]. In another meta-analysis of 12 randomized and quasi-experimental studies, Coutureau found an overall standardized mean difference (SMD) in HbA1c change of −0.67 (95% CI −0.87 to −0.48; p<0.0001) between the pharmacist intervention and usual care groups [4]. Likewise, van Eikenhorst performed a systematic review and meta-analysis of interventions by a pharmacist for self-management support and reported a mean reduction in HbA1c of 0.71 percentage points, a significant decrease in systolic blood pressure of−5.20 mmHg, a significant decrease in diastolic blood pressure of−3.51 mmHg, a significant reduction in BMI of −0.49 kg/m2, and improvements in lipid profile [5]. Also performed a narrative/systems review of 27 studies that showed that reporting pharmacist-led intervention resulted in a mean decrease of 0.75% in HbA1c, mean improvements in body mass index, blood pressure, and lipid profile, and economic benefits [6].

In addition to the single-site trials, a number of big, multisite demonstration experiments have shown if these effects can be replicated in a variety of pharmacy practice. One of the very first to systemically compensate community pharmacists for providing diabetes-related pharmaceutical care services (including clinical assessment, self-monitored blood glucose training and collaborative drug therapy management with physicians), was the Asheville Project, which began in North Carolina in 1997. This program had a long-term follow-up that showed a steady decrease in mean HbA1c level at each follow-up (up to 5 years), and more than half of the patients had clinically meaningful improvement at each follow-up visit, while employers had a decrease in mean total direct medical costs over time [7]. The American Pharmacists Association Foundation initiated the Diabetes Ten City Challenge with a multisite replication, which was built on the Asheville model, and replicated in ten different geographic sites throughout the United States with a total of about thirty employers. Interim data from the DTCC indicated that clinical markers improved for patients with even the most significant barriers to care [8] and final econometric and clinical results from 573 enrolled for a minimum of one year showed a statistically significant 7.2% ($1,079 per patient per year) decrease in average total health care expenditures over the course of the trial, relative to projected expenditures without the intervention [9]. The Patient Self-Management Program for Diabetes is another APhA Foundation program that showed positive clinical, humanistic and economic outcomes in the first year of implementation at community pharmacies demonstrating the potential for replicability of the model of care [10].

Recent multisite evidence has extended this model to the international arena, and brought formal randomized designs into the model. Iqbal et al. carried out a multi-centre, randomized controlled trial (RCT) in several diabetes medication therapy adherence clinics (DMTAC) in Malaysia, demonstrating that there was a significant improvement in glycemic control, and a better quality of life, with pharmacist-led collaborative care compared to usual care, with less work from doctors and lower medical costs in the group receiving the care collaboration compared to usual care [11], [12] reported successful retention (100%) and achievement of a pre-specified composite clinical endpoint of 36.7% and mean reduction in HbA1c by 0.70 percentage points in a twelve-week, single arm, multisite pilot feasibility study of pharmacist delivered medication, exercise and nutrition counselling with continuous glucose monitoring and a national personal health record platform across eleven community pharmacies in South Korea.

Another, and growing, line of research has focused on the economic aspects of pharmacist-led diabetes care because it has been realized that the achievement of a clinical benefit is not sufficient to ensure sustainable reimbursement or health-system uptake. Franklin performed a pharmacoeconomic analysis in a multisite pharmacist-physician collaborative care model, and concluded that even though the total program cost (labor + overhead) slightly increased the overall cost of care, cost savings due to better HbA1c control and SBP control were more than the cost of the pharmacist labor alone [13]. Similarly, in a family medicine clinic, a study of pharmacists who had begun working with family practitioners to provide care by the pharmacist alone compared to usual care was found to benefit the patients by demonstrating better control of diabetes in the collaborative care group [14]. Pennsylvania specifically, as one of the largest community pharmacy demonstration projects that utilized 283 intervention pharmacists, demonstrated a significant improvement in adherence across five medication classes in the level of adherence, including a 4.8 percentage-point improvement for oral diabetes medications, and a statistically significant decrease of $341 in annual health care spending per patient with oral diabetes medications. [15] This same program was subsequently implemented and analyzed to describe how these targeted adherence interventions were successfully and practically integrated into the daily workflow of the community chain pharmacy system – to scale brief pharmacist interventions across a large retail pharmacy network [16]. After summarizing this literature, Zhu, Zhou and Wang systematically reviewed the large-scale economic assessment of pharmacist-managed diabetes care which showed that, although the cost structures of programs differed, consistent findings across all of the studies demonstrated that pharmacist involvement had a lower cost compared to standard care, though the overall quality of economic reporting was inconsistent [17]. In a similar retrospective study across multiple sites, King and colleagues [18] found that achieving cost-effectiveness of the pharmacist-led disease management model for a cohort of 406 diabetes patients in the ambulatory care setting was beneficial when compared to usual primary care. Taken together, this evidence demonstrates clinical plausibility and multisite generalizability of physician-pharmacist diabetes care, the latter of which this current review summarizes, attending to points specific to health-outcome domains most frequently impacted

3. METHODOLOGY

This paper uses a narrative-comparative review, a method of synthesized evidence that uses and integrates the evidence to demonstrate the effectiveness of community-based, multisite pharmacist-led programs of diabetes care. A narrative synthesis was selected over a systematic review or metanalysis because the goal was to draw conclusions about the findings across programs, which vary widely in methodology (randomized trials, quasi-experimental pre-post cohort, large-scale demonstration project), context (independent community pharmacy, chain pharmacy and integrated health system), and outcome reporting structure, a process that is more suited to qualitative and comparative synthesis and integration than to quantitative pooling and re-analysis of disparate effect sizes.

Literature was identified using a structured search of PubMed/MEDLINE, Web of Science and Scopus databases and by following up on key systematic reviews and the original publications for key multisite demonstration programmes. Search terms that included 'pharmacist' and 'community pharmacy' and 'diabetes' were used with 'scale' and 'design' related terms (such as ‘multisite’, ‘multicenter’, ‘collaborative practice', 'medication therapy management') and with specific outcome terms (such as ‘HbA1c', ‘cost-effectiveness', ‘adherence', ‘blood pressure'). Systematic reviews and/or meta-analyses published from 2017 to 2024 were included as these were the primary publications for major multisite named programs (Asheville Project, the Diabetes Ten City Challenge, the Patient Self-Management Program for Diabetes, and the Pennsylvania Project) that continue to have a strong impact on diabetes care, and more recent (2024-2026) multisite or multicenter randomized and/or pilot studies to extend this approach to other continents and/or to include digital monitoring technologies.

3.1 Studies That Met the Following Criteria were Included

(a) Pharmacist delivered intervention for type 1 or type 2 diabetes (b) multiple sites or clinics or geographic location or (c) systematic reviews/meta-analyses that combined findings from multiple sites, clinics or geographic location; and (d) reported at least one quantitative clinical, humanistic or economic outcome. Key epidemiology and guideline publications such as the latest IDF Diabetes Atlas [1] and the American Diabetes Association Standards of Care [2] were included to frame the challenge of diabetes and provide the justification in the guidelines for a multidisciplinary approach. Studies were not eligible for inclusion if they focused solely on a single site of intervention where no other multisite context was described, nor if they were of bits or pieces of a larger systematic review that included a study of clinical management roles played by pharmacists, but not specifically addressing patient care (e.g., administrative or supply chain functions).

The narrative-synthesis design made formal pooling of the data or risk-of-bias assessment of all sources of data unavailable, and so effect directions and, if provided, pooled or program-level effect sizes in the form of standardized mean difference (SMD), percentage-point change in HbA1c, and cost outcomes from a source study were extracted and tabulated for comparison purposes Table 1, Table 2. Global data on diabetes was taken from the latest IDF Diabetes Atlas to prepare Figure 1, which depicts the diabetes burden expected to increase between 2024 and 2050. The authors summarized across the multisite programs reviewed in Sections II and IV (along the care-delivery pathway from referral/enrolment to pharmacist delivered services to measured health outcomes), by constructing a conceptual diagram Figure 2 as an integrative heuristic of the shared program architecture, not necessarily as a description of any specific named program.

4. RESULTS AND DISCUSSION

As per the Figure 1, the number of adults with diabetes is expected to rise to 853 million by 2050 from 589 million people in 2024, which is a rise of almost 45% [1]. The Global Burden of Disease Study 2021 also estimates significant further increases in age-standardized diabetes prevalence into the future [19]. Population ageing, urbanisation and increasing obesity rates are contributing significantly to this trend, which is far outstripping the growth of the specialist diabetes care workforce in most health systems and makes the practicality of care models based on the existing, geographically wide-spread community health system infrastructure more relevant. Most people with chronic disease visit a community pharmacy more often than they go to a physician and pharmacists are not required to make an appointment; the high numbers of these patients in the community makes pharmacist-led screening, counseling, and management an easily replicable aspect of treatment in addition to the services provided by physicians.

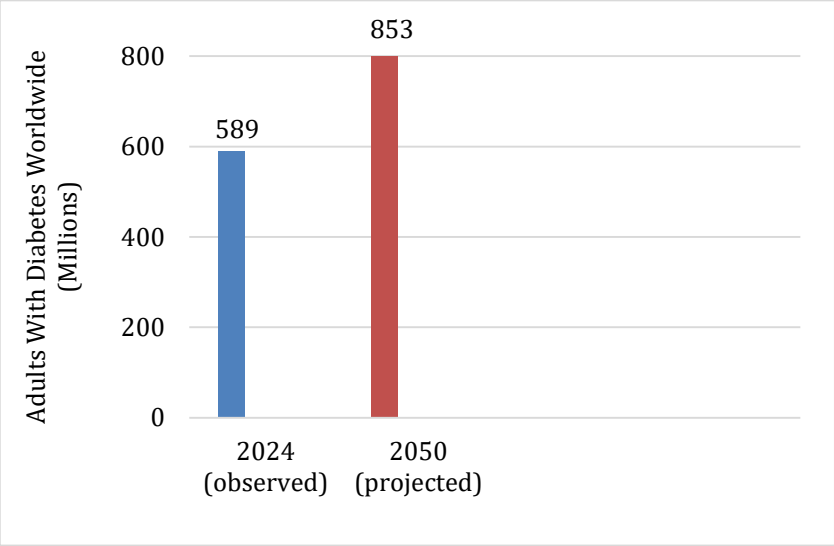


Figure 1. Global Diabetes Burden, 2024 Observed Vs. 2050 Projected [1]

Table 1 provides a summary of the design and reported results of five key multisite, community-based programs that include pharmacists in diabetes care, ranging from the original five-pharmacies, single-city Asheville Project to the replicated diabetes translation and coordination (DTCC) across ten cities nationwide to the most recent multisite pilot incorporating the use of continuous glucose monitoring (CGM) in diabetes care from South Korea. There are a number of commonalities between these programs. First, although there is significant variability in the countries, health system contexts and the payer structure in each country, as well as in the specific health program or care protocol, all reported programs demonstrated directionally consistent improvement in glycemic control, from a 0.70 percentage point decrease in the most recent CGM-integrated pilot [12] to the multi-year improvement reported in the Asheville Project [7]. Second, there was a consistent finding across the programs that demonstrated economic outcomes-DTCC, the Patient Self-Management Program, and the Pennsylvania Project-that total health-care costs or per-dollar per-patient health-care costs decreased, despite an increase in direct costs associated with pharmacist services [8], [9], [10], [15]. Third, the scope of these programs, from 12 pharmacies in a single city to national, multi-employer replications, gives better evidence of generalizability than would be provided by any single-site trial (but not as robust as a randomized controlled trial).

Table 1. Design and Outcomes of Representative Multisite, Community-Based Pharmacist-Led Diabetes Programs

Program	Setting / Scale	Design	Key Reported Outcomes
Asheville Project	12 community pharmacies, Asheville, NC (2 self-insured employers)	Quasi-experimental, longitudinal pre-post, up to 5-year follow-up	Sustained A1c reduction in >50% of patients at each follow-up; decline in mean total direct medical costs [7]
Diabetes Ten City Challenge (DTCC)	Community pharmacies across 10 U.S. cities (~30 employers)	Quasi-experimental, observational, pre-post, multisite, 4-year	Improvement in key clinical measures (A1c, lipids, BP); average total health care cost per patient reduced by 7.2% ($1,079) vs. projected [8], [9]
Patient Self-Management Program for Diabetes	Multiple U.S. community pharmacies (APhA Foundation)	Prospective, multisite, first-year cohort	Clinical, humanistic, and economic improvements; positive first-year cost savings [10]
Pennsylvania Project	283 intervention pharmacists, national community pharmacy chain	Large-scale demonstration study, intervention vs. control pharmacists	Adherence improved 3.1-4.8% across chronic medication classes; per-patient annual spending reduced by $341 for oral diabetes medications [15], [16]
Korea CGM Pilot (2026)	11 community pharmacies, South Korea	12-week, single-arm, multisite pilot feasibility study	100% retention; 36.7% met composite endpoint; HbA1c decreased 0.70% ($p<0.001$); time-in-range increased 5.8 percentage points [12]

Table 2 summarizes the large body of diabetes literature found in Section II by outcome domain, not by individual program, and groups effect magnitudes across the systematic reviews, multisite programs and meta-analyses.

Table 2. Health Outcome Domains Reported Across Pharmacist-Led Diabetes Care Literature

Outcome Domain	Typical Reported Effect	Representative Sources
Glycemic control (HbA1c)	Mean reduction of approximately 0.67-0.75 percentage points vs. usual care across meta-analyses; standardized mean difference −0.67 (95% CI −0.87, −0.48)	[4], [5], [6]
Blood pressure and lipid profile	Clinically meaningful reductions in systolic/diastolic blood pressure, total cholesterol, and LDL-C; increases in HDL-C	[5], [7]
Medication adherence	Absolute adherence gains of 3-5 percentage points across chronic medication classes, including oral antidiabetic agents	[15], [16]
Health care cost / utilization	Reductions in total per-patient annual health care costs ranging from approximately 7% to cost-neutral, depending on program design and labor-cost accounting	[8], [9], [13], [14]
Cost-effectiveness (formal economic evaluation)	Interventions generally judged cost-effective or cost-saving relative to standard care across systematic reviews of economic evaluations	[17], [18]
Patient satisfaction / humanistic outcomes	High satisfaction ratings (>90% satisfied or very satisfied) and improved diabetes-related quality of life	[7], [10]

In terms of glycemic control, the similarities of the effect estimates from independent meta-analyses also stand out: A mean HbA1c difference of −0.67% was reported [4] a mean difference of −0.71 percentage points was reported [5] and a comparable mean difference of −0.75% was reported narrative review. [6] These new findings come in the wake of previous evidence that has shown that pharmacist outpatient interventions have improved glycemic control and cardiovascular risk factor outcomes in adults with diabetes for more than 10 years, as reported by the 2008 systematic review conducted [20]. The fact that this consistency is seen in meta-analyses from countries with different inclusion criteria, different publication period, and is observed in different bodies of literature reinforces the confidence that the effect observed would not be a result of any single body of literature, but rather a reflection of a real and moderate to clinically significant improvement in glycemic control because of pharmacist involvement. In practice, this translates to the effect of a second oral anti-glycemic agent in many patients: the pharmacist-led behavioral and medication-management support has clinical effects that are relevant to routine clinical decision-making, especially for those patients who are not yet controlled on current pharmacotherapy.

The results of van [5] and the observation of lipid improvement in the majority of patients in the Asheville Project long-term follow-up, which occurred at each measurement interval >50% [7], indicate that the beneficial impact of pharmacist-led interventions is limited to more than just glycemic control but to the entire cluster of cardiometabolic risk factors associated with diabetes-related cardiovascular outcomes. The wide scope of impact is related to the comprehensive scope of interventions, which generally target multiple health behaviors-such as medication optimization, adherence to medication, diet, and physical activity-and addresses health behaviors of multiple risk factors at the same time, rather than one.

The Pennsylvania Project's results of improvement in oral diabetes medication adherence by 4.8 percentage-point resulting from short (approximately one minute) and focused pharmacist-patient dialogue given at the point of medication dispensing with 283 pharmacists and tens of thousands of patients are especially significant because they come from such a large population, and they also illustrate that simple, yet effective, adherence gains do not require time consuming or resource intensive conversations [15]. Implications for program design are direct: Protocolized, shorter interventions (with

existing pharmacy operations) may yield similar adherence benefits as more intensive interventions (appointment-based), and at a lower programmatic marginal cost per patient reached.

The DTCC's 7.2% difference between actual versus forecasted health care costs per patient annually across 573 patients from 10 geographically diverse sites of service [9] offers one of the most robust multisite evidence-based outcomes for successfully lowering downstream health system costs at scale by pharmacist-led diabetes care, and not just in an idealized practice environment. It is important to note, however, that the economic benefits of pharmacist-led care are time sensitive, as program levels of cost are influenced by time scales as well, with the full cost of the program overhead, as opposed to pharmacist labour cost, potentially somewhat greater than savings from better clinical outcomes in the short term in the Franklin et al. pharmacoeconomic analysis [13]. Informal systematic reviews of the economic evaluations, specifically, support that pharmacist involvement is cost effective or cost saving in general, but that the quality and consistency of the economic reporting across studies varies [17], [18].

The multisite programs reviewed above share a common care-delivery architecture, conceptualized in Figure 2. Patients access pharmacist-led diabetes care in three ways, all of which have been used explicitly in both the Asheville Project and the DTCC: Direct referral from a physician or clinic, self-referral at an participating community pharmacy, or referral from an employer or health-plan sponsored wellness program with a reduced medication co-payment as an incentive (a method explicitly used in both the Asheville Project and the DTCC). Whatever the entry point, the care is coordinated by a multisite pharmacist-led clinic with a collaborative practice agreement or similar arrangement with the physicians, and these services include, at a minimum, clinical assessment, goal setting, and medication therapy management, patient education and self monitoring training (with more recent programs including continuous glucose monitoring), and structured follow up, referral, and physician communication. All three service components target the outcome domains summarized in Table 2 (medication therapy management primarily impacts on adherence and glycemic outcomes; education and self-monitoring primarily drives behavioral and humanistic outcomes; and structured follow-up and physician communication has a prospective impact on sustaining outcomes over time, and producing the cost reductions that are documented in longer-running programs. The current migration from "Nearly Equal" service delivery models across independently developed programs, spanning programs in North Carolina from the 1990s and programs in South Korea in 2026, and on a three-component service delivery model that has many commonalities, suggests common elements to effective pharmacist-led diabetes services that apply largely independent of the health system or payer context in which these services are provided.

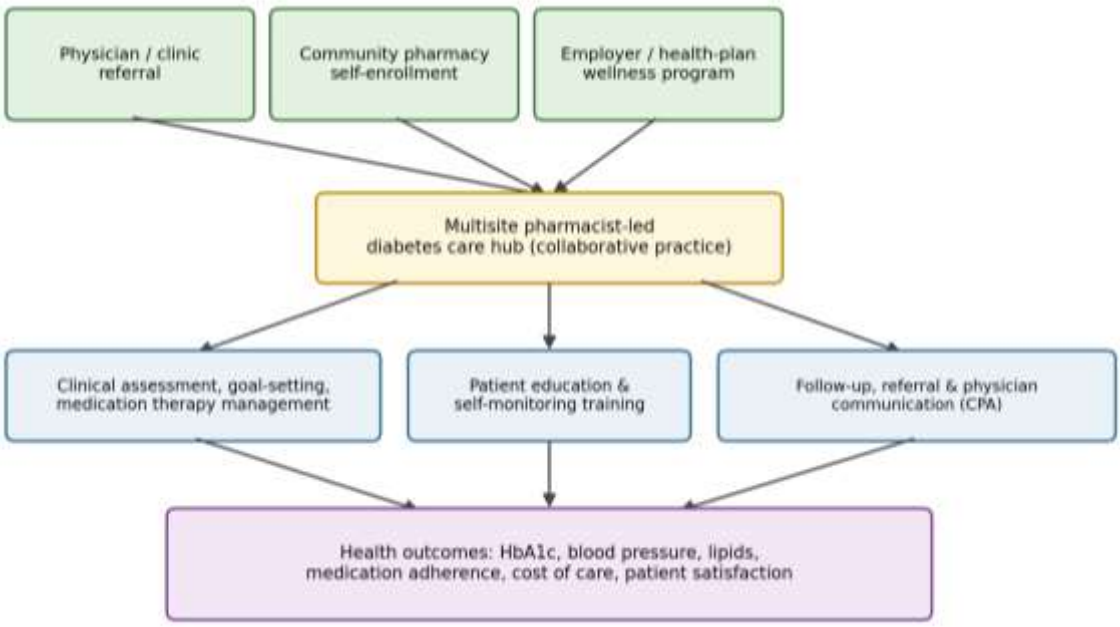


Figure 2. Conceptual Model of the Multisite Community Pharmacist-Led Diabetes Care Pathway

Overall, the findings from the evidence included in this review suggest that there are the following basic implications for health systems, payers, and other leaders of the pharmacy profession who are considering pharmacist-led diabetes programs. Program design should include components of the three-part service design discussed above, which return in all of the most successful multisite programs across different geographic and health system settings. Second, there is some evidence that collaborative practice agreements or equivalent formal mechanisms of authorization are important enablers-that the pharmacist can make adjustments to the patient's therapy, arrange appropriate monitoring, and communicate directly with physicians, rather than simply serving as an adjunct for teaching physicians about patient intraprofessional care. Third, a standardized, transparent economic framework can be used to assess pharmacist-led diabetes programs, accounting for all program overhead and not pharmacist labor costs, to provide health systems and payers with a method of generating a sustainable funding model that is beyond the initial grant-funded demonstration. Fourth, population-level replication of core service model from the resource-rich health system environment in the United States to the national diabetes pilot in South Korea in an environment of digitally integrated health care delivery suggests that this strategy for diabetes care can be implemented in other health system contexts and may be especially useful in underserved and rural communities where access to specialist diabetes education and endocrinology care services may be constrained, yet community pharmacy services are widely available.

Some of the evidence base limitations need to be recognized. In many of the multisite programs analyzed here-the Asheville Project and the DTCC, among others-causal inferences were constrained by the lack of a fully randomized concurrent control group, and the possibility of selection bias such that more motivated patients and pharmacies were enrolled in volunteer programs or experienced regression to the mean contributed to observed improvements. For designs documenting feasibility, where randomized design was used, like the Malaysian multicentre trial [11], sample sizes and lengths of follow-up are still relatively small compared to the large demonstration programs in observational design, reflecting a chicken-or-the-egg dilemma in this body of work. Of special importance is the heterogenous nature of the economic evaluations, some accounting for only the cost of pharmacists' labour, and others accounting for the cost of programs as whole [13], [17] which makes it difficult to be certain on how much cost is being saved by the program in the reported cost savings. Lastly, to support the generalizability of this care model in areas where its need is likely greatest, additional multisite proof of success in low- and middle-income countries, such as in Malaysia and South Korea, has yet to be established.

5. CONCLUSION

By 2050, the number of adults with diabetes will rise from 589 million to 853 million and health systems will face the challenge of delivering scalable, accessible chronic disease care and management. This review summarized the findings from systematic reviews, meta-analyses and large multisite community-based demonstration programs assessing the effectiveness of pharmacist involvement on diabetes-related health outcomes. In this literature, clinically important reductions in HbA1C were always observed to be linked to pharmacist-led interventions, with independent meta-analyses showing reductions of ~0.67-0.75 percentage points compared to usual care, along with improvements in blood pressure, lipid profile, and medication adherence. The multisite programs in Asheville, the Diabetes Ten City Challenge, the Pennsylvania Project, and a pilot program using continuous glucose monitoring in 2026 that took place in eleven community pharmacies across South Korea, all demonstrated that these clinical benefits can be replicated across a variety of geographic, organizational and health system settings, and that they also show reductions in overall per-patient health care costs and adherence improvements that are large enough to matter to payers and employers and lead them to provide financial support for these programs. Additionally, in-line with this, there is a body of evidence that there is no consistent quality of reporting across individual economic studies, but in general, involvement of pharmacists in diabetes management is cost effective or cost saving compared to conventional diabetes management.

These findings reinforce the importance of ongoing investment in collaborative, team-based diabetes care models that formally include community pharmacists, such as collaborative practice

agreements, in particular for integrating the 3 diabetes care services that are most frequently seen across successful multisite models-that is, medication therapy management, structured patient education and self-monitoring support, and formalized doctor-communistion. The proven results in terms of costs reinforce the need to increase and standardize coverage options for pharmacist-provided diabetes care, with payment systems that explicitly recognize the true cost of a program, not the value of a pharmacist's labor. Further research is warranted to include adequately powered, longer duration, multisite, randomized controlled studies, the reporting of economic-evaluation results in a standardized format to enable ease of cross-program comparisons, and the broader evaluation of this care model in LMICs, where the burden of diabetes is expected to grow fastest and where the extent to which community pharmacies may provide access advantage may be particularly high compared with specialist-dependent alternatives.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Mr. Mahadevan R. Swamy	✓	✓	✓		✓		✓		✓		✓			✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study and their voluntary consent was obtained prior to data collection.

Ethical Approval

Not applicable.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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