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Orchestrating Glycemic Health: A Narrative Review of the Multidisciplinary Diabetes Management Team from Diagnostics to Oral-Systemic Support

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Abstract

Background: Diabetes mellitus (DM) is a quintessential chronic disease whose effective management transcends the capacity of any single healthcare discipline. Optimal care requires a coordinated, interprofessional approach addressing its multifactorial pathophysiology and systemic complications. **Aim:** This narrative review examines the comprehensive diabetes care pathway, focusing on the integration of laboratory diagnostics, nursing, nutritional counseling, pharmacy, dentistry, and administrative coordination. It aims to synthesize evidence on the roles, interactions, and collective impact of these disciplines on patient outcomes. **Methods:** A comprehensive literature search was conducted in PubMed, CINAHL, Scopus, and Web of Science (2010-2024) using keywords related to diabetes, multidisciplinary care, and each professional domain. Relevant studies and reviews were thematically analyzed to construct an integrated narrative. **Results:** The review delineates how seamless collaboration across disciplines—from point-of-care glucose/HbA1c testing guided by lab standards, to nursing-led education, pharmacist-mediated medication optimization, dietitian-driven nutritional therapy, and dentist-managed periodontal care—synergistically improves glycemic control, reduces complications, and enhances quality of life. The critical, yet often overlooked, role of the medical secretary in care coordination is highlighted. Significant barriers to integration, including siloed workflows and reimbursement models, persist. **Conclusion:** A truly patient-centered, multidisciplinary model is the gold standard for diabetes management. Future success depends on formalizing team structures, leveraging shared health informatics platforms, and restructuring payment systems to value collaborative, preventive care across the entire diabetes care continuum.
Keywords: Diabetes Mellitus; Interprofessional Relations; Point-of-Care Testing; Medication Therapy Management; Nutritional Therapy

Introduction

Diabetes mellitus represents a global pandemic, with its prevalence and associated economic burden continuing to rise inexorably (Atlas, 2015). Characterized by chronic hyperglycemia, diabetes is far more than a disorder of insulin secretion or action; it is a complex, systemic condition affecting nearly every organ system, with complications ranging from cardiovascular disease and nephropathy to neuropathy and retinopathy (Care, 2023). The management of this disease is consequently intricate, demanding continuous monitoring, lifestyle modification, pharmacological intervention, and vigilant screening for complications. No single healthcare professional possesses the breadth of expertise required to address all these facets effectively. Consequently, the paradigm for optimal diabetes care has shifted decisively from a physician-centric model to a collaborative, multidisciplinary team (MDT) approach (Powers et al., 2020).

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This team, often orchestrated within a structured diabetes care clinic or a patient-centered medical home, brings together distinct but interdependent expertise. The core typically includes endocrinologists or primary care physicians, nurses, dietitians, and pharmacists. However, comprehensive care necessitates expanding this core to include dental professionals, given the well-established bidirectional relationship between diabetes and periodontitis (Sanz et al., 2018), and medical secretaries or care coordinators, who are pivotal in navigating the complex logistics of chronic disease management (Funnell et al., 2007). The laboratory provides the foundational objective data upon which all clinical decisions are built, while point-of-care testing (POCT) empowers both patients and clinicians with immediate feedback.

This narrative review aims to synthesize the evidence from 2010 to 2024 on the roles, collaborative processes, and collective outcomes of a fully integrated multidisciplinary diabetes management team. It will trace the patient journey from initial diagnosis and laboratory assessment through ongoing therapeutic management, emphasizing the specific contributions of nursing (assessment, education, empowerment), nutrition (medical nutrition therapy), pharmacy (medication therapy management), and dentistry (oral health integration). A particular focus will be placed on the practical integration of these services and the critical administrative glue—the medical secretary—that holds the complex care schedule together. By examining this continuum, the review will highlight successful models, identify persistent barriers to interprofessional collaboration, and propose pathways toward more seamless and effective team-based diabetes care.

Laboratory Medicine and Point-of-Care Testing

The management of diabetes is fundamentally data-driven, beginning with accurate diagnosis and sustained by ongoing glycemic monitoring. The clinical laboratory is the cornerstone of this process, providing the gold-standard assays that define the disease and its control.

Diagnosis and Baseline Assessment

The diagnosis of diabetes rests on laboratory-measured parameters: a fasting plasma glucose ≥126 mg/dL, a 2-hour plasma glucose ≥200 mg/dL during an oral glucose tolerance test, a hemoglobin A1c (HbA1c) ≥6.5%, or a random plasma glucose ≥200 mg/dL in a symptomatic individual (American Diabetes Association, 2020). The HbA1c, reflecting average glycemia over approximately three months, is particularly crucial for both diagnosis and monitoring. Standardized laboratory HbA1c testing, certified by programs like the National Glycohemoglobin Standardization Program (NGSP), ensures reliability and comparability across settings (Little et al., 2011). Beyond glucose metrics, the initial and periodic laboratory workup for a person with diabetes is comprehensive, including lipid profiles, renal function tests (serum creatinine, estimated glomerular filtration rate, urine albumin-to-creatinine ratio), liver function tests, and thyroid screening, especially in type 1 diabetes. This panel provides the multidisciplinary team with a holistic view of metabolic status and end-organ health, informing risk stratification and management priorities (Inzucchi et al., 2015).

Point-of-Care Testing (POCT) as a Bridge

While central laboratory testing provides definitive results, POCT plays an indispensable role in daily management. Self-monitoring of blood glucose (SMBG) and continuous glucose monitoring (CGM) are forms of POCT that provide immediate, actionable data to patients and clinicians. SMBG, though invasive, remains a cornerstone for many, informing dietary choices, physical activity, and insulin dosing (Bergenstal et al., 2018). CGM systems, which measure interstitial glucose continuously, offer revolutionary insights into glycemic trends, variability, and time-in-range, moving beyond the snapshot provided by HbA1c (Battelino et al., 2019). In-clinic POCT for HbA1c provides rapid results during a consultation, enabling timely therapeutic adjustments and enhancing patient engagement (Schnell et al., 2017). The laboratory's role extends to overseeing the quality assurance of these POCT devices, ensuring their accuracy aligns with laboratory standards—a critical collaboration between laboratory scientists, nurses who often train patients on device use, and pharmacists who may dispense them (Nayak et al., 2017).

The Linchpin of Education, Advocacy, and Continuous Support

The diabetes care and education specialist (DCES), often a nurse, is frequently the most consistent point of contact for the patient and the central coordinator of the multidisciplinary team's efforts on the ground (American Association of Diabetes Educators, 2020).

Assessment and Personalized Education

Nursing assessment in diabetes care is holistic, encompassing not just glycemic numbers but also the patient's psychosocial context, health literacy, self-efficacy, and barriers to adherence (Funnell et al., 2007). Nurses conduct foot exams to screen for neuropathy and vascular disease, a critical preventive measure against ulcers and amputations. However, their paramount role is education. They translate complex medical and nutritional information into actionable, personalized self-management plans. This includes teaching SMBG/CGM technique, insulin administration (including dose calculation for carbohydrate intake and correction factors), hypoglycemia recognition and treatment, and sick-day rules (Powers et al., 2020). Effective education is not a one-time event but an ongoing process of empowerment, helping patients move from passive recipients to active managers of their condition.

Care Coordination and Advocacy

The nurse often acts as the hub of communication within the MDT. They relay patient concerns to the physician or pharmacist, refer to the dietitian or dentist, and ensure follow-up on lab orders. They advocate for the patient within the healthcare system and help navigate insurance and supply challenges, particularly for expensive technologies like insulin pumps or CGM sensors (Hilliard et al., 2016). Their longitudinal relationship with patients allows them to monitor for signs of diabetes distress or burnout, providing essential psychosocial support and facilitating referrals to mental health professionals when needed (Young-Hyman et al., 2016).

The Dietitian's Role in Glycemic and Overall Health

Medical nutrition therapy (MNT) provided by a registered dietitian nutritionist (RDN) is an evidence-based, essential component of diabetes management, not merely a complementary intervention (Evert et al., 2019).

Individualized Dietary Planning

There is no single "diabetic diet." The RDN's expertise lies in creating an individualized eating plan that considers the patient's glycemic goals, lipid profile, renal function, cultural preferences, socioeconomic status, and personal tastes. The focus has shifted from rigid carbohydrate exchanges to more flexible approaches like carbohydrate counting or consistent carbohydrate intake, often integrated with insulin therapy (Evert et al., 2019). Dietitians educate on portion control, label reading, the glycemic index/load, and meal timing. For patients with obesity—a common co-morbidity—MNT includes strategies for weight management, which can significantly improve insulin sensitivity and even induce remission in some cases of type 2 diabetes (Lean et al., 2018).

Collaboration with Pharmacy and Nursing

The dietitian's work is deeply intertwined with that of other team members. They collaborate with the pharmacist to manage drug-nutrient interactions (e.g., timing of metformin with meals to reduce GI upset, adjusting for corticosteroid-induced hyperglycemia) and to support patients on GLP-1 receptor agonists or SGLT2 inhibitors, which have specific considerations for hydration and ketoacidosis risk (Davies et al., 2022). They work closely with nursing to ensure the educational message about nutrition is consistent and reinforced, and to troubleshoot practical barriers to healthy eating that patients may report to their nurse.

The Pharmacist's Expertise in Optimization and Safety

Pharmacists are medication experts whose role in diabetes care has evolved dramatically from dispensing to active management within collaborative practice agreements (Moore et al., 2021).

Therapeutic Optimization and Deprescribing

Pharmacists conduct comprehensive medication reviews, assessing for efficacy, safety, and adherence. They are instrumental in implementing the complex, often daunting, pharmacotherapy algorithms for diabetes. This includes initiating and titrating medications (where authorized), simplifying complex insulin regimens, and ensuring timely intensification of therapy when glycemic targets are not met (AAP/ACE, 2020). Equally important is deprescribing—discontinuing or reducing doses of medications that are no longer appropriate or are causing harm, such as sulfonylureas in an elderly patient at high risk of hypoglycemia (Farrell et al., 2017). Pharmacists also manage the growing arsenal of cardiorenal protective agents (SGLT2 inhibitors, GLP-1 RAs), ensuring appropriate patient selection and monitoring for side effects.

Addressing the Affordability and Adherence Crisis

Perhaps no issue is more pressing in diabetes care than medication affordability and adherence. Pharmacists are on the front lines of this crisis. They identify lower-cost therapeutic alternatives, assist patients in navigating manufacturer assistance programs and insurance formularies, and provide blister packing or other adherence aids (Viswanathan et al., 2012). They counsel on proper medication storage, administration technique (especially for injectables), and the importance of adherence, directly addressing one of the most significant modifiable factors in poor glycemic control.

The Indispensable Role of Dentistry

The bidirectional relationship between diabetes and periodontitis is one of the most robust examples of oral-systemic health interconnection, making dental professionals essential members of the diabetes MDT (Chapple et al., 2013).

Periodontal Disease as a Complication and Modifier

Periodontitis is considered the sixth classic complication of diabetes. Hyperglycemia impairs neutrophil function and increases inflammatory cytokine production, creating an environment conducive to pathogenic periodontal bacteria (Sanz et al., 2018). Conversely, severe periodontitis acts as a source of chronic, low-grade inflammation, exacerbating insulin resistance and making glycemic control more difficult (Taylor & Borgnakke, 2008). The dentist and dental hygienist are responsible for screening, diagnosing, and actively treating periodontal disease in patients with diabetes. Non-surgical periodontal therapy (scaling and root planing) has been shown not only to improve periodontal health but also to lead to a modest but statistically significant reduction in HbA1c (approximately 0.3-0.4%) (Rodríguez-Medina et al., 2016).

Management of Other Oral Complications

Beyond periodontitis, diabetes is associated with other oral conditions that the dental team manages. Xerostomia (dry mouth), often related to polyuria or medication side effects, increases the risk of caries and oral candidiasis. Dentists can recommend salivary substitutes and preventive regimens (Verhulst

et al., 2019). Oral candidiasis requires antifungal treatment. Burning mouth syndrome and impaired wound healing are also more common. The dental team's management of these conditions improves quality of life and prevents secondary complications.

Co-management and Communication

Effective integration requires bidirectional communication. Dental teams should be informed of a patient's diabetes status, glycemic control level (as poor control increases surgical risk), and current medications. They should advise on the need for antibiotic prophylaxis (now rarely indicated) and stress-reduction protocols for anxious patients. Conversely, dentists must communicate periodontal diagnoses and treatment plans to the medical team, reinforcing the message that oral health is integral to diabetes management (Kane, 2017).

The Medical Secretary's Role in Care Coordination

The smooth operation of a multidisciplinary clinic is heavily dependent on skilled administrative staff, particularly medical secretaries or patient care coordinators. Their role is operational but profoundly impacts clinical outcomes (Hessels et al., 2015).

Logistical Orchestration

Managing the schedule for a patient who needs to see an endocrinologist, nurse educator, dietitian, and dentist—often with specific timing related to lab work—is a complex logistical puzzle. The medical secretary coordinates these appointments to minimize patient burden and maximize efficiency. They handle prior authorizations for medications and devices, a time-consuming but critical task to ensure patients can access prescribed therapies (Sommers et al., 2017). They are often the first point of contact for patients calling with questions about symptoms, supplies, or billing, requiring both clinical knowledge (to triage urgent issues) and exceptional communication skills.

Information Flow and Record Management

Secretaries ensure referral letters and consultation notes are sent and received, maintaining the continuity of information across providers. They manage the influx of laboratory and other diagnostic reports, routing them to the appropriate team member for review. In doing so, they act as the central nervous system for the administrative workflow, preventing patients from getting lost in the system and ensuring the clinical team has the information needed at the point of care (O'Malley et al., 2015). Table 1 & Figure 1 illustrate the integrated, patient-centered model of diabetes management.

Table 1: Core Roles and Collaborative Interactions in the Diabetes Multidisciplinary Team

Discipline	Primary Responsibilities	Key Collaborative Interactions	Exemplar Outcome Metrics
Laboratory Medicine	Provides standardized HbA1c, lipid, renal function testing; oversees POCT quality.	Informs all clinical decisions; works with nursing/pharmacy on POCT.	Assay precision/accuracy; turnaround time for critical results.
Nursing (DCES)	Holistic assessment; self-management education; foot care screening; psychosocial support; care coordination.	Receives lab data to guide education; refers to dietitian/pharmacist/dentist; communicates patient status to team.	Patient self-efficacy scores; hypoglycemia event rates; foot exam completion rates.
Medical Nutrition Therapy (RDN)	Delivers individualized Medical Nutrition Therapy (MNT); provides nutrition education and counseling.	Collaborates with pharmacist on drug-nutrient issues; aligns meal plans with insulin regimens (with nurse/MD).	Changes in dietary patterns; weight management success; post-prandial glucose control.
Pharmacy	Medication therapy management (MTM); therapeutic optimization; adherence counseling; affordability solutions.	Adjusts therapy based on lab trends; consults with RDN on interactions; manages insulin/device training with nurse.	HbA1c reduction from medication changes; medication adherence rates; cost-saving interventions.

Dentistry	Screens, diagnoses, and treats periodontitis; manages xerostomia, candidiasis; provides preventive oral care.	Informs medical team of periodontal status; receives glycemic control info for surgical planning.	Periodontal probing depth reduction; incidence of oral complications; impact of periodontal therapy on HbA1c.
Medical Secretary/Coordinator	Schedules multidisciplinary appointments; manages prior authorizations; fields patient calls; ensures information flow.	Enables team function by coordinating logistics; triages patient communications to the appropriate professional.	Patient show rates, prior authorization approval time, and patient satisfaction with access/communication.

Figure 1. Multidisciplinary Diabetes Management Across the Continuum of Care

Models of Integration and Evidence for Team-Based Care

The structure of multidisciplinary diabetes care varies, from formal, co-located clinics to virtual networks of providers (Table 2). Integrated Practice Units (IPUs), where the team shares physical space, goals, and outcomes measurement, represent an ideal model (Porter & Lee, 2013). Systematic reviews and meta-analyses consistently demonstrate that structured, multidisciplinary team care leads to superior outcomes compared to usual care. These benefits include greater reductions in HbA1c, improved blood pressure and lipid control, higher rates of foot examinations and retinal screening, reduced hospital admissions for hypo- or hyperglycemia, and lower all-cause mortality (Stellefson et al., 2013; Tricco et al., 2012). The success factors common to effective teams include clear role definitions, regular interprofessional meetings (huddles, case conferences), shared electronic health records (EHRs) with robust communication tools, and a unified, patient-centered care plan (Reiss-Brennan et al., 2016).

Table 2: Barriers and Enablers to Effective Multidisciplinary Diabetes Care

Domain	Major Barriers	Potential Enablers & Solutions
System & Financing	Fee-for-service reimbursement that rewards volume over coordination; lack of payment for team meetings or non-physician services (e.g., dental care for adults).	Shift to value-based/ bundled payments for diabetes care; expanded insurance coverage for RDNs, pharmacists, DCES, and periodontal therapy.
Workflow & Communication	Siloed EHRs that don't communicate across medical and dental offices; inefficient communication channels (e.g., phone tag, fax); lack of protected time for team collaboration.	Integrated health information exchanges; shared care plans within EHRs; standardized referral/consult note templates; regular, brief interprofessional huddles.
Professional Culture & Education	Unidisciplinary training leading to role protectionism, a lack of understanding of other professions' scopes and expertise, and hierarchical attitudes.	Interprofessional education (IPE) embedded in training curricula; joint continuing education; team-building retreats; clear, agreed-upon protocols.
Patient Factors	Transportation challenges to multiple appointments; health literacy and language barriers; out-of-pocket costs for non-covered services (dental, nutrition).	Co-location of services (one-stop shop); telemedicine/telehealth options; use of care navigators/community health workers; multilingual educational materials.

Future Directions and Conclusion

The future of diabetes management lies in deepening and technologically enabling multidisciplinary integration. Digital health tools, such as shared care planning platforms, remote patient monitoring (RPM) for glucose and vital signs, and secure messaging, can enhance team communication and patient engagement between visits (Lee et al., 2023). Artificial Intelligence (AI) may soon aid in predicting hypoglycemia, optimizing insulin doses, and identifying patients at the highest risk for complications, presenting insights for the team to act upon (Contreras & Vehi, 2018). Policy advocacy remains crucial to reform payment models to sustainably fund team-based care and mandate medical-dental data interoperability.

In conclusion, diabetes is a paradigm for chronic disease management, demanding a response that is as multifaceted as the disease itself. The evidence is unequivocal: outcomes are superior when care is delivered by a coordinated, multidisciplinary team that includes nursing, nutrition, pharmacy, dentistry, and dedicated administrative support, all guided by robust laboratory diagnostics. Moving from a collection of siloed experts to a truly integrated, collaborative unit requires intentional effort to break down systemic, financial, and cultural barriers. Investing in such teams is not merely an operational choice but a clinical and ethical imperative to reduce the devastating human and economic toll of diabetes complications. The goal must be to create a seamless ecosystem of support where every professional's expertise is leveraged at the right time, and the patient is an informed, empowered partner at the center of it all.

References

1. American Association of Diabetes Educators. (2020). An effective model of diabetes care and education: revising the AADE7 Self-Care Behaviors®. *The Diabetes Educator*, *46*(2), 139-160. https://doi.org/10.1177/0145721719894903
2. American Diabetes Association. (2020). 5. Facilitating behavior change and well-being to improve health outcomes: Standards of Medical Care in Diabetes—2020. *Diabetes care*, *43*(Supplement_1), S48-S65.https://doi.org/10.2337/dc20-S005
3. Atlas, D. (2015). International diabetes federation. *IDF Diabetes Atlas, 7th edn. Brussels, Belgium: International Diabetes Federation*, *33*(2).
4. Battelino, T., Danne, T., Bergenstal, R. M., Amiel, S. A., Beck, R., Biester, T., ... & Phillip, M. (2019). Clinical targets for continuous glucose monitoring data interpretation: recommendations from the international consensus on time in range. *Diabetes care*, *42*(8), 1593-1603. https://doi.org/10.2337/dci19-0028
5. Bergenstal, R. M., Beck, R. W., Close, K. L., Grunberger, G., Sacks, D. B., Kowalski, A., ... & Cefalu, W. T. (2018). Glucose management indicator (GMI): a new term for estimating A1C from continuous glucose monitoring. *Diabetes care*, *41*(11), 2275-2280. https://doi.org/10.2337/dc18-1581
6. Care, D. (2023). 2. Classification and diagnosis of diabetes: standards of care in. *Diabetes Care*, *46*, S19. https://doi.org/10.2337/dc23-S002
7. Chapple, I. L., Genco, R., & Working Group 2 of the Joint EFP/AAP Workshop*. (2013). Diabetes and periodontal diseases: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. *Journal of Periodontology*, *84*, S106-S112. https://doi.org/10.1902/jop.2013.1340011
8. Contreras, I., & Vehi, J. (2018). Artificial intelligence for diabetes management and decision support: literature review. *Journal of medical Internet research*, *20*(5), e10775. https://doi.org/10.2196/10775
9. Davies, M. J., Aroda, V. R., Collins, B. S., Gabbay, R. A., Green, J., Maruthur, N. M., ... & Buse, J. B. (2022). Management of hyperglycaemia in type 2 diabetes, 2022. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). *Diabetologia*, *65*(12), 1925-1966. https://doi.org/10.1007/s00125-022-05787-2
10. Evert, A. B., Dennison, M., Gardner, C. D., Garvey, W. T., Lau, K. H. K., MacLeod, J., ... & Yancy Jr, W. S. (2019). Nutrition therapy for adults with diabetes or prediabetes: a consensus report. *Diabetes care*, *42*(5), 731. https://doi.org/10.2337/dci19-0014
11. Farrell, B., Pottie, K., Thompson, W., Boghossian, T., Pizzola, L., Rashid, F. J., ... & Moayyedi, P. (2017). Deprescribing proton pump inhibitors: evidence-based clinical practice guideline. *Canadian Family Physician*, *63*(5), 354-364.
12. Funnell, M. M., Brown, T. L., Childs, B. P., Haas, L. B., Hosey, G. M., Jensen, B., ... & Weiss, M. A. (2007). National standards for diabetes self-management education. *The Diabetes Educator*, *33*(4), 599-614. https://doi.org/10.1177/0145721707305880
13. Hessels, A. J., Flynn, L., Cimiotti, J. P., Cadmus, E., & Gershon, R. R. (2015). The impact of the nursing practice environment on missed nursing care. *Clinical nursing studies*, *3*(4), 60. https://doi.org/10.5430/cns.v3n4p60
14. Hilliard, M. E., Powell, P. W., & Anderson, B. J. (2016). Evidence-based behavioral interventions to promote diabetes

management in children, adolescents, and families. *American Psychologist*, *71*(7), 590.
15. Inzucchi, S. E., Bergenstal, R. M., Buse, J. B., Diamant, M., Ferrannini, E., Nauck, M., ... & Matthews, D. R. (2015). Management of hyperglycemia in type 2 diabetes, 2015: a patient-centered approach: update to a position statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes care*, *38*(1), 140-149. https://doi.org/10.2337/dc14-2441
16. Kane, S. F. (2017). The effects of oral health on systemic health. *Gen Dent*, *65*(6), 30-34.
17. Lean, M. E., Leslie, W. S., Barnes, A. C., Brosnahan, N., Thom, G., McCombie, L., ... & Taylor, R. (2018). Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial. *The Lancet*, *391*(10120), 541-551. https://doi.org/10.1016/S0140-6736(17)33102-1
18. Lee, Y. B., Kim, G., Jun, J. E., Park, H., Lee, W. J., Hwang, Y. C., & Kim, J. H. (2023). An integrated digital health care platform for diabetes management with AI-based dietary management: 48-week results from a randomized controlled trial. *Diabetes Care*, *46*(5), 959-966. https://doi.org/10.2337/dc22-1929
19. Little, R. R., Rohlfing, C. L., & Sacks, D. B. (2011). Status of hemoglobin A1c measurement and goals for improvement: from chaos to order for improving diabetes care. *Clinical chemistry*, *57*(2), 205-214. https://doi.org/10.1373/clinchem.2010.148841
20. Moore, G. D., Burns, A. L., Fish, H., Gandhi, N., Ginsburg, D. B., Hess, K., ... & Bradley-Baker, L. R. (2021). The report of the 2020-2021 professional affairs standing committee: pharmacists' unique role and integration in healthcare settings. *American journal of pharmaceutical education*, *85*(10), 8720. https://doi.org/10.5688/ajpe8720
21. Nayak, S., Blumenfeld, N. R., Laksanasopin, T., & Sia, S. K. (2017). Point-of-care diagnostics: recent developments in a connected age. *Analytical chemistry*, *89*(1), 102-123. doi: 10.1021/acs.analchem.6b04630
22. O'Malley, A. S., Draper, K., Gourevitch, R., Cross, D. A., & Scholle, S. H. (2015). Electronic health records and support for primary care teamwork. *Journal of the American Medical Informatics Association*, *22*(2), 426-434. https://doi.org/10.1093/jamia/ocu029
23. Porter, M. E., & Lee, T. H. (2013). The strategy that will fix health care. *Harv Bus Rev*, *91*(10), 50-70. https://hbr.org/2013/10/the-strategy-that-will-fix-health-care
24. Powers, M. A., Bardsley, J. K., Cypress, M., Funnell, M. M., Harms, D., Hess-Fischl, A., ... & Uelmen, S. (2020). Diabetes self-management education and support in adults with type 2 diabetes: a consensus report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the American Pharmacists Association. *Journal of the American Pharmacists Association*, *60*(6), e1-e18. https://doi.org/10.1016/j.japh.2020.04.018
25. Reiss-Brennan, B., Brunisholz, K. D., Dredge, C., Briot, P., Grazier, K., Wilcox, A., ... & James, B. (2016). Association of integrated team-based care with health care quality, utilization, and cost. *Jama*, *316*(8), 826-834. doi:10.1001/jama.2016.11232
26. Rodríguez-Medina, C., Agudelo-Suárez, A. A., & Botero, J. E. (2016). Weak evidence hinders the understanding of the benefits of periodontal therapy on glycemic control in patients with diabetes and periodontitis. *Journal of Evidence Based Dental Practice*, *16*(4), 236-238. https://doi.org/10.1016/j.jebdp.2016.11.005
27. Sanz, M., Ceriello, A., Buysschaert, M., Chapple, I., Demmer, R. T., Graziani, F., ... & Vegh, D. (2018). Scientific evidence on the links between periodontal diseases and diabetes: Consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International Diabetes Federation and the European Federation of Periodontology. *Diabetes research and clinical practice*, *137*, 231-241. https://doi.org/10.1016/j.diabres.2017.12.001
28. Schnell, O., Crocker, J. B., & Weng, J. (2017). Impact of HbA1c testing at point of care on diabetes management. *Journal of diabetes science and technology*, *11*(3), 611-617. https://doi.org/10.1177/1932296816678263
29. Sommers, B. D., Gawande, A. A., & Baicker, K. (2017). Health insurance coverage and health—what the recent evidence tells us. *New England Journal of Medicine*, *377*(6), 586-593. DOI: 10.1056/NEJMsb1706645
30. Stellefson, M., Dipnarine, K., & Stopka, C. (2013). The chronic care model and diabetes management in US primary care settings: a systematic review. *Preventing chronic*

disease, *10*, E26. https://doi.org/10.5888/pcd10.120180

31. Taylor, G. W., & Borgnakke, W. S. (2008). Periodontal disease: associations with diabetes, glycemic control and complications. *Oral diseases*, *14*(3), 191-203. https://doi.org/10.1111/j.1601-0825.2008.01442.x
32. Tricco, A. C., Ivers, N. M., Grimshaw, J. M., Moher, D., Turner, L., Galipeau, J., ... & Shojania, K. (2012). Effectiveness of quality improvement strategies on the management of diabetes: a systematic review and meta-analysis. *The Lancet*, *379*(9833), 2252-2261. https://doi.org/10.1016/S0140-6736(12)60480-2
33. Verhulst, M. J., Teeuw, W. J., Gerdes, V. E., & Loos, B. G. (2019). Self-reported oral health and quality of life in patients with type 2 diabetes mellitus in primary care: a multi-center cross-sectional study. *Diabetes, metabolic syndrome and obesity: targets and therapy*, 883-899. https://doi.org/10.2147/DMSO.S207087
34. Viswanathan, M., Golin, C. E., Jones, C. D., Ashok, M., Blalock, S. J., Wines, R. C., ... & Lohr, K. N. (2012). Interventions to improve adherence to self-administered medications for chronic diseases in the United States: a systematic review. *Annals of internal medicine*, *157*(11), 785-795. https://doi.org/10.7326/0003-4819-157-11-201212040-00538
35. Young-Hyman, D., de Groot, M., Hill-Briggs, F., Gonzalez, J. S., Hood, K., & Peyrot, M. (2016). Erratum. Psychosocial care for people with diabetes: a position statement of the American Diabetes Association. Diabetes Care 2016; 39: 2126–2140. *Diabetes Care*, *40*(2), 287. https://doi.org/10.2337/dc17-er02.

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