

Review Article

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The Expanding Role of Pharmacists in Patient Centered Diabetes Care Impacts on Management and Outcomes

Adinarayana Andy

Pharmacy Manager, Weatherwax Family Pharmacies Inc, Spring Arbor, Michigan, USA

The role of pharmacists in diabetes care has evolved significantly, shifting from traditional dispensing to comprehensive patient-centred management. This article explores the expanding responsibilities of pharmacists in diabetes management, highlighting their impact on clinical outcomes, economic benefits, and future directions. By providing Medication Therapy Management (MTM), pharmacists optimize medication regimens, improve medication adherence, and educate patients on lifestyle modifications, leading to enhanced glycemic control and reduced HbA1c levels. Collaborative practices with healthcare teams help prevent complications and decrease hospitalizations, demonstrating the value of integrated care. Economic analyses reveal substantial cost reductions in diabetes-related healthcare due to pharmacist interventions benefiting patients and healthcare systems. However, barriers still need to be addressed, including regulatory limitations and public awareness issues, which hinder the full realization of pharmacists' potential in chronic disease management. The future of diabetes care is promising, with advancements in telehealth and technology paving the way for increased pharmacist involvement. Additionally, the expansion of prescribing rights may enhance the pharmacist's role in medication management, ensuring timely and effective interventions. Addressing these challenges will be crucial for integrating pharmacists into multidisciplinary teams and optimizing diabetes care. Overall, the involvement of pharmacists is essential for delivering comprehensive and effective diabetes management, improving health outcomes, and reducing healthcare costs.

*Corresponding author

Adinarayana Andy, Pharmacy Manager, Weatherwax Family Pharmacies Inc, Spring Arbor, Michigan, USA.

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Introduction

Diabetes mellitus is a long-term disease that results from the reduced ability of the body to produce or properly use insulin, causing high blood glucose levels in millions of people. According to IDF, 463 million people globally were living with diabetes by 2019, and this figure is expected to reach 700 million by 2045. The disease is not only associated with considerable morbidity and mortality but is also a significant source of expenditure for healthcare providers. Type 1 and type 2 diabetes patients tend to develop significant complications, and those include heart disease, renal failure, nerve damage, and retinopathy, among others. These changes have led to increased global prevalence of type 2 diabetes through sedentary living, unhealthy diets, and aging populations, making it more important to have robust, equal, and efficient management regimes introduced. Managing diabetes is essential to reduce complication incidences and enhance these patients' quality of life [1].

The care of diabetes has moved from a primary doctor-centered model to a person-centered model of care because of the chronic nature of the disease. The health care teams have nurses, dietitians, and endocrinologists, who are now part of the expanding pharmacists. As for the new tasks of the personnel of this organization and its changes, it is necessary to note that, for instance, a pharmacist has become not only a drug dispenser but also an active participant in patient-oriented care. As frontline

medication experts, pharmacists are well-placed to contribute to managing diabetes through MTM, education, and counseling. Integrated care and co-location of pharmacists with physicians and other healthcare professionals revealed better glycaemic control and lower hospital admissions among patients, as discussed in Figure 1. This new focus on team care recognizes the need for long-term, easily accessible care for patients with diabetes, increasing the emphasis on patient-centered care and supporting more integrated care provisioning methods [2].

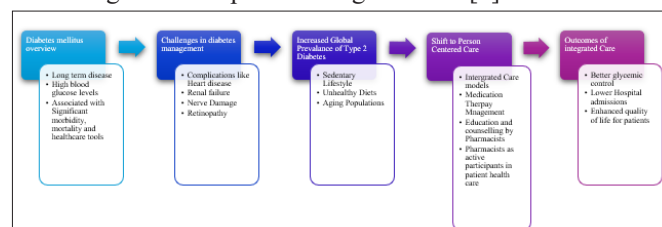


Figure 1: Transition to Person-Centered Diabetes Care

The Role of Pharmacists in Diabetes Care

From Dispensing to Direct Patient Care

Pharmacists have traditionally been perceived simply as agents that dispense medicines and guarantee patient's compliance with prescriptions. Nevertheless, their utility in the management of the health of the community has expanded significantly in chronic diseases such as diabetes. They are now seen as patient caregivers, especially within the community and clinical pharmacy practice areas. Medication Therapy Management (MTM) services show pharmacists who manage diabetes use active medication therapy.

Pharmacists assist the patient with insulin management, choice of oral hypoglycemic agents, and combination therapy, which can alter Dosage in conjunction with the attending prescriber. In addition, they provide crucial teaching about correct blood glucose meters, insulin injections, and the necessity of maintaining a healthy diet and regular exercise. Because pharmacokinetics and pharmacodynamics are their specialties, pharmacists can determine if there are interferences for specific medications, address all side effects, and educate patients on how to go about diabetes. This transition from dispensing jobs to forward, direct patient care represents the recognition of pharmacists as an implementation team for enhancing clinical and quality of life among diabetes patients [3].

- **Collaborative Practices with Physicians and Healthcare Teams**

These working relationships of pharmacists with other healthcare providers have been deemed instrumental in the contemporary management of diabetes. Diabetes is a multifaceted disease, especially type 2 diabetes, with comorbidities and thus needs a teamwork approach. With their vast knowledge of drugs, pharmacists can add a beneficial perspective to developing that therapy plan and guarantee safe and efficient treatment. Collaborative Practice Agreements (CPAs) permit the pharmacist to practice and consult with the physician – frequently with autonomy to change medications, order laboratory tests, and deliver intricate management of diseases according to the joint plan.

Provider-stakeholder relationships, especially between pharmacists and other healthcare providers, are now a necessity in the optimum practice of diabetes management. Diabetes is a chronic disease, and especially type 2 with its combined diseases, needs a team approach. Treatment plans can be safely and effectively implemented with the help of pharmacists, as these employees always have extensive knowledge of medications to offer. Collaborative Practice Agreements (CPAs) permit pharmacists to practice independently and collaborate with physicians to prescribe changes in medication, order laboratory tests, and perform disease management with the doctor's consent.

As per this teamwork-based care case, the pharmacists offer care from an endocrinologist, a dietitian, and even the primary care physician. The integrated approach has generated positive outcomes on level HbA1c, improved medication compliance, and managed complications arising from diabetes. The Asheville Project and Diabetes Ten City Challenge showed that pharmacist intervention with medical professionals effectively improves antidiabetic clinical and cost results. Through increased collaboration on care options and decisions, pharmacists have embraced a crucial function in guaranteeing intercession continuity and enhancing patient care in managing diabetes [4].

Patient Centered Care by Pharmacists

- **Medication Therapy Management (MTM)**

Pharmacists have a significant role in MTM, one of the most critical components of patient-centered diabetes care, as shown in Figure 2. MTM entails identifying all the drugs prescribed to a particular patient and determining whether the drug best serves the patient. In diabetes care, MTM helps the pharmacist review the patient's medication use,

consider possible medication interactions, and advise on the best medication therapy plan. In diabetic patients, this may imply the reconsideration of oral hypoglycaemic agents in insulin therapy or antihypertensive or lipid-lowering drugs.

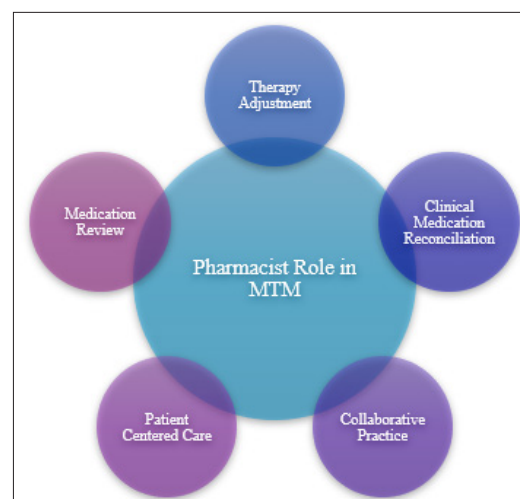


Figure 2: Pharmacist Role in MTM

While in MTM positions, the pharmacist examines the client's therapy patterns for lapses, such as a failure to take medicine on time or infrequent insulin use. During clinical medication reconciliation, the pharmacist performs other checks, including identifying cases of adverse drug reactions and poor compliance with medication regimens since most diseases require long-term medication. They can impact it by suggesting a change of Dosage, a change of therapy, or a change of the method of administration to ease the management of the disease by the patients. There are also certain healthcare facilities where pharmacists can modify medications directly through collaborative practice agreement protocols with doctors.

It is important to note that MTM is necessary because it encompasses patient-centered care, which considers patients' medication regimens, history, and preferences. Through the implementation of MTM into the care of diabetic patients, pharmacists intervene to reduce cases of complications such as hypoglycemia, hyperglycemia, and drug adverse effects. In addition, pharmacist-patient relationships are developed since patients must submit themselves for more frequent checks and other assistance in managing their diabetes. Still, MTM improves clinical effectiveness and satisfaction since diabetes treatments are effectively managed and individualized [5].

- **Patient Education on Lifestyle, Diet and Self-Monitoring**
In addition to the adherence to medication regimes, pharmacists have significant informative responsibility for the patients concerning the essential life changes required for diabetic patients. Diabetes management depends on nutrition, exercise, and regular monitoring; pharmacists can offer this advice during repeated client encounters. Hypoglycemic management, especially knowledge about necessary lifestyle changes, can influence the patients' capabilities and prevent further complications. Regarding dietary changes, pharmacists explain the concept of carbohydrate exchange, portion control, and categorizing sugars and fats into healthy and unhealthy ones. It also pitches the message of physical exercise with detailed information about how it can enhance

insulin sensitivity and maintain better glycemic control. Through giving patient-oriented information, pharmacists educate patients to perform small, measurable, healthy changes. The pharmacists also inform the patients about using glucose monitors, insulin pens, and other complication-checking devices. As mentioned earlier, most patients need help checking their blood sugar levels or understanding the implications of different glucose results. Therefore, poor glycemic control is quite common; pharmacists can educate patients on how to use the devices properly and what actions they should take depending on the results, for instance, on monitoring blood glucose, when to do it, modifying the type and Dosage of insulin, or sure signs that might suggest hypo or hyperglycemia.

This education makes the patient confident when handling diabetes independently, enhancing self-management self-management and patient compliance. Because they are often seen in community settings, they can and should help coach, reinforce behavior change, and motivate people with diabetes. Thereby, they are critical assets in the chronic management of diabetes. It provides diabetes care beyond medicinal prescription as it encompasses every aspect that affects the patients [6].

Impact on Clinical Outcomes

- **Improvements in Glycemic Control and HbA1c Levels**

Possibly the single best predictor of reasonable glycaemic control, one of the critical success factors for diabetes, is the degree of HbA1c. Dieticians have also contributed to patients' achievement of optimal HbA1c reduction through counseling and constant follow-up of patients' therapeutic regimens. Several pieces of research have now indicated that pharmacists' interventions have the potential to enhance glycemic outcomes greatly. For example, patients who can access care from pharmacists primarily via proper Medication Therapy Management MTM services have increasingly tended to have lowered HbA1c scores, which is critical in preventing complications with diabetes. Pharmacists are able to accomplish these results when the patients are on the correct Dosage and know how to respond appropriately when taking their medications. They also look for adverse effects and drugs, especially for those patients who have other diseases and can take several medicines for hypertension or hyperlipidemia. Also, pharmacists play a role in helping patients adhere to the correct insulin regimen; they enlighten patients on how to manage doses based on their blood glucose levels. The active involvement of clients in the process and their repeated visits guarantee that blood glucose levels remain stabilized, improving the general results.

The Diabetes Ten City Challenge and the Asheville project exhibit that patients who consult pharmacists achieve significantly lower HbA1c values than those under conventional practice. Pharmacists supporting and guiding patients with diabetes during and between therapy sessions reach target glycemic goals, thus enhancing long-term outcomes and minimizing risks of complications of diabetes[7].

- **Reducing Complications and Hospitalizations**

Specifically, pharmacists' interventions enhance glycemic control and are considered adequate in addressing complications and hospitalization rooted in diabetes. Diabetes mellitus, for

instance, is usually accompanied by different critical situations, including cardiovascular disease, nephropathy, neuropathy, and retinopathy, which result in hospitalization and additional costs. The pharmacists manage these risks, enhancing overall care and ensuring regular follow-ups with patients. Pharmacists can avert severe problems by providing health improvement knowledge concerning proper self-management skills, such as identifying signs of hypo- or hyperglycemia or determining the correct procedures involved in blood glucose checks. This approach allows the patient to observe signs of complications before they worsen, thus reducing emergent situations. Moreover, pharmacists currently scrutinize medications and dosage frequencies, which assists in avoiding adverse drug interactions leading to the worst of the patient's illness.

Prescription medication nonadherence and noncompliance with other therapeutic regimens also keep pharmacists actively involved in reducing hospital admissions. This results in uncontrolled levels of blood sugar and acute complications, altogether causing many hospitalizations. In Medication Therapy Management (MTM), pharmacists review compliance and patient challenges, like confusion about dosage or side effects. They describe how these barriers can be addressed to guarantee costs cover prescribed medications and prevent patients' health decline. In addition, the study of pharmacist-managed diabetes, especially those involving teamwork, demonstrated a cut down on hospital readmissions. In these models, pharmacists offer a bridge between the hospital setting and home care, thus preventing early complications attributable to invalid orders. It also results in a better quality of life for the patient population. It decreases healthcare costs in itemized counts of reduced admissions cases caused by diabetes-related complications and emergency department visits [8].

Economic Impact of Pharmacist Led Interventions

- **Cost Reduction in Diabetes Related Healthcare**

Pharmacist interventions seem practical from a clinical point of view and more economical than conventional modes of disease control, especially in diabetic instances. People with diabetes experience changing and often severe symptoms, which makes the related healthcare costs high, especially for repeated hospitalizations, emergencies, and long-term treatment of complications. Pharmacists' involvement in patient-centered care reduces such costs by ensuring the clients do not develop complications or require other, more expensive treatments.

Of all clinical services, Medication Therapy Management (MTM) services that pharmacists offer have mainly successfully reduced total healthcare costs. Thus, pharmacists assist in avoiding acute glycemic spikes or hypoglycemia that would otherwise require a hospital stay and, therefore, are worth the annual cost of medication reconciliation. Additionally, because pharmacists can identify possible drug interactions and other adverse effects before they can happen, they help avert cases requiring additional and costly care.

In other significant interventions, including the Asheville Project and Diabetes Ten City Challenge, the management of diabetes by pharmacists was associated with a notable decrease in cost. Such programs contributed to reduced medication costs, the number of patients visiting emergency rooms, and the frequency of hospitalizations [9]. The savings achieved

by the above interventions underscore pharmacists' economic impact on diabetes care, as shown in Table 1 below.

Table 1: Key Roles of Pharmacists in Diabetes Care and Associated Outcomes

S.No	Key Role	Contribution	Outcome
1.	Medication Therapy Management (MTM)	Optimizes medication use and adherence	Improved glycemic control
2.	Patient Education	Informs on lifestyle changes and self-monitoring	Reduced complications
3.	Collaborative practice	Works with healthcare teams	Fewer hospitalizations
4.	Telehealth consultations	Provides remote support	Increased patient engagement
5.	Ongoing monitoring	Adjusts treatment plans	Cost savings in healthcare

• **Economic Benefits to Patients and Healthcare Systems**

Firstly, pharmacist-led care also brings forward adequate economic advantages for patients and, more importantly, healthcare systems. To the patients, the effects are immediate, first and foremost being the stern cut on out-of-pocket expenses. Thus, through proper patient medication management, pharmacists avoid adverse effects that may result in costly treatments such as hospitalizations and surgeries. Also, pharmacists help patients select inexpensive but effective medications, for instance, generics, or help patients get cons and other ways to minimize the cost of drugs, thus reducing the money that patients are supposed to spend on medication.

At this level, healthcare systems are also relieved through the decreased resource use in any healthcare program pharmacists participate in. Less hospitalization, emergency, and complications are connected with considerably lower insurance and health care facilities costs. Fore, medical cation compliance and the most effective treatment plans devised by a pharmacist save costs in the long run.

Pharmalong is also involved in making the delivery of health care efficient. Therefore, it supports the provision of constant care and follow-up in outpatient facilities to reduce the intensity of service and costs associated with these services. This enables the health care system to deploy its resources more efficiently, shifting from a system that deals with ailments that are expensive to handle once they occur to a system that provides preventive health care and any initial treatment whenever possible. Indeed, engaging pharmacists in managing diabetes enhances clinical results and delivers on the value proposition by presenting enormous possibilities for cost reductions as a component of the healthcare framework and patients[10].

Challenges and Barriers to Expanding the Pharmacist's Role

• **Regulatory and Financial Limitations**

Even though successful clinical and financial models exist for pharmacists to lead diabetes care, several regulatory and economic constraints may limit the further development of

pharmacists' role in healthcare. Next, there needs to be more consistency in the scope-of-practice laws that prevail across different regions and countries. Pharmacists' interventions for directly modifying a patient's treatment by changing doses or ordering laboratory tests are limitless in many places. They practice under a collaborative pharmacy practice agreement with a physician. Restrictions abolish the independence of pharmacists from offering desired services to help manage diseases such as diabetes and other chronic diseases.

Moreover, it was established that financial constraints also limit pharmacists from practicing more extensive practices. At the same time, most healthcare systems only compensate pharmacists for the role of dispensing medications. The absence of financial reward for this time kept invested in patient-centric services such as Medication Therapy Management (MTM) and patient counseling discourages pharmacists. When no feasible reimbursement strategy embraces these extended roles, it becomes manageable for pharmacies and healthcare facilities to incorporate pharmacists into a proactive, partner care delivery group. These regulatory and financial challenges must be overcome to fully optimize pharmacists' input in chronic disease management [11].

• **Public Awareness and Acceptance Issues**

One of the significant challenges is the need for better recognition and understanding of the public regarding pharmacists as direct caregivers. Still, many patients have limited expectations of pharmacists, merely individuals who dispense drugs rather than individuals qualified to provide crucial therapeutic information. This false perception reduces patients' healthcare-seeking behaviour from pharmacists for diabetes care. However, there has been an enhancement twice from various research studies showing that patients do better under pharmacist-managed interventions.

However, there are barriers within the healthcare fraternity as well. Worse, some physicians and other healthcare policymakers may refuse to embrace the new role of pharmacists because they perceive this change as an intrusion into their domains. However, failure to engage with this professional group might hamper the emergence of team practice models including pharmacists—closing this gap is still a challenge that calls for constant public and professional awareness of specific positive impacts of the involvement of pharmacists in chronic diseases, such as better patient outcomes, better medication compliance, and reduced costs. Enhancing the public awareness of the pharmacist can assist consumers and other healthcare workers in using pharmacists, making healthcare fair [12].

Future Directions for Pharmacist Involvement in Diabetes Care

• **Advancements in Telehealth and Technology**

It has also been identified that the future of pharmacists in diabetes care involves technology with telehealth and digital possibilities. Telehealth services quickly upsurged through the pandemic, giving pharmacists new, constructive means of contacting patients online. This approach also improves convenience, especially for Chronic diseases like diabetes; patients can consult their physicians and receive MTM, follow-ups, and other services without struggling with how to get to the facility or running out of time due to long distances.

‘Telehealth’ can give pharmacists the statutory authority to recommend the application of mHealth application solutions and telemonitoring equipment for better diabetes type 2 self-/medicine management, regular blood glucose level, medication compliance, and lifestyle modification. The data can be used to make recommendations and timely counseling by pharmacists, which translates to enhanced glycemic control among patients. In the future, with the widespread use of artificial intelligence and machine learning, such concepts can help racists become more proactive in identifying patient needs, allowing intended recessions with the valued patient[13].

• Expansion of Pharmacist Prescribing Rights

The second potential avenue of advancement for pharmacists involved in diabetes care is the possibility of extension of the pharmacists’ prescribing authority. In some areas, pharmacists have already been allowed autonomy when starting or changing therapies under protocols with physicians. Such an extension would mean an increased potential for development in the positioning of pharmacists regarding diabetes therapies.

Improved prescriptive competency means that pharmacists can modify doses at first instance depending on patient compliance and other data captured within a brief period, thus handling nonadherence cases better. Implementing such efficiency means cutting out unnecessary waiting times and allowing the pharmacist to fine-tune a patient’s treatment within minutes. While more states in the US grant pharmacists clinical authority to prescribe medications, there is essential evidence of the potential of pharmacists with prescribing roles to enhance the diabetes care that patients receive, demonstrating that interprofessional teams are more effective once again [14].

Conclusion

Pharmacists’ engagement in diabetes care management has showcased an increased impact on advancing patient health and healthcare service delivery. By using MTM, pharmacists improve the medical management of patients and explain appropriate medication taking and lifestyle changes, thereby bringing down the levels of HbA1c. Their participation in facilitative teamwork with other healthcare teams reduces risks and hospital readmissions; plus, they engage in telemedicine, self-management support interventions, and education that enables those with diabetes to lead satisfactory and improved quality lives. In summary, pharmacists become active parts of the diabetes care team and meet the patients’ polyvalent needs to have a more far-reaching approach. It can be suggested that diabetes will become increasingly dependent on pharmacists’ inclusion in a state team of healthcare professionals. With the need for managing more chronic diseases on the rise, broader scopes of practice for pharmacists, such as tele pharmacy and prescriptive authority, will be paramount. These innovations will further improve or expand service delivery, medication compliance, and patient management abilities. Improving legal and economic hurdles must be the focus of harnessing pharmacists in the battle against diabetes mellitus. That way, healthcare systems can allow these changes to focus more on patient-centered diabetes care, thereby improving overall outcomes and decreasing costs associated with diabetes [15].

References

1. Jarred Prudencio T, Cutler S, Roberts S, Marin M Wilson (2018) The effect of clinical pharmacist-led comprehensive medication management on chronic disease state goal attainment in a patient-centered medical home. *Journal of managed care & specialty pharmacy* 24: 423-429.
2. Jamie L McConaha, GW Tedesco, L Civitarese, MF Hebda (2015) A pharmacist’s contribution within a patient-centered medical home. *Journal of the American Pharmacists Association* 55: 302-306.
3. Fazel MT, Bagalagel A, Lee JK, Martin JR, Slack MK (2017) Impact of diabetes care by pharmacists as part of health care team in ambulatory settings: a systematic review and meta-analysis. *Annals of Pharmacotherapy* 51: 890-907.
4. Butt M, Ali AM, Bakry MM, Mustafa N (2016) Impact of a pharmacist led diabetes mellitus intervention on HbA1c, medication adherence and quality of life: A randomised controlled study. *Saudi pharmaceutical journal* 24: 40-48.
5. Isetts B (2017) Integrating medication therapy management (MTM) services provided by community pharmacists into a community-based accountable care organization (ACO). *Pharmacy* 5: 1-56.
6. SA Gernant (2015) The impact of care coordination on community pharmacist-delivered medication therapy management. *Purdue University*.
7. Hwang JK, Seung Hwa Lee, Young Bin Song, Joonghyun Ahn, Keumhee Carriere, et al. (2017) Glycemic control status after percutaneous coronary intervention and long-term clinical outcomes in patients with type 2 diabetes mellitus. *Circulation: Cardiovascular Interventions* 10: e004157.
8. Garg R, Brooke Schuman, Angela Bader, Shelley Hurwitz, Alexander Turchin, et al. (2018) Effect of preoperative diabetes management on glycemic control and clinical outcomes after elective surgery. *Annals of Surgery* 267: 858-862.
9. Wang Y, Yeo Q, Ko Y (2017) Economic evaluations of pharmacist-managed services in people with diabetes mellitus: a systematic review. *Diabetic Medicine* 33: 421-427.
10. Wu WC, Tracey H Taveira, Sean Jeffery, Lan Jiang, Lisa Tokuda, et al. (2018) Affiliations Collapse et al., Costs and effectiveness of pharmacist-led group medical visits for type-2 diabetes: A multi-center randomized controlled trial. *PLoS One* 13: e0195898.
11. Fakeye TO, Adisa R, Olukotun RT, Morawo PK (2017) Hospital and community pharmacists’ perception of the scope, barriers and challenges of pharmacy practice-based research in Nigeria. *Pharmacy Practice (Granada)* 15: 881.
12. Nordin N, Hassali MA, Sarriif A (2017) A global picture of extended pharmacy services, perceptions and barriers toward its performance: a systematic review. *Asian J Pharm Clin Res* 14: 417-427.
13. Ashrafzadeh S, Hamdy O (2019) Patient-driven diabetes care of the future in the technology era. *Cell Metabolism* 29: 564-575.
14. Martin A, Philip Brummond, Tara Vlasimsky, Aaron Steffenhagen, James Langley, et al. (2018) The evolving frontier of digital health: opportunities for pharmacists on the horizon. *SAGE Publications Sage* 53: 7-11.
15. Lyford T, Sheppard J (2020) Diabetic Eye Disease: Advancements in Technology, Detection, and Access to Care. *The Senior Care Pharmacist* 35: 266-272.

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