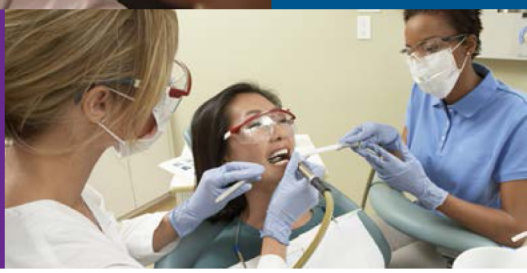
ENGLISH

Working Together to Manage Diabetes:

A GUIDE FOR PHARMACY, PODIATRY, OPTOMETRY, AND DENTISTRY



NDEP **National Diabetes Education Program**

A program of the National Institutes of Health and the Centers for Disease Control and Prevention

ADN Alabama Diabetes Network

CARDIOVASCULAR HEALTH PROGRAM Alabama Department of Public Health

AD Alabama Diabetes PROGRAM

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Overview

Almost 26 million Americans have diabetes, and these rates are increasing.[1] Now it is more important than ever for health care professionals, like you, to come together to provide diabetes care, decrease the risk for complications of diabetes, and manage medication therapy.

You Can Make a Difference. You and other providers of pharmacy, podiatry, optometry, and dentistry (PPOD) are well positioned to advise and educate your patients about diabetes control and prevention. You may be the first to see a person with, or at risk for, diabetes. You also have the opportunity to:

- Give consistent diabetes messages.
- Recognize early danger signs.
- Promote the team approach to care.

Integrated, comprehensive care benefits everyone involved—patients, health care providers, and the community.

This Guide Will Show You How. This online resource, *Working Together to Manage Diabetes: A Guide for Pharmacy, Podiatry, Optometry, and Dentistry*, shows how practitioners in the four disciplines presented here—pharmacy, podiatry, optometry, and dentistry—can work collaboratively with each other, as well as with all other members of the health care team, such as primary health care providers, physician assistants, nurse educators, and community health workers to treat people with diabetes (or in some cases even prevent type 2 diabetes).

Inside the PPOD Guide, you will find:

- An introduction to team care
- Tips on communicating with patients
- Sections about each of the four PPOD areas
- Resources and links to other PPOD-related resources and organizations

Each section of the PPOD Guide provides a "quick course" on that health care specialty and its relation to diabetes. Because each section is written for professionals outside of that specialty, all team members who might care for a person with diabetes can collaborate and make cross-disciplinary treatment referrals.

This PPOD Guide is part of the W*orking Together to Manage Diabetes PPOD Toolkit*, offering additional information and resources that can be customized to suit each provider's practice and expertise. Other toolkit resources include:

- Patient education sheet and patient care checklist
- Patient fact sheet series
- PowerPoint presentation
- Quick reference guide to medications

Incorporate Diabetes Prevention Messages Into Your Practice. The PPOD Guide and the accompanying Toolkit will enhance providers' medical practices and patient care, as well as educate all persons concerned with diabetic care. You and other health care providers will learn to:

- Recommend that patients receive routine exams, and explain to patients the importance of managing the ABCs (A1C, blood pressure, cholesterol, and smoking cessation).
- Reinforce the importance of self-exams and self-management education by patients and offer them materials and resources that are easy to use and understand.
- Create a network of engaged PPOD providers in the local community who recognize possible signs of diabetes across all four PPOD specialties.

Reference

1. American Diabetes Association. Standards of medical care in diabetes - 2013. *Diabetes Care* 2013; 36 Suppl 1: S11-66.

What Is PPOD and Why Is It Important in Diabetes Care?

With Americans increasingly being diagnosed with diabetes and its related health complications—such as cardiovascular disease, blindness, nontraumatic amputations, and kidney disease[1]—PPOD providers and other health care professionals face the challenge of keeping abreast of the latest data, helping patients to manage their diabetes, and monitoring them regularly for associated complications. (See the supplemental section of this Guide for data and trends related to diabetes.) You can make these tasks less daunting by working together with other health care professionals to provide integrated diabetes care to your patients.

Working Together to Manage Diabetes: A Guide for Pharmacy, Podiatry, Optometry, and Dentistry will show you how to reinforce consistent diabetes messages across four disciplines—pharmacy, podiatry, optometry, and dentistry—and to promote a team approach to comprehensive diabetes care that encourages collaboration among all providers.

PPOD and Key Diabetes Messages

As a PPOD provider, you and your staff are well positioned to deliver key diabetes prevention and management messages; communicate the need for metabolic control; and encourage patients with diabetes to see their optometrist (or other eye care professional), foot care specialist such as a podiatrist, and dentist, and review their medication therapy with a pharmacist at least once a year.

The PPOD message emphasizes the importance of **all** health care providers treating patients with diabetes. You and other PPOD providers are often a primary point of care for people with, or at risk for, type 2 diabetes and, as such, have an opportunity to:

- Educate people with diabetes about the disease.
- Encourage them to attend a diabetes self-management education program.
- Support their efforts to practice self-management, set goals, and encourage behavior change to achieve these goals.
- Provide appropriate treatment.
- Direct them to other health care professionals for treatment of conditions you do not normally treat.

All of these key messages, delivered by you and other PPOD providers, can help patients significantly reduce their risk of developing serious diabetes-related complications such as blindness, lower-extremity ulcers and amputations, periodontal disease, tooth loss, heart disease, and adverse reactions from drug interactions or poor drug therapy management.

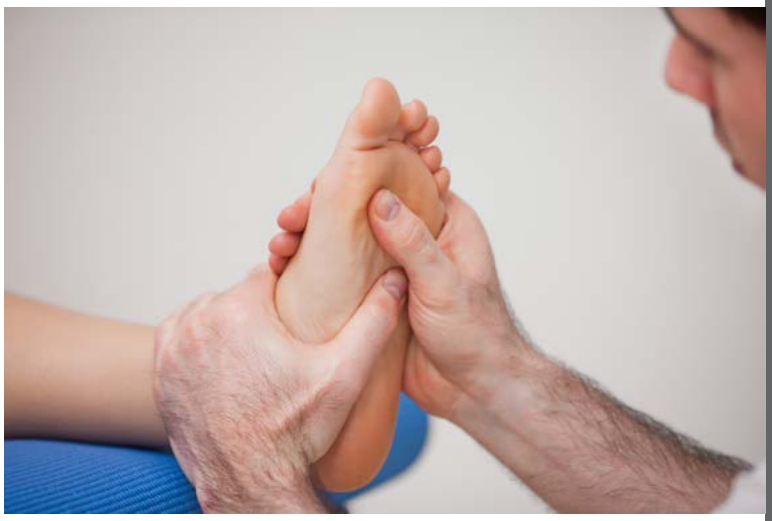
Patient Case Example

A person requests a foot soak from the pharmacist for an ingrown toenail. Inquiry reveals that he has diabetes and for 3 weeks has had a severely inflamed ingrown toenail that has not responded to topical antibiotic ointment.

The pharmacist discusses the relationship between diabetes and its complications, as well as the need for him to seek immediate attention from a podiatrist.

The pharmacist also emphasizes that people with diabetes should NOT routinely soak their feet unless advised to do so by a health care professional. Improper soaking dries the skin and can cause more skin and foot complications.

Today, many people with diabetes, especially those from underserved communities, are not getting annual foot, eye, and oral exams, nor are they discussing their drug therapy with a pharmacist each year, as recommended by diabetes care experts. Greater adoption of the PPOD message by you and other providers will facilitate better care and better outcomes for people with diabetes. The patient care checklist can help to remind providers and document care.



PPOD and the Health Care Team

A team approach, among PPOD providers as well as other health care professionals, is of crucial importance in helping patients to manage their diabetes and take the needed steps to lower their risk for complications, including those related to their feet, eyes, teeth, and medication management. See the Team Care Approach for Diabetes Management section of this Guide for more information about the entire diabetes management team.

Reference

1. American Diabetes Association. Standards of medical care in diabetes - 2013. *Diabetes Care* 2013; 36 Suppl 1: S11-66.

How to Use This Guide

The PPOD Guide is a resource to help you and other pharmacy, podiatry, optometry, and dentistry (PPOD) providers better understand the interactive roles each other plays in treating people with diabetes and to integrate with the rest of the health care team. It is not a comprehensive guide to all diabetes concerns in any one of the PPOD disciplines, but is instead a "key issues" guide to messages that every health care professional can give to support comprehensive care.

Learning Objectives

In this guide, you will learn how to:

- Identify ways to be involved with the whole health care team.
- Determine key messages to convey to all patients with diabetes.
- Understand the key concerns about foot, eye, and oral health care, as well as medication management issues, for people with diabetes.
- Review the key basic concepts of diabetes care and prevention.
- Learn about and be able to access resources of the National Diabetes Education Program (NDEP).

Using the Guide in Practice

You can use *Working Together to Manage Diabetes: A Guide for Pharmacy, Podiatry, Optometry, and Dentistry* and other PPOD Toolkit materials to:

- **Facilitate a team approach to care and increase communication across the four PPOD specialties and with other key providers.** The content in this Guide, along with the PPOD marketing sheets and PowerPoint presentation, can help you educate other providers in the community about the benefits of a comprehensive team approach to caring for people with diabetes.
- **Educate patients with diabetes about needed exams and care.** Several of the materials will help patients understand diabetes and the four PPOD specialty areas. The patient materials are clear, concise, and user friendly.

Other Helpful Tips

A few points to keep in mind about the PPOD Guide include:

- As an online resource, each section may be accessed or downloaded separately so that the content is easy to find. Feel free to access and read the sections in the order that best meets your needs.
- Each specialty section provides a "quick course" on that specialty and its relation to diabetes.
- Each section is written for providers outside of the specialty. As a result, your own specialty section may seem simplistic.
- The Resource Center section and PPOD-related Organizations List provide additional resources and links to organizations across all four PPOD specialties to help you put the ideas in this Guide into practice.

Other Resources in the PPOD Toolkit

The PPOD Guide is just one component of the PPOD Toolkit, which also includes the following information and resources to provide comprehensive, team-based diabetes care to patients:

For Patients

- **A patient education sheet and patient care checklist:**
  - » Side one, *I Can Control My Diabetes By Working With My Health Care Team!*—Helps patients understand how to work with PPOD providers to successfully control their diabetes.
  - » Side two, *Diabetes Head to Toe Checklist Examination Report*—Documents recommended care and encourages communication among all health care providers.
- **Patient fact sheet series.** Provides patients with a brief overview of diabetes-related health issues in each PPOD area and offers patient-centered steps and tips to manage diabetes and stay healthy. The series includes:
  - » *Diabetes and You: Healthy Eyes Matter!*—Explains eye problems that can occur with diabetes and provides important tips for patients to keep their eyes healthy.
  - » *Diabetes and You: Healthy Teeth Matter!*—Explains the dental problems that can occur with diabetes and provides important tips for patients to keep their mouths healthy.
  - » *Diabetes and You: Healthy Feet Matter!*—Explains the foot problems that can occur with diabetes and provides important tips for patients to keep their feet and limbs healthy.
  - » *Diabetes and You: All Medicines Matter!*—Explains the importance of managing medications and provides tips for patients on working with their pharmacist to manage their medications.

For Providers

- **PPOD PowerPoint presentation.** Introduces the PPOD approach to comprehensive diabetes care and includes an overview of each of the four PPOD specialty areas and ways that you and other PPOD providers can work together, both among yourselves and with other health care providers, to provide team care. When you attend professional conferences, you may use, and customize, the template to deliver a presentation about the PPOD goals and resources.

- **A patient education sheet and patient care checklist:**
  - » Side one, *I Can Control My Diabetes By Working With My Health Care Team!*—Helps patients understand how to work with PPOD providers to successfully control their diabetes.
  - » Side two, *Diabetes Head to Toe Checklist Examination Report*—Documents recommended care and encourages communication among all health care providers.
- ***Working Together Medications Supplement*.** Serves as a quick reference guide to medications commonly used by people who have diabetes. It is intended to help you and other providers to understand these medications.

Benefitting From the PPOD Guide and Toolkit

An integrated PPOD approach to care benefits everyone involved—health care providers, patients, and the community. The materials within the PPOD Guide and Toolkit can be customized to meet your needs in helping manage diabetes in your patients. Below are ways in which the materials can help providers, patients, and the community to promote diabetes management.

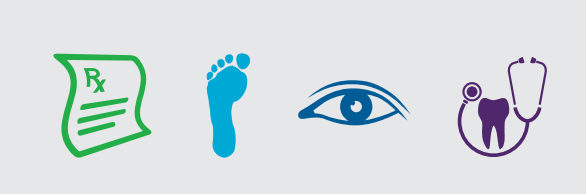
Patient Case Example

A 70-year-old woman with diabetes tells her optometrist that her blurred vision is such a problem that she is afraid to cut her toenails. She states, "They are so long, my shoes don't fit!" She is wearing oversized bedroom slippers to the appointment.

The optometrist asks the patient to take off her slippers, and finds overgrown, thickened toenails that have curled around and are cutting the skin. The patient has little sensation and has noticed no pain, although several areas are red.

The optometrist arranges for her to be seen that day by a podiatrist and emphasizes the importance of prompt treatment to avoid serious injury.

The optometrist also gives the patient helpful NDEP materials about managing diabetes.



You and other PPOD providers can use the kit to:

- Create a network of engaged PPOD providers in your local community. Establishing a referral system with PPOD and other health care providers can improve your patients' health and increase your knowledge of medical professionals in these fields, as well.
- Help recognize possible signs of diabetes across all four PPOD specialties.
- Recommend that patients receive routine exams, including dental exams, comprehensive foot checks, and dilated eye exams, to prevent complications.
- Help explain to patients the importance of managing the ABCs (A1C, blood pressure, cholesterol, and smoking cessation).
- Help reinforce to patients the importance of self-exams and self-management education.
- Offer materials and resources that are easy to use and understand that educate and help the patient cope with diabetes.
- Ensure that, when PPOD providers work with primary care providers, people with diabetes receive clinical practice recommendations such as comprehensive foot and oral health exams. Documentation of these exams certainly can help primary care providers achieve the results needed for favorable "pay for performance" quality improvement programs.
- Improve the quality of health care a patient receives through use of evidence-based educational materials from NDEP. The materials can potentially become one of the components of the Meaningful Use Program to promote the electronic exchange of health information. "Meaningful use" is the set of standards defined by the Centers for Medicare & Medicaid Services' Incentive Programs that governs the use of electronic health records and allows eligible providers and hospitals to earn incentive payments by meeting specific criteria.

The kit offers **patients**:

- An approach to enhanced, integrated diabetes care across all four specialty areas.
- A strong educational focus on their preventive care and ways to decrease their risk of diabetes complications.
- Patient education materials that are science-based, tested, and easy to use and understand.

The **community** benefits because:

- Integrated, high-quality diabetes care leads to healthier patient populations and healthier communities.
- An integrated approach to health care generates a network of engaged providers who look at the whole patient when delivering care, creating the best health outcomes for their patients.
- This integrated approach supports the goals of Healthy People 2020, a science-based, 10-year national set of objectives for improving the health of all Americans. (See each section for specific Healthy People 2020 goals.)

Taking Time to Discuss Diabetes Care With Patients

You may be wondering how realistic it is to practice team care. For example, is it realistic for a busy optometrist to look at a patient's feet or for any provider to accomplish any of the scenarios described in the Patient Case Examples? They can be done, and are being done, by providers all around the country.

In fact, you don't need to be an expert or do a thorough exam to identify that a problem needs attention by a specialist. It takes less than a minute to look at a person's feet, mouth, or eyes, or to ask a few questions about medications, supplies, or tobacco use. Although you have limited time for patient care, you can provide comprehensive care efficiently. You can make a big difference in your patients' lives and help your patients prevent complications from diabetes:

- Prioritize messages based on the patient's specific needs.
- Reinforce the importance of preventive care by taking the time to check a complaint yourself before referring the patient to another provider.
- Use direct health messages such as "I recommend that you…" (Research has shown that health messages direct from a provider are more effective than generalized or third-person recommendations such as "You should see someone about that…")
- Support comprehensive diabetes care by thinking beyond your own discipline to identify other potential problems. Then refer the patient with an "I recommend…" message. Patients will appreciate your concern for their health and well-being as a whole.
- Keep in mind that every team member does not need to be involved in every patient's care. A flexible plan will help determine the most effective team, as patient needs will change over time.

Team Care Approach for Diabetes Management

A team approach to diabetes care can effectively help people cope with the vast array of complications that can arise from diabetes. People with diabetes can lower their risk for microvascular complications, such as eye disease and kidney disease; macrovascular complications, such as heart disease and stroke; and other diabetes complications, such as nerve damage, by:

- Controlling their ABCs (A1C, blood pressure, cholesterol, and smoking cessation).
- Following an individualized meal plan.
- Engaging in regular physical activity.
- Avoiding tobacco use.
- Taking medicines as prescribed.
- Coping effectively with the demands of a complex chronic disease.

Patients who increase their use of effective behavioral interventions to lower the risk of diabetes—and treatments to improve glycemic control and cardiovascular risk profiles—can prevent or delay progression to kidney failure, vision loss, nerve damage, lower-extremity amputation, and cardiovascular disease. This in turn can lead to increased patient satisfaction with care, better quality of life, improved health outcomes, and ultimately, lower health care costs.

The challenge is to broaden delivery of care by expanding the health care team to include several types of health care professionals. Collaborative teams vary according to patients' needs, patient load, organizational constraints, resources, clinical setting, geographic location, and professional skills.

PPOD and the Team Approach. You and other PPOD providers play an integral role in the team care approach to diabetes care. When you are educated about the complications of diabetes care issues in your own and other PPOD disciplines, you can better recognize symptomatic concerns warranting timely referral and reinforce annual screening recommendations that are proven to lower the risk of serious complications for diabetic patients.

Below you will find information and resources to promote this comprehensive, team-based diabetes care for patients. A multidisciplinary team approach is critical to success in diabetes care and complications prevention. Evidence indicates that a team approach:

- Can facilitate diabetes management.
- Can lower the risk for chronic disease complications.[1]
- Helps educate about ways to reduce risk factors for type 2 diabetes in your patients' family members.

Patient Case Example

A dentist needs to schedule a patient for several procedures and asks about the timing of the patient's morning insulin. The patient is confused about his complicated medication regimen and asks, "Should I just skip all medicines that day until after you work on my teeth?" The dentist phones the patient's pharmacist to arrange a consultation.

The pharmacist collaborates with the primary care clinician to develop an individualized medication schedule and advises the patient and his dentist on medication usage on the day of the procedure.

Health Care Team for People With Diabetes. There are many other possible members of the health care team in addition to physicians (e.g., primary care, endocrinologist, obstetrician-gynecologist, ophthalmologist). This team could include (but is not limited to):

- Pharmacists
- Podiatrists
- Optometrists
- Dental care professionals
- Primary care physicians
- Physician assistants
- Nurse practitioners
- Dietitians
- Certified diabetes educators
- Community health workers
- Mental health professionals

Other Valuable Team Members. Clinical care teams can be augmented by including the resources and support of community partners such as:

- School nurses
- Trained peer leaders

Nontraditional approaches to health care can expand access to team care and, if used effectively, can build team care practices. These approaches include telehealth, shared medical appointments, and group education. For instance, pharmacist-directed telehealth programs have improved outcomes in blood pressure and diabetes medication management. There are also opportunities to partner with primary care providers in shared group appointments (SGAs). These shared group visits allow time for learning and integration of new knowledge and skills. A literature review showed that SGAs build synergy between health care providers and patients while using group interactions to increase knowledge and self-care skills.[2,3,4]

All of these team members play important roles in the delivery of care for people with diabetes. When you work together using a team care approach, you can:

- Minimize patients' health risks through assessment, intervention, and surveillance.
- Identify problems early and initiate timely treatment.

Key Messages All Health Care Providers Can Reinforce

- Emphasize the importance of metabolic control and the control of other cardiovascular risk factors such as the ABCs.
- Promote a healthy lifestyle that includes physical activity, healthful eating, and coping skills.
- Explain the benefits of diabetes comprehensive team care.
- Recommend routine checkups to prevent complications: a dental exam, a comprehensive foot exam, and a complete dilated eye exam.
- Reinforce self-exams for foot care and dental care, and others as appropriate.
- Recognize the danger signs for foot and dental problems and seek help from a health care provider.
- Promote the pharmacist's role in drug therapy management.

The *What to Discuss With Patients* section of this Guide provides further explanation of the diabetes management messages that providers can relay to patients.

Promoting Team Interaction

Below are some tools and resources you can use to promote interaction among PPOD professionals and other providers:

- The National Diabetes Education Program's (NDEP) *Redesigning the Health Care Team* illustrates how teams can work together effectively. Examples from the peer-reviewed literature and case studies that show the diversity and effectiveness of health care professional teams working with people who have diabetes include:
  - » Community-based primary care providers who involve a pharmacist and dietitian in implementing treatment algorithms, nurse and dietitian case managers, and educators who help to improve patients' weight loss and A1C values.
  - » A nurse practitioner-physician team that manages patients with diabetes and hypertension.

- » Health care professionals who use telehealth to improve eye care, nutrition counseling, and diabetes self-management education.
- » Pharmacists who work with company employees who have diabetes and their physicians to improve clinical measures and lower health care costs.
- » Trained community health workers who bridge the gap among traditional health care teams to improve access to diabetes health care, complications assessment, and education in underserved communities.
- » Podiatrists and other health care professionals who help reduce lower-extremity amputation rates in foot care clinics.
- » Dental and eye care professionals who help prevent and manage diabetes complications.

- NDEP's comprehensive *Diabetes Head to Toe Checklist Examination Report* was developed by the NDEP Health Care Providers Stakeholders' Group (comprised of physicians, nurses, physician assistants, and diabetes educators), and the PPOD Providers Stakeholders' Group (comprised of providers in all four of the PPOD fields—pharmacy, podiatry, optometry, and dentistry)—to foster collaboration. The groups developed the checklist to support coordination of care and to recognize the following variables:
  - » Coordination will help ensure patients understand and can implement the intended treatment plan and can identify drug and disease management and psychosocial problems in a timely manner.
  - » Coordination of care presents many challenges when delivered by multiple providers in a variety of settings.
  - » PPOD professionals are often a primary point of care for people with type 2 diabetes. You have an important role in ensuring that diabetes care is continuous and patient-centered.

The checklist was pilot-tested by a range of health care providers and was found to be useful in a real-world clinical setting. They indicated that they were likely to change their practice to more of a team approach, incorporating the members of the team, or to adopt a referral approach. The providers also reported that the checklist helped them educate their patients about how preventive care can decrease the risk of diabetes complications. Further, 30% indicated that the checklist has useful application in electronic medical record/electronic health record systems.

Additional Resources

Redesigning the Health Care Team: Diabetes Prevention and Lifelong Management
NDEP

Find out how to form and implement a multidisciplinary team to provide effective care for people with diabetes in all clinical settings. This guide provides insights on how to practice a proactive, planned, patient-centered, and population-based approach to care.

Practice Transformation for Physicians and Health Care Teams
NDEP

This website discusses the meaning of team care, what is required to form a coordinated care group, and the advantages that can result from this model.

Diabetes HealthSense: Resources for Living Well
NDEP

This website has resources on many topics, such as managing weight, coping with stress and emotions, being active, and eating healthy.

How to Use Telehealth in Diabetes Management
Canadian Diabetes Association

The Canadian Diabetes Association 2013 guidelines strongly recommend using telehealth as part of a disease management program. This website offers a case study and information about using telehealth to improve access to expert diabetes care.

References

1. Redesigning the health care team: Diabetes prevention and lifelong management. NIH Publication No. 11-7739 NDEP-37. Bethesda, MD: National Diabetes Education Program; Revised June 2011.
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3. McFarland M, Davis K, Wallace J, Wan J, Cassidy R, Morgan T, Venugopal D. Use of home telehealth monitoring with active medication therapy management by clinical pharmacists in veterans with poorly controlled type 2 diabetes mellitus. *Pharmacotherapy*. 2012; 32(5):420-6.
4. Margolis K, Asche S, Bergdall A, Dehmer S, Groen S, Kadrmas H, Kerby T, Klotzle K, Maciosek M, Michels R, O'Connor P, Pritchard R, Sekenski J, Sperl-Hillen J, Trower N. Effect of home blood pressure telemonitoring and pharmacist management on blood pressure control: A cluster randomized clinical trial. *JAMA*. 2013; 310(1):46-56.

Collaboration Strategies for PPOD Providers

Below are some tips for integrating the information and approach in the PPOD Guide and other PPOD Toolkit materials into your routine practice.

Collaborate With Other PPOD Providers

Network With Local Providers

- Get to know the providers in your community—some may hold diabetes classes or consult at local clinics.
- Network with local associations and local chapters of national associations, including groups such as Lions Clubs and professional membership organizations, such as:
  - » American Optometric Association
  - » American Dental Association
  - » American Podiatric Medical Association
  - » American Pharmacists Association
- Create a referral network with other PPOD providers, as well as other health care providers who practice a team care approach.

Partner With Select Providers

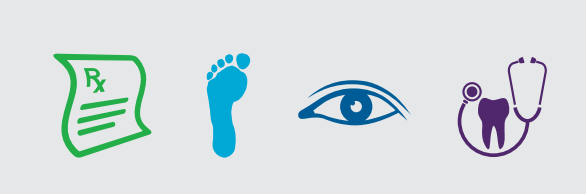
- Form a partnership with other providers within your specialty to create a larger network with specialized services or products.
- Choose the providers you include in your network wisely. Select the right balance of specialists for your patient mix.
- Monitor the performance of the providers you select for your network. Identify each provider's strengths, weaknesses, qualities, and efficiency.
- Consider setting aside time for integrated patient care discussions once you've established your PPOD network.

Promote Your Network

- Present about PPOD at conferences and local meetings.
  - » Talk with your local hospital or medical society about presenting at hospital grand rounds.
  - » Try to engage multiple types of providers as a unique way of getting people involved.
- Consider creating a local PPOD coalition in your state or community.
  - » Visit the Massachusetts Diabetes Education Program Coalition website to see an example of a state PPOD coalition.

Create Custom Materials

- Create a website that lists local associations and member providers.
- Tailor national materials to fit your coalition or practice.
  - » The National Diabetes Education Program (NDEP) has a wealth of diabetes resources that you can tailor to fit your coalition or personal practice. Feel free to put your logo on NDEP materials.
  - » You can download and tailor the checklist for care by adding your office information. Give this checklist to your patients, and they can then bring it to all of their provider visits to document the recommended interventions (which may help in pay-for-performance situations). The checklist can help foster better communication among all of the providers.



- NDEP's Partners & Community Organizations web page has tips on how you can partner with NDEP, co-brand materials, and benefit from NDEP's wealth of resources.
- You can use the NDEP materials to help educate your patients about diabetes, its complications, and even ways to prevent type 2 diabetes.

Collaborate With Other Members of the Health Care Team

Below are some ways to start building the team care approach into your practice.

Educate Others About What You Do

- Partner with primary care providers and their local organizations, such as the ones below, to provide mutual continuing education:
  - National medical societies
  - State medical societies
  - County medical societies
  - Local specialty chapters of national associations such as the American Diabetes Association and the American Association of Diabetes Educators
- Invite local family practice physicians or diabetes educators to present at your local dental, podiatry, optometry, and pharmacy groups. Ask about presenting at their local meetings.
- Coordinate efforts to present at consumer diabetes education programs.
- Use the PPOD Working Together to Manage Diabetes PowerPoint Presentation in the PPOD Toolkit.

Connect With Other Health Professionals

- Work together with local health care providers to develop a diabetes education resource guide for your community.
- Work with your local health department.

- Always follow up with the referring primary care provider (via e-mail, letter, phone), with the patient's permission, after you have examined the person with diabetes to establish closer relationships.
- Reach out to PPOD professional schools and other health care provider schools (e.g., medical schools, nursing schools).

Create a Referral System

- Facilitate an integrated system by setting up referral lists for routine preventive care as well as for urgent needs. Use the following tips to establish a referral system:
  - » Create a network for preventive care and urgent referrals.
  - » Contact primary care and specialty providers to discuss criteria and ensure that procedures are in place for seeing a person who is referred for preventive care or on an urgent basis.
  - » Make a list of providers, case managers, phone numbers, and other contact information; keep it handy for quick reference. Consider giving handouts with referral information to individuals or calling clinics directly for urgent referrals.
  - » Check the Practice Transformation for Physicians and Health Care Teams for tools to help you set up a referral system.

Messages to Reinforce With Your Patients

This section provides messages about foot, eye, and oral health and drug therapy management that you, as a health care provider, can reinforce with people with diabetes. The bullets highlight questions to ask and information to discuss about diabetes-associated risks, the benefits of comprehensive care, the need for regular medical examinations, symptoms to look for, and self-care issues. You can discuss these topics over a series of patient visits. Keep in mind that you need not cover all the material with every patient. Adapt to your patients' specific needs.

Promote the ABCs

Help patients with the important task of managing risk factors for diabetes-related cardiovascular disease. Ask patients about the ABCs (A1C, blood pressure, cholesterol, and smoking cessation) of diabetes:

- **Ask:** "Do you know your ABCs goals and how to reach them?" Recommend working with relevant members of the health care team to determine both long- and short-term goals for each ABC.
- **Advise:** "You can take action to prevent diabetes-related complications." Inform your patients that poor ABC control can lead to problems in foot, eye, and oral health (as well as other complications such as cardiovascular disease). Explain that screening and team care can prevent complications.
- **Assist:** Give your patients resources to help them make healthy changes. Visit the PPOD Resource Center for a list of resources.

Patients may be eligible for the benefits of pharmacy, podiatry, optometry, and dentistry (PPOD) health care through Medicare and Medicaid. Visit these websites to learn more about these programs.

Culturally Competent Care

With the increasing diversity of our nation's population, you are more and more likely to encounter situations that require the delivery of culturally competent care, access to language services, and supportive health care organizations.

When you give culturally competent care, you:

- Can address cultural and language differences that may cause misunderstanding, lack of compliance, or other factors that negatively influence clinical situations.
- Learn to be more aware of your own cultural beliefs and more responsive to those of your patients.
- Can develop greater self-awareness and, over time, change beliefs and attitudes that will translate into better health care.

Effective Communication Approaches for Culturally Competent Care and Health Literacy

Strengthen the provider-patient relationship and enhance care delivery with the following approaches:

- **Acknowledge cultural diversity** and be sensitive to cultural differences that affect the way patients navigate the health care system.
- **Address low health literacy** and bridge knowledge gaps that can prevent patients from adhering to prevention and treatment protocols.
- **Accommodate low English proficiency** and effectively use tools that don't rely on the written or spoken word.

For more information, please visit the Resource Center in the PPOD Guide.

Promote a Healthy Lifestyle

A healthy lifestyle is key to diabetes control. You may want to talk with your patients about lifestyle choices such as those below. Visit the Resource Center for a list of relevant resources.

- **Weight.** Advise people with diabetes to aim for a healthy weight. Emphasize the importance of setting realistic goals and manageable steps for weight reduction. Visit Diabetes HealthSense for many resources, including some on living well and eating healthy.
- **Healthy food choices.** Encourage meal planning that includes a variety of foods and controls portion sizes and snacks. Increasing fiber and limiting refined carbohydrates, salt, and fat will help control blood glucose, blood pressure, and cholesterol. Recommend that patients consult with a dietitian for additional help with meal planning and learning how to make healthy food choices.
- **Physical activity.** Advise people with diabetes that moderate-intensity physical activity (such as brisk walking) can help control the ABCs and prevent complications.
- **Self-management.** Ask people with diabetes to identify their high-priority concerns or goals. Prompt them to plan for challenging situations and set short-term achievable goals. Compliment them on any steps taken toward these goals. Give them resources that can support them in making lifestyle changes and coping with stress and negative emotions. Visit Diabetes HealthSense for resources to facilitate behavior change in your patients. Resources included in Diabetes HealthSense have been reviewed by leading independent experts on psychosocial issues who have specific expertise on how to make and sustain lifestyle changes.
- **Tobacco.** Ask about tobacco use. Encourage people with diabetes to avoid smoking and using smokeless tobacco products. Recommend that they call the FREE tobacco quit line at 1-800-QUIT-NOW. People who use tobacco are at greater risk for stroke; heart, kidney, and eye diseases; nerve damage; and lower-extremity complications. To learn more about tobacco cessation strategies, consult the Centers for Disease Control and Prevention's (CDC) Smoking & Tobacco Use website.

Tips for Busy Health Care Providers: Making the Time to Deliver Team Care Messages

- Don't give every message at one appointment.
- Customize and prioritize messages according to the patient's needs.
- Establish a blueprint of messages over a period of client appointments.
- Provide the patient with a written reminder of key messages discussed at each appointment.
- Use teach-back and close the loop.
- Document what is accomplished at each appointment and the patient's response.
- Share NDEP materials such as *Diabetes Numbers At-a-Glance 2012* and *4 Steps to Manage Your Diabetes for Life*. Include key messages in office newsletters.
- Refer patients to a diabetes self-management education program in your community.
- Establish a referral resource database in the community.

Explain the Risks of Disease and the Benefits of Care

People with diabetes make daily decisions that affect their diabetes control. Cornerstones of diabetes self-management include meal planning, incorporating physical activity, managing medications as prescribed, and self-monitoring blood glucose. Routine self-care behaviors also affect diabetes complications prevention.

With each patient encounter, you have an opportunity to remind patients of the risks of developing diabetes-related complications and the benefits of foot, eye, and oral health care as well as drug therapy management. Ask about annual screening exams as well as routine self-care behaviors. Assess symptoms that warrant urgent referral. Table 1 below contains an integrated overview of messages to discuss with patients in all PPOD areas.

Discussion Point Checklist

This checklist outlines messages about foot, eye, and oral health and about drug therapy management that health care providers should discuss with people who have diabetes.

Health care providers in these four disciplines are well positioned to deliver these overarching prevention messages, communicate the need for metabolic control, and encourage multidisciplinary team diabetes control.

Promote the ABCs

- ☐ Reinforce with patients that controlling the ABCs can prevent complications and reduce the risk of stroke and heart attack.
- ☐ Ask, "Do you know your ABCs goals and how to reach them?"
- ☐ Explain that poor ABCs control can also lead to problems in foot, eye, and oral health.

Ask About Health Examinations and Management

- ☐ Foot exams
- ☐ Eye exams
- ☐ Oral health exams
- ☐ Drug therapy management
- ☐ ABCs monitoring and control

Promote a Healthy Lifestyle

- ☐ Weight control
- ☐ Healthy food choices
- ☐ Daily physical activity
- ☐ Support of diabetes self-management
- ☐ Coping with diabetes
- ☐ Tobacco cessation: call 1-800-QUIT-NOW for help

Support Self-care Behaviors

- ☐ Daily foot care
- ☐ Eye care
- ☐ Daily oral care: brush and floss
- ☐ Monthly oral self-exam
- ☐ Selection and use of a blood glucose monitor as needed
- ☐ Knowledge of your ABCs goals and how to reach them
- ☐ Use of medications as prescribed

Assess PPOD Symptoms That Require Referral

- ☐ Foot symptoms
- ☐ Eye symptoms
- ☐ Oral symptoms
- ☐ Medication-related symptoms

Foot Health

Ask people with diabetes if they know how diabetes affects their feet. Explain that diabetes raises the risk of foot ulcers, which can lead to amputation, and that proper foot care reduces their risk. Topics you can discuss include:

- **Foot exams:**
  - » Ask people with diabetes if they have had a comprehensive foot examination in the past year that included elements such as vibration perception; sensory exam with a monofilament; footwear assessment; and examination of the skin, nails, joints, and muscles.
  - » Recommend a comprehensive annual foot exam by a podiatric physician and a foot inspection (visual foot check) at every primary care provider visit.

- **Daily foot care:**
  - » Ask about daily foot care. People with diabetes may develop neuropathy and may not notice injuries, as they may not feel pain. Advise all people with diabetes to take the following steps:
    - Examine feet daily, both by looking and touching. Look for cuts, bruises, puncture wounds, corns or calluses, swelling, areas of redness, or pus. Seek podiatric medical advice right away for any of these symptoms. These may be early warnings signs of serious injury leading to amputation.
    - Clean feet (both skin and nails) daily and dry the spaces between the toes gently. Check the insides of shoes for objects before putting them on.
    - Never walk barefoot, not even indoors or at the beach. Protect feet from hot and cold.
- Wear appropriate footwear, such as athletic or walking shoes that fit well and cover the feet (i.e., NOT sandals) to protect the feet since sensation may be decreased. Think about what you will be doing that day and use common sense to choose shoes that will protect your feet.
- Avoid shoes with pointed toes. Don't buy shoes with too flat a sole or high heels because they don't allow for even distribution of foot pressure. Look for styles that have soft insoles. Choose shoes made of leather or canvas to allow circulation of air. Avoid plastic or other materials. Features such as laces, buckles, or Velcro® make it easier to adjust the shoe.

For more information, see:

Feet Can Last a Lifetime: A Health Care Provider's Guide to Preventing Diabetes Foot Problems

Diabetes and You: Healthy Feet Matter!

Take Care of Your Feet for a Lifetime

Eye Health

Advise people with diabetes about the risk of diabetic retinopathy, a leading cause of blindness in adults and one that may be prevented or delayed by careful control of blood glucose. People with diabetes also may be at greater risk for eye problems such as cataracts and glaucoma. Ocular symptoms associated with diabetes include fluctuation in visual acuity, double vision, dry eye, recurrent lid infections (blepharitis), and changes in color vision. Relevant topics you can discuss with people who have diabetes include:

- **Eye exams:**
  - » Ask when the person with diabetes last had a dilated eye exam by an optometrist or ophthalmologist. Reinforce the need for regular eye exams to prevent or delay the onset of blindness due to diabetic retinopathy. Most people with diabetes should have a dilated eye exam annually. The person will need examinations more frequently if retinopathy exists or is progressing. But some studies show every 2 years is fine for others. Also, fundus photography may aid in the diagnosis of diabetic eye disease.

    A person with diabetes can have 20/20 vision even if he or she has sight-threatening diabetic retinopathy. The quality of the vision alone does not determine whether diabetic retinopathy is present or progressing. Diabetic retinopathy often progresses without pain or vision loss until it is very advanced. The best way to be certain that no diabetic retinopathy exists or that diabetic retinopathy is not progressing is to have a dilated eye exam by an optometrist or ophthalmologist.
- **Eye care.** Advise people with diabetes to:
  - » Report eye symptoms to their health care provider.
  - » Maintain a current prescription for eyeglasses, contact lenses, or low-vision aids.
- **Eye symptoms:**
  - » Ask about eye symptoms and their frequency and duration.
  - » Encourage people with diabetes to alert their health care provider if they experience any changes in their eyes or vision, such as sudden onset of blurriness, spots forming, or persistent redness or pain.
  - » Refer the patient at once to an optometrist or ophthalmologist if he or she reports a sudden change in vision.

For more information, see *Diabetes and You: Healthy Eyes Matter!*

Oral Health

Explain to people with diabetes the two-way relationship between blood glucose (glycemic) levels and periodontal (gum) disease. Healthy gums help keep blood glucose on target, while good glycemic levels may help keep teeth and gums healthy. Relevant topics you can discuss with people with diabetes include:

- **Oral health exams.** Ask the date of the patient's last dental/oral health exam. Stress the importance of oral health exams at least once a year and the importance of preventive care delivered by a dental hygienist or dentist to prevent oral disease. Inform denture wearers that oral health exams once a year are necessary, even if wearers don't have teeth, to screen for oral cancer, fungal infections, or other lesions.
- **Oral symptoms.** Ask about oral health symptoms that may indicate infection, such as sore, swollen, or bleeding gums; aching or sensitive teeth; bad taste or bad breath; loose teeth or a change in tooth position; or mouth ulcers. Oral infections can progress quickly and lead to serious complications. Refer a patient with these symptoms immediately for prompt treatment.

For more information, see *Diabetes and You: Healthy Teeth Matter!*

Medication Therapy Management

Pharmacists can play a key role in general diabetes education. Recommend that your patients with diabetes talk with their pharmacist about how to benefit most from their medications. Pharmacists can review medications with patients to ensure that they take medications as prescribed and understand the risks of using over-the-counter (OTC) medications. They can also monitor any possible drug interactions. Patients respond well to the idea of getting help to take medications safely.

Regular Medication Review

Advise people with diabetes that regular medication reviews; adjusting the medication regimen as needed; and screening for interactions and side effects from medications, OTC medications, herbal products, and supplements can help them get the most from their drug therapy.

Promote effective medication therapy management and review by discussing the following with your patients:

- Ask people with diabetes if they take their medication exactly as prescribed.
- Remind patients of the importance of taking their medications as prescribed, even if they are feeling well. Most diabetes medicines are made to prevent a patient's sugar from going high, not to treat it when it is already high.
- Advise patients to talk with their pharmacist if they are unable to follow the medication plan prescribed or if they cannot afford their medication.
- Remind people with diabetes to seek advice from their pharmacist before taking any OTC medications, herbal products, or other supplements.
- Ask about medication use at every visit.
- Ask people with diabetes to alert all health care providers to any changes in symptoms, medical conditions, medications, doses, supplements, or lifestyle. Refer individuals to a pharmacist or primary care provider, as indicated, for evaluation.
- Refer people with diabetes to a pharmacist or diabetes educator for help in choosing an appropriate blood glucose meter, learning how to use it, and understanding the results to check how medications are working. Many pharmacists can also give information about the various pharmaceutical companies' patient assistance programs.

For more information, see *Diabetes and You: All Medicines Matter!*

Know the ABCs[1]

A for the A1C test. The A1C test shows you what your blood glucose has been over the last 3 months. The A1C goal for many, but not all, people with diabetes is below 7%. High blood glucose levels over time can harm your heart and blood vessels, kidneys, feet, and eyes.

B for blood pressure. The goal for most people with diabetes is less than 140/80mm/hg. Hypertension can harm your eyes, kidneys, and heart and may cause a stroke.

C for cholesterol. Cholesterol can build up and clog your blood vessels.

S for smoking cessation. Don't smoke. People who use tobacco are at greater risk for stroke; heart, kidney, and eye diseases; nerve damage; and lower-extremity complications.

Promote ABC Monitoring and Personal ABCs

Ask your patients with diabetes when they last had their ABC levels checked and if they know the results of these tests.

Ask patients with diabetes if they know what they need to do to manage their ABCs.

Advise about the ABC goals: A1C <7% for many people (but must be individualized), blood pressure <140/80mmHg for most people (but must be individualized).

Evidence for targeting specific levels of low density (LDL) cholesterol is lacking. In people with diabetes over age 40, moderate to high intensity statin therapy reduces cardiovascular risk regardless of the baseline LDL. See *Guiding Principles for Diabetes Care*.

Even small improvements in elevated A1C levels can be helpful. For instance, every percentage point drop in A1C blood test results (e.g., from 8% to 7%) can reduce the risk of eye, kidney, and nerve diseases by 40%.[2]

Tables 1 and 2 give a snapshot of the issues commonly associated with diabetes in each PPOD area.

Table 1. Common Health Issues Related to Diabetes

Diabetes-related Foot Conditions	Diabetes-related Eye Conditions	Diabetes-related Oral Health Conditions	Diabetes Drug Management Issues
Neuropathy such as pain or numbness	Retinopathy	Periodontal disease	Improper drug choice
Vasculopathy	Double vision	Oral candidiasis (thrush)	Underdosage
Dermatological conditions	Vision fluctuation	Xerostomia (dry mouth)	Overdosage
Musculoskeletal problems	Cataracts, glaucoma	Burning mouth	Adverse drug reactions
Foot ulcers	Macular edema		Drug interactions
	Diplopia		Undertreatment
	Cranial nerve palsy		
	Keratitis sicca		

Table 2. PPOD-related Symptoms of Diabetes

Comprehensive Foot Examination to Identify the High-risk Foot	**Comprehensive Eye Examination**	**Comprehensive Oral Examination**	**Strategies for Managing Drug Therapy**
Loss of protective sensation	Visual acuity	Teeth and restorations	Use of medications
Skin and nail condition	Visual fields	Periodontal health	Monitoring of treatment
Absent pedal pulses	Pupillary reaction	Intraoral lesions, infections, or masses	Self-treatment and OTC medications
Foot deformity	Intraocular pressure	Adequate saliva flow	Selection and use of a blood glucose meter
History of foot ulcers	Cranial nerves	Properly fitting prosthetics	Cost control
Prior amputation	Slit-lamp exam	Oral function	Coordination of care
Redness	Dilated retinal exam	Assessing home care, oral hygiene instruction	
Edema	Retinal imaging		

Self-management Support

As a health care provider, you know that ongoing self-management support is important in helping people achieve health goals. You play an integral part in helping your patient acquire the behavioral skills needed to make decisions about diabetes management in daily life.

Help patients develop self-efficacy (i.e., confidence in one's ability to perform a task successfully) by encouraging them to:

- Set realistic goals.
- Proactively identify barriers to reach self-identified goals.
- Identify an accomplishable action he or she would like to take in changing a behavior (e.g., walking 10 minutes a day before dinner, starting tomorrow)—without telling or advising the individual what to do.
- Troubleshoot missed appointments. For example, schedule annual appointments around another significant annual event such as a birthday or anniversary.
- Establish routines around daily activities such as dental hygiene, foot care, or blood glucose testing.
- Help patients learn about healthy coping skills. Diabetes can affect people physically and emotionally. Living with it every day can make people feel discouraged, stressed, or even depressed.

Patient Self-management Tasks

At each visit, you and your patient need to consider how to execute the following patient self-management tasks:

- Taking care of diabetes and its complications.
- Incorporating behavioral strategies into daily life activities.
- Coping with emotions, including future concerns.

Find resources to help your patients set goals at Diabetes HealthSense.

Find resources to help your patients cope with diabetes at Healthy Coping.

Additional NDEP Resources

Guiding Principles for Diabetes Care: For Health Care Professionals

This evidence-based booklet outlines important patient-centered principles of diabetes care, helping health care professionals identify people with prediabetes and undiagnosed diabetes for treatment aimed at preventing long-term complications.

NDEP Team Care Information

Redesigning the Health Care Team: Diabetes Prevention and Lifelong Management

Find out more about implementing multidisciplinary team care for people with diabetes in all clinical settings and how to reduce the human and economic toll of diabetes through a continuous, proactive, planned, patient-centered, and population-based approach to care.

Practice Transformation for Physicians and Health Care Teams

This Practice Transformation site, formerly called Better Diabetes Care, is designed to help physicians, health care professionals, and health care administrators across the country who want to change the system of health care delivery around diabetes. NDEP believes that practice change is essential to provide the type of evidence-based care recommended by the Patient-Centered Medical Home (PCMH) model to effectively manage diabetes, prevent its serious complications, and delay or prevent type 2 diabetes. The PCMH incorporates dimensions of patient-centered care presented by the Institute of Medicine and the Chronic Care Model. This site is organized according to those dimensions.

Diabetes HealthSense

Diabetes HealthSense provides easy access to resources to help your patients live well and meet their goals—whether they have diabetes or are at risk for the disease. This site offers tools, strategies, and programs that can help patients make lifestyle and behavior changes.

Small Steps. Big Rewards. Your GAME PLAN to Prevent Type 2 Diabetes, Health Care Provider Toolkit

This resource contains a decision pathway for diabetes prevention, including proven strategies to counsel and motivate patients, an office poster, and print-ready patient education materials. The toolkit is based on the lifestyle modification strategies used in the Diabetes Prevention Program (DPP), sponsored by the National Institutes of Health. All of the DPP resources are available online at http://www.bsc.gwu.edu/dpp/manuals.htmlvdoc.

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What Pharmacists Would Like Team Members to Know About Medication Therapy for Diabetes

In this section, you will find an overview of key issues related to medication therapy management and diabetes in order to support the pharmacy, podiatry, optometry, and dentistry (PPOD) model of team care. The information presented in this section validates key Healthy People 2020 objectives for diabetes and reinforces your value as PPOD professionals in the team care approach to comprehensive diabetes care.

Healthy People 2020 National Objectives (Released by the U.S. Department of Health and Human Services each decade, Healthy People is a set of goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States.)

> **Diabetes Objective #10 (D–14):** Increase the proportion of persons with diagnosed diabetes who receive formal diabetes education.
>
> **Target:** 62.5%.
>
> **Baseline:** 56.8% of adults ages 18 years and older with diagnosed diabetes reported they ever received formal diabetes education in 2008 (age adjusted to the year 2000 standard population).
>
> **Target Setting Method:** 10% improvement.
>
> **Data Source:** Behavioral Risk Factor Surveillance System (BRFSS), Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion.

Current Data and Trends

Medication therapy management (MTM) has traditionally been concerned with ensuring correct dosage, avoiding drug interactions, and educating patients about possible side effects.

People identified as being at high risk for drug-related problems include those who:

- Have multiple medical conditions.
- Take multiple medications.
- See multiple health care providers.

Because people with diabetes often fall into these categories, MTM is especially important.

PPOD professionals can provide MTM by:

- Conducting comprehensive reviews of medication and medical records.
- Educating patients to improve the safety and appropriate use of medications.
- Assessing the patient's response to therapy to ensure timely interventions, communication back to primary care and other providers, and coordination and continuity of care.

Today's pharmaceuticals and advanced medical technologies offer many therapeutic options for treating diabetes and its comorbidities. If these medications are used inappropriately, however, they can cause serious illness, long-term disability, or even death.

Patient Case Example

A man living with diabetes for more than 20 years asks the pharmacist for advice on care of his foot, which is warm, red, and swollen. The man recalls no trauma, and there is no evidence of skin breakdown or an open wound.

The pharmacist arranges for a same-day referral to a podiatrist for examination.

Upon a physical exam and an x-ray of the affected foot, the podiatrist diagnoses Charcot's arthropathy and implements a plan of treatment with no weight bearing and close follow-up, with casting, until the edema resolves.

The pharmacist also refers the man to the NDEP website, if he has a computer, for helpful materials about managing diabetes.

The latest study shows that misuse of prescription drugs in the United States costs $177 billion annually in additional treatments, hospital care, and doctor visits, up from $76.5 billion in 1995. More important than the costs, however, this study estimates that 1.5 million adverse drug events are preventable, yet 218,000 prescription drug-related deaths annually are due to misused prescription medications.[1]

Drug-related problems can be grouped into several categories, including:

- Inappropriate drug choice
- Underdosage
- Overdosage
- Adverse drug reactions
- Drug interactions
- Undertreatment

Additional identified factors include untreated medical conditions and medication use with no indication.[2,3]

Drug-related Problems

Patients can experience a number of problems related to their use of medication, including:

- More than 50% of those with chronic disorders do not take their medication properly (such as correct time, correct dose, or in relation to eating).
- Only about 50% of persons with diabetes reach their blood glucose goals as measured by A1C.
- Of persons treated for high blood pressure and high cholesterol, 51% and 56%, respectively, reach target blood pressure and total cholesterol levels. Only 18% reached all three ABC goals.[4]

Patient Case Example

A dental hygienist asks if a patient's medications have changed since the last visit and discovers the patient is confused about how to take a newly prescribed medicine. The patient asks if "twice a day" means at specific times each day, and if the medication may be taken at the same time as other medications. He states, "It's hard to find time to take all these medicines in 1 day!"

The dental hygienist reinforces the importance of taking the medicine as directed. She suggests consulting with the provider who prescribed the medicines and with the pharmacist, who may be immediately accessible and can work with the patient to create an individualized regimen.

To improve medication-taking behaviors and minimize these health care adversities, medication therapy regimens must be regularly and carefully evaluated and monitored. Correct use of medication improves health and saves money for the health care system.[5,6,7]

Role of the Pharmacist in Diabetes Care Management

The pharmacist can play an important role in the care of the diabetes patient. The American Diabetes Association, in its clinical guidelines statement, recognizes that pharmacists may provide care beyond dispensing of drugs to include services such as counseling patients on diabetes self-management and improving medication taking.[8] Pharmacists are also playing a role in the timely administration of recommended vaccines for people with diabetes, including influenza, pneumococcal, and hepatitis B.

Many studies have demonstrated the effectiveness of pharmacists in diabetes management.[9] In particular, the Asheville Project is a landmark study that used community pharmacists in Asheville, North Carolina, to help manage diabetes care and educate employees of the City of Asheville who had diabetes. After 1 year, employees had significantly reduced their A1C and low-density lipoprotein cholesterol levels, and this improvement was sustained 5 years later. Notably, employees reduced total direct medical costs by $1,200 to $1,800 per patient per year for this self-insured employer, and productivity was increased by $18,000.[10]

The Diabetes Ten City Challenge (DTCC), sponsored by the American Pharmacists Association (APhA) Foundation, engaged 30 employers in 10 cities and provided a voluntary health benefit to employees, dependents, and retirees with diabetes; waived copays for diabetes medications and supplies; and helped people manage their diabetes on a day-to-day basis with the help of hundreds of specially trained pharmacist "coaches." Employers realized an average annual savings of almost $1,100 in total health care costs per patient when compared to projected costs if the DTCC had not been implemented. Participants saved an average of almost $600 per year.[11]

In summary, the pharmacist is an accessible and valuable health care team member who can help patients with diabetes improve their overall health and diabetes outcomes through medication management.

Strategies for Managing Drug Therapy

People with diabetes should establish an ongoing relationship with a pharmacist who can help them monitor drug regimens, advise on how to take medications safely and for maximum effectiveness, provide other information to help them manage their diabetes, and communicate information and recommendations back to their health care provider. Strategies include the following:

Use of Medications

Pharmacists can individualize drug regimens to reduce the patient's risk of side effects and drug interactions and offer behavioral strategies, reminders and other aids, appropriate dosage, and a drug delivery system.

Optimized Selection of Medications

Depending on the presence of a collaborative practice agreement between the pharmacist and the physician, the pharmacist may be able to adjust medications to improve dosing or to add/delete drugs that may or may not be valuable. For example, the pharmacist may switch to generic drugs for improved affordability, and can identify drugs that may have caused or have the potential to cause adverse drug reactions. Even without a collaborative practice with a physician, a proactive pharmacist can provide physicians with recommendations to consider for optimizing medication use. In addition, pharmacists can advise patients on topics such as:

- **Self-treatment and over-the-counter medications.** Ask patients with diabetes if they are using nonprescription medications; vitamin, herbal, or nutritional supplements; or topical and skin care products.

  Assess the severity and urgency of the person's complaint, the appropriateness for self-treatment, and any precautions and contraindications. Recommend self-treatment, follow-up, and/or referral to another health care professional, as appropriate. One study reported that more than 40% of people with diabetes use complementary and alternative therapies.[12]

- **Selection and use of a blood glucose meter.** Help the patient choose an appropriate blood glucose meter and provide training on how to use it. Educate the person about the results, actions to take, and when to seek help. Self-monitoring of blood glucose is an important way to assess the effectiveness of therapy.
- **Cost control.** Advise the patient on ways to decrease the costs of medications and supplies by providing information on private insurance plans, pharmaceutical company and other drug programs, Medicare and Medicaid, the role of generic medications, and possible coverage for referrals to other health care professionals.

Coordination of Care

Coordination of care presents many challenges when delivered by multiple providers in a variety of settings.

Changes in drug therapy may occur when patients see specialty providers or experience acute illness or hospitalization. When a patient's situation includes multiple disease states and multiple drugs, along with over-the-counter medications, herbal products, and other supplements, diligent case management is required to ensure well-coordinated continuity of care.[12]

Patient Case Example

A 40-year-old woman asks her local pharmacist for advice on reading glasses. She says, "I must be getting older; everything is just blurry."

The pharmacist discovers that the patient has a history of diabetes, diagnosed the previous year, but she never returned for follow-up. The pharmacist advises the woman that her blurred vision may in fact be a sign of diabetes. He arranges for her to be seen by a primary care provider and eye care provider for follow-up.

He also refers her to the NDEP website, if she has a computer, for helpful materials about managing diabetes.

As an extension of the dispensing role of pharmacists, central medication review and drug therapy management (including oversight of nonprescription products) can ensure that a current appropriate drug therapy plan is implemented.

In one study, when pharmacists and other health care providers practiced collaborative drug therapy management (CDTM), they identified problems in 65% of patients' drug regimens.[13]

In other studies, CDTM resulted in decreased morbidity and mortality, as well as decreased costs attributable to fewer unscheduled physician visits, urgent care visits, emergency room visits, and hospital days.[2,6,14]

With coordinated care, all members of the health care team, including the patient, benefit from having a primary resource to deliver intended drug therapy, information, and monitoring for effectiveness and adverse effects. This coordination will help ensure adherence to the intended treatment plan and identify drug and disease management problems in a timely manner.

Key Questions That All Members of the Health Care Team Should Ask Patients About Their Medications

Patients should be referred to a pharmacist if the answers to these questions are "no" or "unsure":

- Do you bring a list of all your medicines and the exact doses, including over-the-counter medicines, vitamins, and herbal supplements, to all of your appointments?
- Do you know the reason why you take each medicine?
- Do you know how your medicines affect your diabetes?
- Do you update and review your list with your pharmacist when there is a change?
- Do you know how to safely take your medicine and use supplies to get the most benefit at the lowest cost?
- Have you reported any side effects from your medicines to your pharmacist?
- Do you let your pharmacist know if you have a problem with missing doses of your medicines?

Patient Education

Pharmacists can inform all patients about the connection between managing their medications and diabetes. Pharmacists can help patients manage their medications by:

- Printing out or encouraging patients to make a list of all medicines, including over-the-counter medicines, vitamins, and herbal supplements, and the exact doses they take, and take it to all health care provider appointments.
- Reminding patients to update and review their medication list every time there is a change.
- Teaching patients how to take their medicine for maximum benefit and safety, and how to use their supplies to get the best results at the lowest cost.
- Discussing new medicines that patients can talk about with their provider.

Please visit the Resource Center section of the PPOD Guide and Toolkit for resources on medication management.

Key Points

- Pharmacists are important participants in a team care approach for diabetes management because they can help patients get the most benefits from their medications by actively managing drug therapy and by identifying, preventing, and resolving medication-related problems.[15]
- Pharmacists play a key role in diabetes self-management education.

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Over-the-counter medications can interact with prescription medications. Encourage patients to consult with the pharmacist.

Many people need additional counseling on HOW to take medications—for example, with meals or on an empty stomach, or whether "three times a day" means breakfast, lunch, and dinner or every eight hours.

Encourage patients to bring all bottles in to the pharmacist to review regularly.

Tools are available to help patients keep track of multiple medications.

Pharmacists can coach the family to help with diabetes control and the use of supplies.

Pharmacists can help obtain medicines less expensively.

What Podiatrists Would Like Team Members to Know About Foot Health and Diabetes

In this section, you will find an overview of key medical issues related to foot health and diabetes to inform all members of the health care team about diabetes and how it can affect the health of the patient's feet. The information presented in this section validates key Healthy People 2020 objectives for diabetes and reinforces your value as pharmacy, podiatry, optometry, and dentistry (PPOD) professionals in the team care approach to comprehensive diabetes care.

Healthy People 2020 Objectives (Released by the U.S. Department of Health and Human Services each decade, Healthy People is a set of goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States.)

> **Diabetes Objective #9 (D–9):** Increase the proportion of adults with diabetes who have at least an annual foot examination.
>
> **Target:** 74.8%.
>
> **Baseline:** 68.0% of adults ages 18 years and older with diagnosed diabetes had at least one foot examination by a health professional in the past 12 months, as reported in 2008 (age adjusted to the year 2000 standard population).
>
> **Target Setting Method:** 10% improvement.
>
> **Data Source:** Behavioral Risk Factor Surveillance System (BRFSS), Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion.

Current Data and Trends

Diabetes-related complications may present initially in the foot. Foot symptoms increase the risk for comorbid complications, of which nontraumatic lower-extremity amputations (LEAs) are the greatest concern:

- In the United States, more than 60% of nontraumatic LEAs occur in people with diabetes. About 65,700 nontraumatic LEAs were performed in 1 year on people with diabetes.[1]
- In the general population aged ≥45 years, the incidence of vascular lower-limb amputation (LLA) at or proximal to the transmetatarsal level is eight times higher in people with diabetes than those without diabetes.[2] The incidence of initial unilateral amputation per 100,000 person-years was 192 for women with diabetes versus 22 for women without diabetes, and 197 for men with diabetes versus 24 for men without diabetes.[2]
- The overall 25-year incidence of LEA in people with diabetes was 10.1%. Male gender, smoking, hypertension, diabetic retinopathy, and higher A1C values were associated with a greater risk of LEA.[3]

Patient Case Example

A podiatrist notices his 35-year-old patient with diabetes has terrible breath and asks about it. The patient is embarrassed, but admits that he has noticed a bad taste as well. A quick look in the patient's mouth reveals inflamed, swollen gums with pus at the gum line.

The podiatrist describes the link between periodontal disease and poor blood glucose control and stresses the need for urgent dental attention for a possible abscess. The podiatrist's office helps the patient obtain a prompt dental appointment for care.

From reported statistics, about 75,000 diabetes-related hospital discharges involve LEA. The LEA rate per 1,000 persons with diabetes is 3.9 among persons ages 65 years and younger, 6.6 among persons ages 65 to 74 years, and 7.9 among persons ages 75 years or older. After their initial amputation, 9% to 17% of patients will experience a second amputation within the same year[4], and 25% to 68% of people with diabetes will have an amputation of the contralateral extremity within 5 years.[5]

One study found that 80% of nontraumatic LEAs are preceded by a foot ulceration, which provides a portal for infection.[6] According to BRFSS data, approximately 12% of U.S. adults with diabetes have a history of foot ulcer, a risk factor for LEA.[7]

Another report identified minor trauma, ulceration, and faulty wound healing as precursors to 73% of LEAs, often in combination with gangrene and infection.[6] Other risk factors include the presence of sensory peripheral neuropathy, altered biomechanics, elevated pressure on the sole of the foot, and limited joint mobility.[8]

Diabetes-related Foot Conditions

Podiatrists consider the following conditions as they assess the risk for complications when evaluating the feet of people with diabetes.

Neuropathy

A patient who experiences subjective tingling, burning, numbness, or the sensation of bugs crawling on the skin, especially at night, may be experiencing peripheral sensory neuropathy. On clinical examination, podiatrists can detect this condition in various ways: with an instrument known as a Semmes-Weinstein 5.07 (10-gram) monofilament and also testing for vibratory sense by using a 128mhz tuning fork. You can find a description of how to perform a comprehensive foot exam in the free National Diabetes Education Program (NDEP) health care provider kit, *Feet Can Last a Lifetime*.

People with diabetes who have neuropathy are 1.7 times more likely to develop foot ulceration. In persons with both neuropathy and foot deformity, the risk is 12 times greater, and in those who also have a history of pathology (prior amputation or ulceration), the risk is 36 times greater.[6,9]

Factors that increase a patient's risk for lower-extremity ulceration and amputation include:

- Male sex
- The existence of documented diabetes for more than 10 years
- History of tobacco use
- A history of persistently elevated blood glucose levels
- The presence of cardiac, retinal, or renal complications or peripheral arterial occlusive disease[8,9,10,11]

Charcot Foot

Patients with neuropathy are at risk for painless degenerative arthropathy, which typically affects the midfoot joints, resulting in a red, swollen, and possibly deformed foot that can be mistaken as being affected by cellulitis.

One form of arthropathy, called Charcot foot, causes weakening and fracturing of the bones in the foot and occurs most often in people who have significant neuropathy. Radiographs may show collapse of joint structure and can be misinterpreted as osteomyelitis. Charcot foot is a very serious condition that can lead to severe deformity, disability, and even amputation.

Treatment for Charcot arthropathy is complicated and requires a specialist. In some instances, surgery is necessary, but most urgently a non-weight-bearing cast is generally advised. After the acute inflammation has resolved, and if the foot is braceable, the podiatrist may prescribe special shoes to correct altered biomechanics.[13] Without treatment, the Charcot foot can progress to further deformity and ulceration and lead ultimately to amputation.

Consider it a red flag when a patient complains to you that his or her shoes no longer fit, or if the patient is wearing slippers or shoes with sections cut out to accommodate changes in foot shape, walks with a new limp, or complains of unilateral swellings.

A Charcot foot usually causes little to no pain and may be slowly progressive over weeks to months before coming to a health care provider's attention. You can contribute to amputation prevention by referring patients with these signs and symptoms to a foot care specialist.

Foot Complication Prevention

- Many people with diabetes who request routine care will have a treatable foot problem.[12]
- The lifetime incidence of foot ulcers among patients with diabetes is 25%.[12] Most of these are preventable through interventions available in most primary care settings and appropriate self-care.
- Patients with diabetes who are on dialysis are at extreme risk for foot complications. Increased foot care frequency and educational outreach to this group are associated with improved foot outcomes.

Vasculopathy

When a patient experiences cramping of calf muscles when walking (often referred to as a "charley horse") that requires frequent rest periods, he or she may have intermittent claudication. This condition, often caused by insufficient blood supply to the region beneath the knee, indicates the presence of early or moderate occlusion of the arteries, which is common to the lower extremities of people with diabetes.

However, the classic symptoms of peripheral artery disease (PAD) may be absent if neuropathy is present. In these instances, patients may complain of painless fatiguing of muscles after walking short distances and indicate that the fatigue is relieved by rest. Remember, PAD is a marker for overall cardiovascular disease. If a patient is diagnosed with PAD, the patient should also be evaluated for cardiovascular risk factors. This may prevent early cardiovascular-related mortality.

Patients who experience intense cramping and aching in the toes only at night, called "rest pain," can usually relieve the discomfort by hanging their feet over the side of the bed and by walking. Rest pain signifies the end-stage blood vessel disorder and tissue ischemia that precedes diabetic gangrene. Although most clinical research continues to list the loss of sensation/neuropathy as the leading factor in ulceration and associated complications, poor blood supply can contribute to poor ulceration healing and is a significant risk factor for amputation. Both factors need to be addressed in comprehensive diabetes foot care, with diagnostic testing for treatable vascular lesions and intervention as warranted.

Dermatological Conditions

Corns and calluses (hyperkeratotic lesions) of the patient's feet result from elevated mechanical pressure and shearing of the skin. They often precede breakdown of skin and lead to blisters or ulceration, especially in neuropathic patients.

Superficial lacerations and heel fissures, or maceration (softening caused by wetness) between the toes, can all serve as portals for infection. Corns, calluses, toenail deformity, and bleeding beneath the nail may signify the presence of sensory neuropathy. Fungal infections are common and should be treated promptly.

Musculoskeletal Symptoms

Structural changes in the diabetic foot may develop in combination with muscle-tendon imbalances as a result of motor neuropathy.

These deformities include the presence of hammertoes, bunions, high-arched foot, or flatfoot—all of which increase the potential for focal irritation of the foot in the shoe. People with diabetes may have reduced elasticity of the Achilles tendon, which limits ankle dorsiflexion and increases pressure on the feet.

Patient Case Example

A 70-year-old man consults a podiatrist because of painful corns on his feet. He says, "I don't walk anymore because of these corns, but I guess that doesn't matter—I'm too old to be walking much."

The podiatrist emphasizes the many benefits, including diabetes prevention, of regular physical activity such as walking. He explains that one in five people older than age 60 have diabetes, but that the disease can be prevented or delayed.

He treats the man's corns and then shares the NDEP *It's Not Too Late to Prevent Diabetes* tip sheet with the man. He says, "After we get your feet fixed up, you will be out there walking again."

Lifestyle and Family History

People with diabetes who currently smoke are four times more likely than people without diabetes who smoke to develop lower-extremity vascular disease.

Poor food choices and low physical activity levels can lead to persistently elevated A1C levels, which can increase the risk that peripheral nervous system and/or blood vessel disorders will progress.

A family history of cerebrovascular accidents and coronary artery disease may indicate a further increased risk of developing lower-extremity arterial complications. Inherited foot types (e.g., shapes) may predispose the patient to biomechanical deformities that lead to problems with skin breakdown.

Comprehensive Foot Examination

A comprehensive foot examination for abnormalities, including evaluation of pulses, sensation, foot biomechanics (i.e., general foot structure and function), and nails, as well as a footwear assessment, helps determine the person's category of risk for developing foot complications.

Persons with diabetes who are at high risk have one or more of the following characteristics:

- Loss of protective sensation
- Absent pedal pulses
- Foot deformity
- History of foot ulcers
- Prior amputation

Low-risk individuals have none of these characteristics. Assessment of risk status identifies people who need more intensive care and evaluation. Further patient education, early intervention, and special footwear, if indicated, can prevent ulcers and ultimately LEAs.

To assess risk factors, have the patient remove socks and shoes, and then inspect both feet for acute problems at each visit.

Foot Risk Status

The American Diabetes Association and American Podiatric Medical Association consider two categories of risk for developing foot complications.

High Risk (one or more of the following):

1. Loss of protective sensation.
2. Absent pedal pulses.
3. Foot deformity.
4. History of foot ulcers.
5. Prior amputation.

Low Risk: None of the above characteristics.

See the next box, High- and Low-risk Foot Patient Education, for interventions for patients with high- and low-risk foot status.

Patient Education

The goal is to prevent low-risk patients from moving to the high-risk category by managing the ABCs (A1C, blood pressure, cholesterol, and smoking cessation).

Health care providers can inform all patients about the connection between foot health and diabetes. Encourage patients with diabetes to:

- Prevent ulcers through self-management education, podiatry care, and use of appropriate footwear. Patients should be taught how to check their own feet every day, including what to look for and when to contact their provider.
- Get a full foot exam by a podiatrist at least once each year. Patients with diabetes should also make sure their feet are checked at every health care visit. They need to take off their shoes and socks at all visits and be sure to ask for a foot exam.
- Prevent ulcers through self-management education, podiatry care, and proper use of appropriate footwear. Patients should learn how to check their own feet every day.
- Avoid minor foot trauma, such as stubbing a toe, stepping on a sharp object, or experiencing pressure from tight shoes. These can lead to ulcer in patients with diabetes.
- Be diligent in clearing walking spaces (especially around the bed and the path to the bathroom), using nightlights, and wearing properly fitted shoes.
- Know when and who to call with specific foot problems. Patients with a puncture wound, ulcer, redness, or new-onset foot pain should call and see their primary care provider or podiatrist that day. Patients with calluses and/or thick or ingrown nails should call a podiatrist and be seen within a few days.

High- and Low-risk Foot Patient Education

The goal for low-risk patients is to keep them low risk by:

- Controlling the ABCs.
- Quitting tobacco.

The goal for high-risk patients is to prevent foot ulcers by:

- Educating them on self-management.
- Stressing the role of minor trauma.
- Clearing walking spaces of potential hazards.
- Seeking prompt, same-day care for injuries.
- Receiving regular podiatry care.

For a useful exam tool for health care providers, visit NDEP's resource, *Feet Can Last a Lifetime: A Health Care Provider's Guide to Preventing Diabetes Foot Problems*.

For more information for patients, see *Diabetes and You: Healthy Feet Matter!* and

Take Care of Your Feet for a Lifetime

Please visit the Resource Center section of the PPOD Guide and Toolkit for other resources on foot health.

Key Questions That All Members of the Health Care Team Should Ask Patients About Foot Health

Patients should be referred to a podiatrist if the answers to these questions are "no" or "unsure":

- Do you get a full foot exam by a podiatrist at least once each year?
- Do you know how diabetes can affect your feet?
- Do you know how to check your feet every day?
- Do you check your feet every day?
- Do you know what to do if you develop foot pain, redness, or sores?
- Do your shoes fit you correctly?

Key Points

- Podiatrists play a key role in the early identification and treatment of foot problems in people with diabetes.
- Podiatrists are important in the collaborative interprofessional team care approach for diabetes management.

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Gangrene
Severe infections may be present but undetected by patients with neuropathy who have difficulty examining their feet.

Ulceration of the great toe
This deceptively small lesion seriously increases the risk for amputation. Risk factors for amputation include peripheral neuropathy, abnormal biomechanics, peripheral vascular disease, prior ulceration, and prior amputation.

Hammer toes
The loss of foot musculature has led to abnormal foot biomechanics with the toes drawn up into a "hammer toe" position. This increases the risk of ulceration and amputation.

Peripheral neuropathy
Shiny skin, the inability to sweat, and lack of protective sensation compound the risk for amputation in this patient with foot deformity and overriding toes. Treatment includes special footwear, patient education, and vigilant daily foot hygiene and inspection.

Ulceration
Even large wounds can be painless in the face of neuropathy, and patients may deny there is a problem. The patient with this lesion needs referral for a program of wound management and non-weight-bearing rehabilitation.

What Eye Care Professionals Would Like Team Members to Know About Eye Health and Diabetes

In this section, you will find an overview of key medical issues related to eye health and diabetes in order to support the pharmacy, podiatry, optometry, and dentistry (PPOD) model of team care to inform all members of the health care team about diabetes and eye health.

The information presented in this section validates key Healthy People 2020 objectives for diabetes and reinforces your value as PPOD professionals in the team care approach to comprehensive diabetes care.

Healthy People 2020 Objective (Released by the U.S. Department of Health and Human Services each decade, Healthy People is a set of goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States.)

Diabetes Objective #10 (D–10): Increase the proportion of adults with diabetes who have an annual dilated eye examination.

Target: 58.7%.

Baseline: 53.4% of adults ages 18 years and older with diagnosed diabetes had a dilated eye examination in the past year, as reported in 2008 (age adjusted to the year 2000 standard population).

Target Setting Method: 10% improvement.

Data Source: National Health Interview Survey, Centers for Disease Control and Prevention (CDC), National Center for Health Statistics.

Current Data and Trends

Diabetes is the leading cause of new cases of blindness among adults ages 20 to 74 years. Approximately 11.0% of U.S. adults with diabetes have some form of visual impairment (3.8% uncorrectable and 7.2% correctable).[1]

Of late, 4.2 million people with diabetes ages 40 years or older (28.5%) had diabetic retinopathy (DR) and, of these, 655,000 (4.4% of those with diabetes) had advanced DR that could lead to severe vision loss.[2]

DR is projected to affect 16 million people with diabetes by 2050. Other diseases, like cataracts and glaucoma, also are projected to increase in this population.[3]

Patient Case Example

A 45-year-old woman tells her podiatrist that she can't check her feet because she "just can't see as well" as she used to. She has not had an eye exam because she never had poor vision before, but she was recently diagnosed with diabetes.

The podiatrist recognizes that the patient's blurred vision could be a sign of poor glucose control or eye pathology and explains the relationship between diabetes and vision problems.

The podiatrist then refers the patient to an optometrist for a comprehensive eye examination, including pupil dilation. The podiatrist also refers her to her primary care physician or an endocrinologist for glucose management.

Diabetes-related Eye Conditions

People with diabetes are at 25 times greater risk for blindness than people without diabetes.[4] People with diabetes who currently smoke, have poor nutrition, and do not control their diabetes have an even greater risk of developing eye complications. Because many people with diabetes have slower healing time, eye injuries—even minor corneal abrasions—should not be taken lightly.

Further, many of the complications of diabetes and the eye are painless and sightless diseases that the patient will only notice after the disease has progressed.

With cataracts, DR, glaucoma (other than angle closure), and early dry eye and corneal disease, the patient is unaware that a pathology is present without an examination.

Retinopathy

DR is a common complication of diabetes. Elevated blood sugar damages the retinal blood vessels, causing them to break down, leak, or become blocked. Over time, this causes retinal hemorrhage and impaired oxygen delivery to the retina, which can lead to the growth of abnormal vessels (proliferative diabetic retinopathy, or PDR). These new vessels are fragile and can break easily, resulting in fibrovascular scar tissue that detaches the retina and causes permanent vision loss (traction retinal detachment).

Additionally, increased vascular permeability in the macula—the central area of the retina responsible for good detail and color vision—may lead to accumulation of fluid that significantly impairs vision (diabetic macular edema, or DME).

Studies have shown that aspirin use (e.g., for cardiovascular disease prophylaxis) is safe in persons with retinopathy and has no adverse effect on the development or progression of DR.[5,6]

Poor glycemic control and longer duration of diabetes lead to increased rates of retinopathy in people with type 1 and type 2 diabetes. However, DR is treatable and is one of the most preventable causes of vision loss and blindness. The risks of DR are reduced through good management of the ABCs (A1C, blood pressure, cholesterol, and smoking cessation).[7]

Early diagnosis and proper treatment reduce the risk of vision loss; however, as many as 50% of patients do not get their eyes examined or are diagnosed too late for treatment to be effective.[8] Individuals with diabetes are also at an increased risk for other eye diseases, including glaucoma, cataracts, cranial nerve palsies affecting binocular vision, staphylococcal eyelid disease, and dry eye.

Cataracts

Cataracts are a clouding of the eye's internal lens, most often caused by aging. The lens is responsible for focusing images onto the retina, and, thus, a clouding of the lens can result in diminished vision and increased sensitivity to glare.

More than 22 million Americans ages 40 and older have cataracts, making it the number one age-related eye disease.[9] More than half of all Americans ages 65 years and older have cataracts, but patients with diabetes often develop them 10 to 20 years prematurely, a phenomenon aggravated by both poor blood glucose control and increased body mass index.[10] The treatment for cataracts is usually surgery.

Glaucoma

Glaucoma is a progressive disease that damages the optic nerve. It is this nerve that carries the retinal image to the brain, so disruption of this transmission causes irreversible blind spots or field loss, which over time can lead to total blindness.

A view of the optic nerve during a dilated eye exam—combined with visual field testing, intraocular pressure testing (IOP), and other tests—can often reveal damage at an early stage, thus providing opportunity for treatment. It is important to note that IOP should never be used as a sole diagnostic indicator, as some patients sustain optic nerve damage at lower levels and many patients have variable IOP depending on the time of day.

Some studies have suggested that patients with diabetes are more likely to develop the most common type of glaucoma—primary open angle glaucoma—whereas diabetes is a well-established and major risk factor for neovascular glaucoma that may accompany proliferative retinopathy.

Among Americans ages 40 years or older, nearly 3 million have glaucoma and more than half are unaware of having the disease.[13]

Comprehensive Diabetic Eye Exam: How Often and By Whom?

- The American Diabetes Association (ADA) recommends that adults and children ages 10 years or older with type 1 diabetes should have an initial dilated comprehensive eye exam by an optometrist or ophthalmologist within 5 years after the onset of diabetes, and patients with type 2 diabetes should undergo an examination shortly after diagnosis of the disease. As many as 21% of patients with newly diagnosed type 2 diabetes will have retinopathy at diagnosis.[11]
- Patients with either form of the disease should generally be examined annually thereafter by an optometrist or ophthalmologist. According to ADA, the recall interval may be shortened if the retinopathy is progressing but extended to every 2 to 3 years if it is not.[12] However, it is important to note that annual eye examinations are an opportunity for optometrists and ophthalmologists to reinforce the importance of good metabolic control, diagnose and treat eye complications other than diabetic retinopathy, and make appropriate referrals to other members of the diabetes care team.

For this reason, glaucoma often is referred to as the "silent thief of sight." Glaucoma is two to five times as common among older black adults as among older white adults.[11,14]

Double Vision

People with diabetes may complain about sudden onset of double images. Because this can be due to damage to the nerves from the brain to the eye, it is important to see an optometrist or ophthalmologist immediately.

This symptom can be misinterpreted by the patient or by a non-eye care provider unfamiliar with this ocular complication as a sign of a stroke or other neurological problem, prompting unnecessary diagnostic procedures such as radiological exams. Double vision (diplopia) may be due to damage to a single nerve (mononeuropathy) where cranial nerves III and VI are most frequently affected.

In the majority of cases, IIIrd nerve palsies occur with pupillary sparing. Most diabetic IIIrd nerve palsies usually resolve spontaneously within 2 to 3 months, and symptoms of double vision can often be controlled with the use of special lenses.

Vision Fluctuation

Poor control of blood glucose levels can lead to a fluctuation in vision. These temporary visual fluctuations occur because of fluid imbalance in the crystalline lens.

When the glucose level is elevated, the lens thickens due to osmotic swelling, causing vision changes that may increase nearsightedness or farsightedness. When the glucose level returns to normal, the lens can shrink back to its normal state.

For patients who need glasses, if the glucose level is poorly controlled, the constant state of flux can pose a challenge to the optometrist or ophthalmologist in determining the best prescription lenses until blood glucose levels stabilize.

Dry Eye and Corneal Disease

Elevated blood glucose levels increase the osmolarity of the tears and impair the ability of the tear (lacrimal) gland to secrete tears, resulting in dry eye. Increased glucose in the meibomian glands of the eyelid may disrupt the normal flow of oils that prevent evaporation of the tears, which increases the risk of staphylococcal overgrowth. Patients with diabetes are twice as likely to report symptoms of dry eye and/or frequent use of artificial tears products.

Hyperglycemia also adversely affects adherence of corneal epithelial cells to underlying tissue, which can result in chronic sloughing of the corneal surface (recurrent corneal erosion syndrome) and increased risk of infection. Accordingly, both contact lenses and corneal refractive surgery should be prescribed with care and only to those patients who maintain good glycemic control.

Comprehensive Eye Examination

People with diabetes can maintain optimal vision and healthy eyes by having an annual comprehensive vision examination, including a dilated retinal examination, with early intervention if retinopathy is found. More than 90% of vision loss caused by diabetes can be avoided by good diabetes management (i.e., good control of blood glucose, blood pressure, and lipids), early detection, and timely treatment.[1]

Early detection and treatment can prevent or delay blindness due to DR in 90% of people with diabetes. Studies show that good glycemic control can reduce or significantly delay the development of retinopathy and the risk of visual impairment in people with both type 1 and type 2 diabetes.[7,12,15,16,17,18] Intensive management of blood glucose reduces the first appearance of any retinopathy by 27%, and improved blood pressure control has been shown to reduce substantially the risk of significant vision loss in people with type 2 diabetes.[18]

New evidence suggests that angiotensin conversion enzyme inhibitors and angiotensin receptor blocking agents (-prils and -sartans) further reduce the risk of worsening retinopathy in people with type 1 diabetes.[19,20] For patients with type 2 diabetes, emerging evidence shows that fenofibrate therapy reduces the risk of worsening retinopathy.[21]

Retinal laser photocoagulation surgery can reduce the risk of severe vision loss from the worst form of the disease, PDR, to 4% or less.[22] Treatment of significant DME may include focal laser photocoagulation (per Early Treatment of DR Study guidelines[23]), injected or implanted, and sustained release of intraocular steroids and/or agents that block vascular endothelial

growth factor (anti-vascular endothelial growth factor medicines like Avastin™ and Lucentis™).

Optometrists and ophthalmologists can provide low-vision aids and devices—from simple handheld and stand magnifiers to innovative, computer-assisted optical devices—to help those who have experienced uncorrectable vision loss due to DR. These eye care professionals can also provide or ensure the provision of a full spectrum of care and services that may allow people with vision impairment and diabetes to maintain their independence and quality of life and help control their diabetes (e.g., to read instructions, take medications, perform self-monitoring of blood glucose levels, continue with household tasks).

Patient Education

The goal is to prevent low-risk patients from moving to the high-risk category through control of the ABCs (A1C, blood pressure, cholesterol, and smoking cessation).

PPOD providers can help by educating patients about the connection between diabetes and eye health. Encourage patients to get a dilated eye exam at least once a year. Discuss with patients how to prevent diabetic eye disease. And, tell patients to visit their eye care provider right away if they:

- See little black lines or spots that don't go away.
- See any red spots or red fog.
- Have a sudden change in how clearly they see.
- Take longer than usual to adjust to darkness.

Please visit the Resource Center section of the PPOD Guide and Toolkit for resources on eye health.

Key Questions That All Members of the Health Care Team Should Ask Patients About Eye Health

Patients should be referred to an optometrist or other eye care professional if the answers to these questions are "no" or "unsure":

- Do you get a full eye exam with dilated pupils at least once a year? This is important because diabetes can affect your eyes without any signs or symptoms.
- Do you know how diabetes can affect your eyes?
- Do you know what to do if you suddenly have a change in your vision?

Key Points

- Optometrists and ophthalmologists play a key role in the early detection and intervention of diabetes-related eye complications. Retinopathy, glaucoma, cataracts, and other common eye complications can be avoided with annual comprehensive vision examinations that include dilated retinal examination. Special fundal photography may also be helpful.
- Optometrists and ophthalmologists are important in the collaborative interprofessional team care approach for diabetes management.

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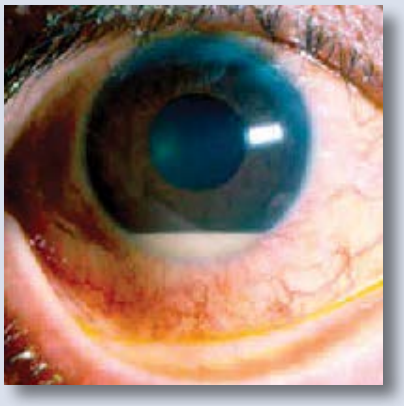
This is what a person with normal vision sees.

This is what a person with diabetic retinopathy sees.

This patient with ptosis (drooping lid) and double vision from an inability to turn the eye up, down, or inward has a Cranial Nerve III palsy. Cranial nerve palsy is not uncommon in diabetes; a person with this condition should be referred for an eye exam to rule out other serious conditions.

This patient with eye pain, light sensitivity, and a 2-mm white lesion has a corneal ulcer. People with diabetes may not complain of pain because of corneal neuropathy. Steroid or over-the-counter eye drops would be a serious mistake—this patent needs a referral.



Hypopyon, white cells collecting in the anterior chamber of the eye, is a sign of serious intraocular infection and/or inflammation; this person should be referred immediately.

An irregular pupil can it be a sign of iritis or nerve palsy—a potential complication of diabetes or other conditions. Iritis can lead to pupillary block glaucoma, a sight-threatening condition. This patient needs a referral.

What Dental Professionals Would Like Team Members to Know About Oral Health and Diabetes

In this section, you will find an overview of key medical issues related to oral health and diabetes. The information presented in this section validates key Healthy People 2020 objectives for diabetes and reinforces your value as pharmacy, podiatry, optometry, and dentistry (PPOD) professionals in the team care approach to comprehensive diabetes care.

Healthy People 2020 Objective (Released by the U.S. Department of Health and Human Services each decade, Healthy People is a set of goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States.)

> **Diabetes Objective #8 (D–8):** Increase the proportion of persons with diagnosed diabetes who have at least an annual dental examination.
>
> **Target:** 61.2%.
>
> **Baseline:** 55.6% of the population ages 2 years and older with diagnosed diabetes had been to the dentist in the past year, as reported in 2008 (age adjusted to the year 2000 standard population).
>
> **Target Setting Method:** 10% improvement.
>
> **Data Source:** National Health Interview Survey, Centers for Disease Control and Prevention (CDC), National Center for Health Statistics.

Current Data and Trends[1]

Periodontal (gum) disease is more common in people with diabetes, so they need to be especially diligent about getting regular dental examinations. Other current data include:

- Among young adults, those with diabetes have about twice the risk of developing periodontitis as those without diabetes.
- Adults ages 45 or older with poorly controlled diabetes (A1C >9%) are 2.9 times more likely to have severe periodontitis than those without diabetes.
- People who smoke and have persistently elevated glucose levels have a 4.6 times greater risk for developing periodontitis.
- About one third of people with diabetes have severe periodontal disease consisting of loss of attachment (5 millimeters or more) of the gums to the teeth.

Diabetes-related Oral Health Conditions

Periodontal disease is a very common complication of diabetes.[2] Other diabetes-related oral health conditions include:

- Xerostomia (dry mouth syndrome, which can be caused by impaired salivary gland function in people with diabetes possibly due to decreased blood flow to salivary glands and decreased local production of saliva, dehydration due to hyperglycemia, and side effects of drugs such as diuretics used for hypertension and other cardiovascular diseases).
- Tooth loss.
- Dental caries (cavities) and abscesses.
- Oral candidiasis (a fungal infection in the mouth, also known as thrush, that may appear as white patches or plaques on the tongue and other oral mucous membranes).
- Oral lichen planus (an ongoing inflammatory condition that affects mucous membranes inside the mouth and may appear as white, lacy patches; red, swollen tissues; or open sores. These lesions may cause burning, pain, or other discomfort.).
- Burning mouth syndrome (chronic or recurrent burning in the mouth, which may affect the tongue, gums, lips, inside of the cheeks, roof of the mouth, or widespread areas of the whole mouth).

The relationship between periodontal disease and diabetes has been broadly studied, while the relationship between other oral diseases and diabetes requires further research.[3] The evidence supporting the linkage between periodontal disease and diabetes is based upon the pathophysiologic principle, in which the harm of an infective and inflammatory disease such as periodontitis can have pronounced adverse effects for individuals with diabetes due to their altered immune system and reparative processes.[4]

In periodontal disease, biofilms containing gram-negative anaerobes initiate an immune response that results in the local and systemic release of a cascade of mediators and factors. This response affects insulin sensitivity and places those with diabetes at greater risk for diabetes complications—namely cardiovascular disease and kidney disease.

Therefore, eliminating risk factors that initiate the immune response and the release of harmful mediators such as C-reactive protein, interleukins, and tumor necrosis factor bears importance for the prevention and treatment of periodontal disease.

Patient Case Example

Noting that her patient with diabetes smokes, a dental hygienist informs him of the links between tobacco use and oral cancer. She also explains that tobacco use can increase diabetes complications, including periodontal disease.

She lets him know about programs that can help support him in quitting, such as 1-800-QUIT-NOW (1-800-784-8669) and Diabetes HealthSense resources.

The dental hygienist notes in the chart that the dental team should follow up with the patient on this advice the next time he is seen.

Other possible mechanisms of the diabetes/periodontitis relationship include:

- Altered host response
- Alterations in connective tissue
- Microaniopathy
- Changes in the gingival crevicular fluid
- Subgingival microflora and hereditary predisposition

Comprehensive Oral Health Examination

The oral health and diabetes relationship has primarily focused upon the reciprocal connection between periodontal disease and diabetes. However, this linkage is just one reason why oral health is an important part of diabetes management. Oral health providers should review the following factors with patients who have diabetes during a comprehensive oral health examination.

The Functional Dentition and Nutrition

Functional dentition is an important part of proper nutrition because the act of chewing is compromised if fewer than 20 teeth are present. Oral dysfunction leads to an increased risk of alimentary problems, orofacial pain, and the loss of physical and emotional well-being.

Evidence suggests that there is a relationship between a patient's healthy body mass index and the ease with which he or she can chew, called masticatory efficiency. Poor dentition also affects the absorption of nutrients if food is not adequately masticated. The patient's masticatory efficiency may affect his or her dietary choices. However, additional research is needed to establish the relationship among masticatory efficiency, general health, and quality of life.[5]

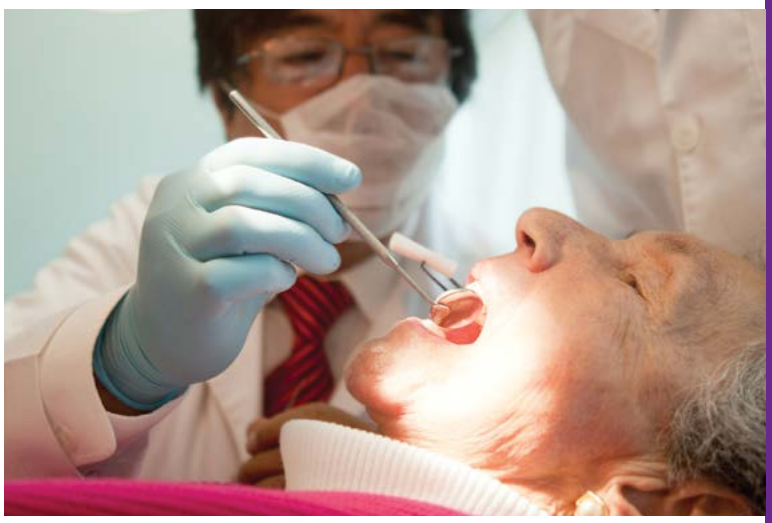
The Oral and Systemic Health Connection

Significance of Treating Periodontal Disease to Improve Glycemic Control

The Diabetes Control and Complications Trial (DCCT) and UK Prospective Diabetes Study (UKPDS) demonstrated the importance of improving glycemic control. Intensive blood glucose management in type 1 diabetes (DCCT) and type 2 diabetes (UKPDS) resulted in reduced diabetes complications (retinopathy, nephropathy, and neuropathy). Reducing A1C by 1% lowers microvascular complications by 35%, while a 0.2% reduction lowers mortality by 10%.[6,7] Several meta-analyses have shown that treating periodontal disease can reduce A1C by at least 0.4%.[8,9,10,11]

Studies of the Pima Indians and Gila River Indians found that periodontal disease is related to 3.2 times greater risk of cardio-renal mortality[12], and moderate to severe periodontal disease or edentulism is associated with a 2.0 to 2.6 times greater risk for microalbuminuria and a 2 to 5 times greater risk for end-stage retinal disease.[13]

Therefore, preventing and treating periodontal disease is important because periodontal disease negatively affects glycemic control and increases the risk of diabetes complications. Research suggests that periodontal disease may be a risk factor for the development of type 2 diabetes, but this evidence is mixed[14,15], necessitating further epidemiologic study.



Common Modifiable Risk Factors

Oral health and diabetes management have many notable similarities. The World Health Organization notes that noncommunicable diseases (NCDs) such as diabetes and oral disease share preventable risk factors related to lifestyle, including diet and tobacco use.[16]

Improving health outcomes by modifying these common behavior-related risk factors would assist in the prevention, primary care, and ongoing management of NCDs.

Tobacco Use

Diabetes and tobacco use are common risk factors for the development of cardiovascular disease, the complication that accounts for the highest morbidity, mortality, and health care costs in diabetes.[17]

In addition, tobacco use promotes periodontal degeneration, suppresses the immune system, and delays healing.[18] Therefore, tobacco use must be mitigated through prevention and cessation programs.

Nutrition

Poor nutrition is a risk factor that drives the NCD epidemic. Diets rich in carbohydrates and with a high sugar content compromise oral health and are leading contributors to the rise of type 2 diabetes.[19]

Globalization of this western dietary trend is a component of the growing incidence of dental caries[20] and type 2 diabetes in the developing world.[21] To battle oral disease and diabetes, PPOD providers need to promote their patients' health and encourage public education

focusing on the importance of making dietary choices that support a healthy lifestyle. The Academy of Nutrition and Dietetics supports the collaboration between dietetics and dentistry in research, curriculum, and practice roles.[22]

GDM, Periodontal Disease, and Pregnancy Outcomes

Substantial evidence shows that patients with type 2 diabetes face increased severity of periodontal disease.[23,24] Data also show that the presence of periodontal disease is higher in women with gestational diabetes mellitus (GDM) than in pregnant women without GDM.[25,26]

Recently, data on the relationship among diabetes, periodontal disease, and pregnancy outcomes (combined effect) revealed that women with the combination of GDM plus periodontal disease had a 2.3-fold greater risk for developing adverse maternal outcomes than women with either GDM or periodontal disease alone. In addition, probing pocket depth, independent of GDM status, was a significant predictor of adverse pregnancy outcomes. However, women with the combination of GDM plus periodontal disease had no greater risk for adverse fetal outcomes than women with either GDM or periodontal disease alone.[25]

Currently, studies are under way to determine the effect of periodontal therapy on adverse maternal outcomes in women with GDM and periodontal disease. Women with GDM should be referred to their dentist to evaluate their oral health status and maintain their periodontal health during pregnancy. Women with GDM should be encouraged to have their blood glucose levels evaluated soon after delivery and on a regular basis thereafter to determine their status relative to type 2 diabetes mellitus, since women who have had GDM have a 35% to 60% chance of developing diabetes in the next 10–20 years.[1]

Oral Health Care Professionals: Part of the Health Care Team

There is a real opportunity for oral health professionals to educate other members of the health care team about the oral/systemic health connection in diabetes. Unfortunately, many health care providers have had little, if any, training about the oral/systemic health link.[27] PPOD providers can help change this as they collaborate with other members of the health care team and educate others about what they do.

More than 80% of recent internal medicine trainees never ask patients if they have been diagnosed with periodontitis, 90% did not receive any training about the periodontal/systemic link in medical school, and more than 40% believe that discussing periodontal disease is not related to their roles as physicians. Twenty-two percent state that they never refer patients to dentists.[28]

Diabetes educators also report a lack of knowledge about the oral health/systemic link. A survey of Certified Diabetes Educators (CDEs) found that most do not routinely provide oral health education to people with diabetes primarily due to lack of time and knowledge related to oral health. Of 130 respondents, 94% felt that oral health should be part of the curriculum, yet only 23% reported that the curricula used for their patients included an oral health module.[29]

Another study showed that only 51% of CDEs discussed oral health with their patients. Most, however, agreed with the need to collaborate with dental professionals in the total diabetes care management of their patients and agreed that adding an oral health component to their own continuing education would be useful.[30] The bottom line is that increased training for both dental and medical providers about the oral health/systemic connection is important and may help to improve clinical outcomes in people with diabetes.

Screening for Undiagnosed Diabetes

The dental office may also be a useful setting in which to identify individuals with undiagnosed diabetes.[31,32] As the incidence of diabetes continues to rise, with a concomitant number of undiagnosed patients, the dental team may be able to screen people using a questionnaire for risk assessment based on the National Health and Nutritional Examination Survey (NHANES) III.

CDC performed this survey to collect information about the health and diet of Americans. The self-reported information provided by the patients' completion of the questionnaire, along with an intraoral periodontal exam, could identify those at risk so that they can be referred to their primary health care provider for further assessment.

Guidelines for Oral Disease

Several professional organizations have developed guidelines and tools to help providers prevent and manage periodontal disease and other oral health conditions in patients with diabetes.

The National Institute for Clinical Excellence developed a checklist of modifying factors to determine the recommended interval between dental recalls.[33]

- The recall interval is determined specifically for each patient and is based on his or her needs, according to a risk assessment for oral disease.
- The recall interval ranges from a minimum of 3 months to a maximum of 12 months (ages 18 years or younger) to 24 months (more than 18 years of age).

The American Academy of Periodontology has developed guidelines and resources for the management of patients with periodontal diseases.[34]

- Risk assessment was the basis for criteria to assist the dental team in identifying and referring patients for specialty care.

The International Diabetes Federation guidelines on oral health for people with diabetes provide recommendations on clinical care for people with diabetes.[3]

- The recommendations stress that diabetes care providers should ask their patients annually if they receive professional oral health care and explain to them that oral health home care is an important component of their diabetes self-management.
- Diabetes care providers should also ask patients if they are experiencing symptoms of periodontal disease and educate them on the implications of periodontal disease in diabetes management.

Patient Case Example

A dentist sees a 55-year-old man for a new patient exam. The man is experiencing limited mobility of his lower front teeth, halitosis, a dry mouth, and problems chewing.

The patient has not seen a doctor or dentist in several years, and he has a family history of diabetes. Oral examination reveals periodontal disease.

The dentist explains the connection between diabetes and oral health problems and suggests that the patient see his primary care provider as soon as possible to determine if he has diabetes. The dentist also refers the patient to a periodontist for assessment and care.

Patient Education

Diabetes Self-Management Education

Effective diabetes management and oral health are impossible to attain without self-management skills. With patient education and ongoing self-management support, patients can learn the importance of oral health and necessary skills. This education and support offers patients the necessary knowledge and self-efficacy to perform these skills and incorporate them into their oral health routine to achieve sustainable outcomes.

Yet, people with diabetes often are not aware of the significance of the relationship between poor oral health and diabetes. A study of oral self-care and self-perceived oral health in type 2 diabetes patients noted that 85% received no information about the relationship between oral health and diabetes, 83% were unaware of the link, and 48% thought that the dentist or dental hygienist was unaware that they had diabetes. They were also less likely to have visited a dentist in the past 12 months because of the lack of perceived need and cost.[35]

These results indicate that challenges exist in improving education programs in dental offices in order to raise awareness and understanding of the relationship between oral health and overall health.

Through analysis of the psychosocial characteristics of oral health habits and adherence among diabetes patients, researchers discovered a correlation between these behaviors.[36] Self-efficacy was found to be the best determinant in oral health and general health behavior and may be the best predictor of a health-promoting lifestyle.

Supporting self-efficacy in one aspect of health care may also translate into improved self-efficacy in other aspects of health care. Health care professionals may be able to improve patient self-efficacy by promoting a positive psychological state through support and positive feedback.[37]

Therefore, oral health care providers must:

- Recognize the importance of educating patients about the relationship between oral health and diabetes.
- Provide patients with the self-management skills to manage this relationship.
- Provide patients with support and feedback to promote self-efficacy for oral health and other healthy behaviors.
- Encourage patients to visit their dental provider at least once a year for a full mouth exam.

- Teach patients the most effective way to brush their teeth and use dental floss.
- Teach patients about the early signs of tooth, mouth, and gum problems, and about the link between diabetes and gum disease.

Please visit the Resource Center section of the PPOD Guide and Toolkit for resources on oral health.

Key Questions That All Members of the Health Care Team Should Ask About Oral Health

Patients should be referred to an oral health professional if the answers to these questions are "no" or "unsure":

- Do you visit your dental provider at least once a year for a full-mouth exam?
- Do you know how diabetes can affect your teeth and gums?
- Do you know the best way to brush your teeth and use dental floss?
- Do you know the early signs of tooth, mouth, and gum problems?
- Do you have any problems in your mouth, such as loose teeth, red or swollen gums, burning, difficulty chewing, or poorly fitting dentures?

Key Points

- Dental professionals are important participants in a collaborative team care approach for diabetes management.
- Oral health care providers play a key role in treating and controlling periodontal disease, maintaining oral function, developing self-efficacy via self-management behaviors that prevent and control oral disease, and addressing common modifiable risk factors.
- Oral health care providers also may be able to identify people with undiagnosed diabetes by screening those at risk and referring them to their primary health care provider for diagnosis.

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Periodontal (gum) disease

Periodontal (gum) disease

Periodontal abscess

Periodontal abscess

Thrush (oral candidiasis)

Healthy gums and teeth

Diabetes—A Major Health Problem

Diabetes is a serious, common, costly, yet manageable disease. It is one of the top 10 leading causes of death in the United States and affects almost 26 million Americans, with 18.8 million people diagnosed and an additional 7 million people still undiagnosed.[1]

People with diabetes face an array of health issues:

- It is the leading cause of lower-limb amputation not related to trauma, new cases of blindness, and kidney failure in the United States.
- It also is a major contributor to cardiovascular disease, the number one cause of death in this country. About 68% of people with diabetes die from cardiovascular disease.[1]

In 2012, diabetes cost the nation an estimated $245 billion in direct and indirect costs.[1] These current data tell an urgent story about the increasing rates of diabetes in the United States, reflecting the need to integrate pharmacy, podiatry, optometry, and dentistry (PPOD) providers into the health care team to deliver high-quality, integrated care.

Types of Diabetes

Type 1 diabetes was previously called insulin-dependent diabetes mellitus or juvenile-onset diabetes. Type 1 diabetes develops when the body's immune system destroys pancreatic beta cells, the only cells in the body that make the hormone insulin that regulates blood glucose. To survive, people with type 1 diabetes must have insulin delivered by injection or a pump. This form of diabetes usually strikes children and young adults, although disease onset can occur at any age. In adults, type 1 diabetes accounts for approximately 5% of all

diagnosed cases of diabetes. Risk factors for type 1 diabetes may be autoimmune, genetic, or environmental. There is no known way to prevent type 1 diabetes. Several clinical trials for preventing type 1 diabetes are currently in progress or are being planned.[1]

Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus or adult-onset diabetes. In adults, type 2 diabetes accounts for about 90% to 95% of all diagnosed cases of diabetes. It usually begins as insulin resistance, a disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce it. Type 2 diabetes is associated with older age, obesity, family history of diabetes, history of gestational diabetes, impaired glucose metabolism, physical inactivity, and race/ethnicity. African Americans, Hispanic/Latino Americans, American Indians, and some Asian Americans and Native Hawaiians or other Pacific Islanders are at particularly high risk for type 2 diabetes and its complications. Type 2 diabetes in children and adolescents, although still rare, is being diagnosed more frequently among American Indians, African Americans, Hispanic/Latino Americans, and Asians/Pacific Islanders.[1]

Gestational diabetes is a form of glucose intolerance diagnosed in some women during pregnancy. Gestational diabetes occurs more frequently among African Americans, Hispanic/Latino Americans, and American Indians. Like type 2 diabetes, gestational diabetes mellitus (GDM) is also more common among obese women and those with a family history of diabetes.[1]

During pregnancy, women with gestational diabetes require treatment to normalize maternal blood glucose levels and avoid complications for the infant. After pregnancy, the glucose metabolism problems of pregnancy may resolve in many women, but 5% to 10% of women with gestational diabetes will have diabetes, usually type 2. Women who have had gestational diabetes have a 20% to 50% chance of developing diabetes in the next 5 to 10 years.[1]

Other types of diabetes result from specific genetic conditions (such as maturity-onset diabetes of youth), surgery, drugs, malnutrition, infections, and other illnesses. These types of diabetes account for 1% to 5% of all diagnosed cases.[1]

Additional Resources

The Facts About Diabetes: A Leading Cause of Death in the U.S.
NDEP

This fact sheet includes general information and statistics on diabetes in the United States. Statistics are given on the prevalence of diabetes and prediabetes; prevalence by diabetes type, gender, age, and race; mortality rates; and cost to the nation.

National Diabetes Fact Sheet, 2011
NDEP

This comprehensive fact sheet provides national estimates and general information on diabetes and prediabetes in the United States, and also features complications of diabetes and information on preventing these complications.

Diabetes Data & Trends
CDC

Diabetes Data & Trends, which includes the National Diabetes Fact Sheet and the National Diabetes Surveillance System, provides resources documenting the public health burden of diabetes and its complications in the United States. The surveillance system also includes county-level estimates of diagnosed diabetes and selected risk factors for all U.S. counties to help target and optimize the resources for diabetes control and prevention.

Diabetes: The Numbers
NDEP

These slides contain the latest U.S. diabetes prevalence and incidence rates broken down by age, sex, and race/ethnicity.

Diabetes: The Science of Control
NDEP

These slides contain information about the science of diabetes control and highlight the National Diabetes Education Program's materials for consumers at risk for diabetes and health care professionals. Slides can be downloaded as an entire presentation or used individually.

Patient Case Example

A 30-year-old woman, recently diagnosed with gestational diabetes, is sent by her OB-GYN to her dentist and dental hygienist. She asks her dental health team, "What do my teeth have to do with my gestational diabetes?"

The dental hygienist reinforces the connection between oral health and a healthy pregnancy, especially in women with GDM.

The dental hygienist also talks about the increased risk of type 2 diabetes later in life in women with GDM and refers the patient to the free National Diabetes Education Program (NDEP) materials about GDM.

Reference

1. Centers for Disease Control and Prevention. National diabetes fact sheet, 2011. Fast facts on diabetes. Atlanta, GA: U.S. Department of Health and Human Services; 2011.

Prediabetes and Primary Prevention of Type 2 Diabetes

Prediabetes is a condition in which blood glucose levels are higher than normal but not in the diabetes range. PPOD and other health care providers can work with patients who are diagnosed as having prediabetes to help prevent them from progressing to additional health complications. Without intervention, people with prediabetes will progress to type 2 diabetes at a rate of 10% per year. Prediabetes also increases the risk of heart disease and stroke.[1]

Prediabetes is defined as impaired fasting glucose (IFG) of 100 to 125 mg/dl, impaired glucose tolerance (IGT) diagnosed by a post 75-gram glucose challenge (oral glucose tolerance test of >140 to <200 mg/dl or both IFG and IGT), or a hemoglobin A1C of 5.7–6.4%. The Are You at Risk for Type 2 Diabetes? test, from NDEP, can help patients and providers assess individual risk for prediabetes.

Primary Prevention

Primary prevention refers to preventing diabetes from occurring. Secondary prevention refers to preventing complications in those who already have diabetes (e.g., prevention of neuropathy), and tertiary prevention refers to prevention of worsening complications (e.g., amputation resulting from injury to a neuropathic foot) or death.

Trend Is Not Destiny

Progression to diabetes among those with prediabetes is not inevitable. Studies have shown that people with prediabetes who lose weight and increase their physical activity can prevent or delay diabetes and return their blood glucose levels to normal.

A major National Institutes of Health (NIH)-supported clinical trial—the Diabetes Prevention Program (DPP) study—provided scientific evidence that the onset of diabetes could be prevented or delayed in people at high risk. In the DPP, adults with prediabetes reduced their risk of developing diabetes during the course of the study by 58% through lifestyle changes such as:

- Reduced fat and calorie intake.
- Increased physical activity of at least 150 minutes/week (e.g., brisk walking 30 minutes a day, 5 days/week).
- Loss of at least 5% to 7% of body weight.

These lifestyle changes were effective in preventing or delaying diabetes in all ages and all ethnic groups in the DPP. Among people ages 60 years and older, progression to type 2 diabetes was reduced by 71%. The DPP showed that moderate changes resulting in modest weight loss can make a difference.

Interventions to prevent or delay type 2 diabetes in individuals with prediabetes can be feasible and cost-effective. Research has found that lifestyle interventions are more cost-effective than medications.[1] Further information on prediabetes, testing recommendations, and more can be found on the National Diabetes Education Program's (NDEP) *Small Steps. Big Rewards. Prevent Type 2 Diabetes* campaign site.

The National Diabetes Prevention Program

The National Diabetes Prevention Program is a public-private partnership of community organizations, private insurers, employers, health care organizations, and government agencies. These partners are working to establish local evidence-based lifestyle change programs for people at high risk for type 2 diabetes. It is based on the DPP research study led by NIH and supported by the Centers for Disease Control and Prevention (CDC) and several translation studies.

There are four components of the National Diabetes Prevention Program:

Training: Increase workforce
Train the workforce that can implement the program cost-effectively.

Recognition Program: Assure quality
Implement a recognition program that will assure quality, lead to reimbursement, and allow CDC to develop a program registry.

Intervention Sites: Deliver program
Develop intervention sites that will build infrastructure and provide the program.

Health Marketing: Support program uptake
Increase referrals to and use of the prevention program.

Participants work with a lifestyle coach in a group setting to receive a 1-year lifestyle change program that includes 16 core sessions (usually 1 per week) and 6 post-core sessions (1 per month).

Partners of the National Diabetes Prevention Program include the Y (also known as YMCA of the USA) and United Health Group. These partner organizations were instrumental in starting up the national program and continue to expand the reach of evidence-based lifestyle programs. CDC is enthusiastic about the numerous organizations becoming involved in the National Diabetes Prevention Program.

Explore the National Diabetes Prevention Program site to learn more about prediabetes and how to prevent or delay type 2 diabetes.

Patient Case Example

A 45-year-old African American woman brings in her mother for her annual comprehensive diabetes eye exam. The eye care provider asks the woman if she ever considered that she, too, has a family history of diabetes, which would place her at risk for developing type 2 diabetes.

The woman is surprised. "Me? I just never thought much about it. I've always been focused on Mama."

The provider gives the woman the *Am I at Risk?* brochure and NDEP's toll-free number and website URL and suggests she make a follow-up appointment with her own primary care provider.

The Role of Pharmacy, Podiatry, Optometry, and Dentistry Providers in Primary Prevention

All health care providers can play a role in diabetes primary prevention and diabetes management. As a pharmacist, podiatrist, optometrist, dentist, or dental hygienist, you can make a difference in primary prevention because:

- You know your patients.
- Your patients trust you.
- A few words from you can go a long way.
- You can determine with just a few questions who is at high risk for diabetes (see risk factor list below).

Do Your Patients Have Any of the Following Risk Factors?

- Family history of type 2 diabetes.
- Overweight or obesity.
- High blood pressure or cholesterol.
- African American, American Indian/Alaska Native, Asian American, Hispanic/Latino, or Native Hawaiian/Pacific Islander ethnicity.
- Prediabetes.
- Older than 45 years of age.
- History of gestational diabetes mellitus.

Patient Case Example

A 50-year-old man, accompanied by his overweight teenage son, asks the pharmacist about weight loss pills. The teen seems embarrassed and unconvinced. He says, "What am I supposed to eat when the guys are all eating burgers and fries?"

The pharmacist agrees that changing eating habits is hard. He suggests that the son try eating smaller portions or choosing a plain burger instead of the oversized one with cheese. He also suggests the family visit NDEP's website for tips on healthy eating and physical activity, and that they talk with a dietitian.

Dad agrees to play basketball with his son a couple of nights a week—good exercise for both of them.

A Few Words Can Go a Long Way

You don't need to do it all—resources are available to help. Your patients will appreciate that you care about their overall health.

- Ask: "Has anyone ever told you that you are at risk for diabetes?"
- Advise: "You can take action to prevent or delay type 2 diabetes."
- Assist: Give your patients resources to help them make healthy changes.
- Refer your patients to their primary care provider.

Use the free primary prevention materials available from NDEP online and at 1–888–693–NDEP (1–888–693–6337).

Reference

1. Herman WH, Hoerger TJ, Brandle M, et al. The cost-effectiveness of lifestyle modification or metformin in preventing type 2 diabetes in adults with impaired glucose tolerance. *Ann Intern Med*. 2005 Mar 1;142(5):323–32.

Resource Center

This section includes links to a sampling of additional resources for all four pharmacy, podiatry, optometry, and dentistry (PPOD) specialties.

Resources for Medication Therapy/Pharmacy

Resources for Providers

- *Effect of Outpatient Pharmacists' Non-Dispensing Roles on Patient Outcomes and Prescribing Patterns*
  Cochrane Database of Systematic Reviews, 2010, published online

  The roles of pharmacists in patient care have expanded from the traditional tasks of dispensing medications and providing basic medication counseling to working with other health professionals and the public. This systematic review focuses on services provided by outpatient pharmacists in community or ambulatory care settings. Most of the included studies supported the role of pharmacists in medication/therapeutic management, patient counseling, and provision of health professional education with the goal of improving patient process of care and clinical outcomes.

- American Diabetes Association Management of Hyperglycemia in Type 2 Diabetes: A Patient-Centered Approach. *Diabetes Care,* 2012; 35:1364–1379.

  These guidelines, developed jointly by the American Diabetes Association and the European Association for the Study of Diabetes, detail a patient-centered approach that allows for individual patient needs, preferences, and tolerances and takes into account differences in age and disease progression. The guidelines call for provision of diabetes education to all patients in an individual or group setting, focusing on dietary intervention and the importance of increased physical activity, as well as weight management, when appropriate. These guidelines encourage development of individualized treatment plans built around a patient's specific symptoms, comorbidities, age, weight, racial/ethnic/gender differences, and lifestyle.

- *A Program Guide for Public Health: Partnering with Pharmacists in the Prevention and Control of Chronic Diseases*
  Centers for Disease Control and Prevention

  This guide embraces the team-based health care approach and explains the active role that pharmacists hold on the health care team. The guide contains basic definitions for medication therapy/collaborative drug therapy management, an overview of pharmacist scope of practice policies at the federal and state levels, and strategies for working with pharmacists.

Resources for Patients

- Living With Diabetes: Medication Resources
  American Diabetes Association

  This website provides numerous resources on medication for individuals with diabetes. Resources include information on insulin and oral medications, tips for travel, and an "Ask the Pharmacist" forum.

- Script Your Future Diabetes Resources
  National Consumers League

  This website from the National Consumers League features many convenient tools that individuals with diabetes can use to make managing their medications easier every day. Resources include a medication schedule and dosage wallet card, a glucose reading worksheet, and medication guides.

- What I Need to Know About Diabetes Medicines
  Lo que usted debe saber sobre las medicinas para la diabetes (What you need to know about diabetes medicines)
  National Diabetes Information Clearinghouse

  This website provides answers to common questions surrounding diabetes medicines. Information is provided on the types of diabetes medicines, their relation to blood glucose levels, and questions patients should ask about their diabetes medicines.

Resources for the Feet

Resources for Providers

- *Feet Can Last a Lifetime*
  National Diabetes Education Program (NDEP)

  This comprehensive guide to foot care includes a quick-reference card for conducting a foot exam, a monofilament for sensory testing, and templates for waiting room posters and medical record stickers.

- Lower Extremity Amputation Prevention (LEAP)
  Health Resources and Services Administration

  LEAP is a comprehensive program developed by the Health Resources and Services Administration that can dramatically reduce lower extremity amputations in individuals with diabetes mellitus or any condition that results in loss of protective sensation in the feet.

- Diabetes Foot Care Hub
  Indian Health Service

  This website includes training and reviews guidelines for screening and prevention of neuropathic and ischemic foot ulcers in people with diabetes.

Resources for Patients

- *Be Sweet to Your Feet If You Have Diabetes*
  NDEP

  Taking care of your feet is important for people with diabetes. Patients can learn essential foot care tips that will keep their feet healthy.

- Prevent Diabetes Problems: Keep Your Feet and Skin Healthy
  Cómo prevenir los problemas de la diabetes: Mantenga sanos los pies y la piel (Prevent Diabetes Problems: Keep Your Feet and Skin Healthy)
  National Diabetes Information Clearinghouse

  This website provides answers to common questions, focusing on the complications diabetes can cause and ways in which patients can care for their feet. Information about finding a diabetes teacher, dietitian, and other valuable resources are also listed.

- *Take Care of Your Feet for a Lifetime*
  Cuídese los pies durante toda la vida (Take Care of Your Feet for a Lifetime)
  NDEP

  This illustrated booklet from NDEP helps patients care for their feet and provides tips to avoid serious health problems.

- Diabetes Health Concerns: Foot Care for People with Diabetes
  CDC Division of Diabetes Translation

  This website offers information on health concerns related to diabetes, including tips on how to take care of your feet if you have diabetes.

- *Foot Care Checklist and Information on Preventing Foot Injuries on the Job,*
  Putting Your Best Foot Forward: Choosing Shoes to Prevent Diabetic Foot Problems
  NDEP www.Diabetesatwork.org resources

  These resources provide a checklist to help you take care of your feet and skin, tips to prevent foot injuries on the job, and recommendations for choosing shoes that fit well.

Resources for the Eyes

Resources for Providers

- Diabetes and Healthy Eyes Toolkit
  National Eye Institute (NEI)

  The *Diabetes and Healthy Eyes Toolkit* provides community health workers and health educators with unique tools to inform people with diabetes and their loved ones about diabetic eye disease and maintaining healthy vision.

- *Diabetic Eye Disease: An Educator's Guide* (English and Spanish)
  NEI

  This flipchart is designed for health professionals to use in small-group settings to help educate people about diabetic eye disease. The flipchart covers the various risk factors for developing diabetes, eye complications that can be caused by diabetes, and more. It also includes a PowerPoint and self-guided module.

- Diabetic Eye Disease—Educational Resources and Materials
  NEI

  This web page contains a full listing of the National Eye Health Education Program's (NEHEP) educational resources and materials (for providers and patients).

- *Documentation of Diabetic Retinopathy*
  American Optometric Association (AOA)

  This chart from AOA contains technical information on the classification of diabetic retinopathy and macular edema.

- *ICO Guidelines for Diabetic Eye Care*
  International Council of Ophthalmology (ICO)

  These guidelines represent a technical consensus from the ICO Task Force on Diabetic Eye Care following extensive review of diabetic eye care guidelines collected from around the world. The guidelines offer recommendations for screening and evaluating people with diabetes for potentially blinding eye problems, and for treating those with diabetic retinopathy and other ocular complications of diabetes. The guidelines demonstrate the need for ophthalmologists to work with diabetologists, primary care providers, and others.

- *Optometric Clinical Practice Guideline: Care of the Patient with Diabetes Mellitus*
  AOA

  This guide provides optometrists with examination and management recommendations to preserve vision and reduce the risks of vision loss in patients with diabetes through timely diagnosis and appropriate referral and intervention.

- Vision Health Initiative (VHI)
  CDC Division of Diabetes Translation

  CDC Division of Diabetes Translation has joined with others committed to vision health to create a more effective multilevel network for vision loss prevention and eye health promotion. VHI has the unique role of collaborating with state and national partners to strengthen science and develop interventions to improve eye health, reduce vision loss and blindness, and promote the health of people with vision loss.

Resources for Patients

- Diabetic Eye Disease—Educational Resources and Materials
  NEI

  This NEI web page contains a full listing of NEHEP's educational resources and materials (for providers and patients).

- Diabetic Retinopathy
  AOA

  This AOA web page contains an overview of diabetic retinopathy, including information on what it is, how it is diagnosed, and how it can be treated.

- *Prevent Diabetes Problems: Keep Your Eyes Healthy*
  Cómo prevenir los problemas de la diabetes: Mantenga los ojos sanos (Prevent Diabetes Problems: Keep Your Eyes Healthy)
  National Diabetes Information Clearinghouse

  This website provides answers to common questions, focusing on the complications diabetes can cause and ways in which patients can care for their eyes. Information about finding a diabetes teacher, dietitian, and other valuable resources are also listed.

- Diabetes Health Concerns: Eye Health
  CDC Division of Diabetes Translation

  This website offers information on health concerns from diabetes, including tips on how to keep your eyes healthy if you have diabetes.

- What Is Diabetic Retinopathy?
  American Academy of Ophthalmologists EyeSmart

  This resource offers information about diabetic retinopathy, the most common diabetic eye disease.

- Saving Vision
  American Society of Retina Specialists

  Saving Vision is a patient-information resource hosted by the American Society of Retina Specialists in collaboration with its Foundation. This site offers information for patients diagnosed with retina conditions and promotes the importance of care by a retina specialist.

Resources for Oral Health

Resources and More References for Providers

- *HHS Oral Health Initiative 2010: "Promoting and Enhancing the Oral Health of the Public"*
  U.S. Department of Health and Human Services (HHS)

  HHS supports a broad spectrum of oral health activities to disseminate the message that "Oral Health is Integral to Overall Health."

- *Healthy Smiles for a Lifetime*
  National Center for Farmworker Health

  Healthy Smiles for a Lifetime is an oral health training curriculum for lay health workers. It focuses on preventing common dental problems, such as tooth decay and gum disease, and the barriers that keep farmworkers from being able to enjoy good dental health. The curriculum provides detailed lessons and activities for training lay health workers on dental health issues such as dental hygiene, tooth decay, gum disease, baby bottle tooth decay, dental injuries, and extractions.

- *IDF Guideline on Oral Health for People with Diabetes*
  International Diabetes Federation (IDF)

  IDF and the World Dental Federation came together under the lead of the IDF Task Force on Clinical Guidelines to address whether the evidence base in this area allowed formal recommendations on oral health and diabetes care to be made. The focus has been placed on activity within diabetes care. The result of the collaboration between the two organizations is the *IDF Guideline on Oral Health for People with Diabetes*.

- Oral Health Topics—Diabetes
  American Dental Association

  This overview is tailored specifically for dentists who may be treating patients with diabetes. This website identifies a wealth of resources that can be used to treat the special needs of patients with diabetes.

- Prevent Diabetes Problems: Keep Your Mouth Healthy
  Cómo prevenir los problemas de la diabetes: Mantenga la boca sana (Prevent Diabetes Problems: Keep Your Mouth Healthy)
  National Diabetes Information Clearinghouse

  This website provides answers to common questions, focusing on the complications diabetes can cause and ways in which patients can maintain their oral health. Information about finding a diabetes teacher, dietitian, and other valuable resources are also listed.

- Diabetes and Oral Health Connection
  Indian Health Service

  This web-based training from the Indian Health Service reviews the etiology, signs, and symptoms of periodontal disease; the provider's role in screening for periodontal disease; the dental team's role in the treatment of periodontal disease; and the connection between periodontal disease and diabetes management.

- Eldarrat A. Awareness and attitude of diabetic patients about their increased risk for oral diseases. *Oral Health Prev Dent.* 2011;9(3):235–41.

  In this study, patients with diabetes were found to have little awareness of their increased risk for oral diseases. In order to promote proper oral health and to reduce the risk of oral diseases, health professionals in both the dental and medical fields need to develop programs to educate the public about the oral manifestations of diabetes and its complications for oral health.

- Duley S, Fitzpatrick P, Zornosa X, Barnes D. A center for oral health promotion: Establishing an inter-professional paradigm for dental hygiene, health care management and nursing education. *J Dent Hyg*. 2012; 86:63–70.

  Current research has shown correlations between oral and systemic disease. Professionals need to be educated about these connections and advised how, by maintaining proper oral health, they may avoid systemic consequences. Students in dental hygiene, health care management, and nursing programs can play a vital role in this education. By jointly creating and operating an educational Center for Oral Health Promotion, they can better understand each other's professions.

- Heinricks E, Famili P. Dental school faculty teaching the periodontal-systemic connection to medical students: A pilot mini-elective. *J Dent Educ.* 2011;75:1370–1373.

  In January 2009, faculty members of the University of Pittsburgh School of Dental Medicine and School of Medicine pilot tested a mini-elective in which several dental school faculty members team-taught medical students about conducting oral exams and the systemic effects of oral diseases. This article gives an overview of this elective and its outcomes.

- Lopes M, Southerland J, Buse J, Malone R, Wilder R. Diabetes educators' knowledge, opinions and behaviors regarding periodontal disease and diabetes. *J Dent Hyg.* 2012;86:82–90.

  The purpose of this study was to determine Certified Diabetes Educators' (CDE) knowledge, behaviors, and opinions about periodontal disease and diabetes. The findings indicate that CDEs are aware of and agree that there is a link between oral health and systemic health and that collaboration with the dental profession would be a positive outcome for their patients, as would oral health topics being added to their continuing education courses.

- New York Academy of Sciences. Diabetes and oral disease: Implications for health professionals. *Ann N Y Acad Sci*. 2012;1255:1–15.

  The Columbia University College of Dental Medicine, the Columbia University College of Physicians and Surgeons, and the New York Academy of Sciences convened a 1-day conference to examine the relationship between oral disease and diabetes and to improve patient management of the oral and overall effects of diabetes. This report summarizes the scientific presentations of the event.

- Owens J, Wilder, R, Southerland J, Buse J, Malone R. North Carolina internists' and endocrinologists' knowledge, opinions, and behaviors regarding periodontal disease and diabetes: Need and opportunity for interprofessional education. *J Dent Educ.* 2011; 75:329–338.

  This study suggests that internists and endocrinologists have some knowledge about oral health and believe that there is a link between periodontal disease and diabetes mellitus; however, the majority do not have sufficient familiarity with the studies that link periodontal disease and diabetes mellitus. Perhaps the time is conducive to promote interprofessional education and collaboration between medical and dental health care.

- Position of the Academy of Nutrition and Dietetics: Oral health and nutrition. *J Acad Nutr Diet*. 2013;113:693–701.

  This paper presents the position of the Academy of Nutrition and Dietetics that nutrition is an integral component of oral health. The Academy supports integration of oral health with nutrition services, education, and research. As knowledge of the link between oral health and nutrition increases, dietetics practitioners and oral health care professionals must learn to provide screening, education, and referrals as part of comprehensive client/patient care.

- Vanderbilt A, Isringhausen K, VanderWielen L, Wight M, Slashcheva L, Madden M. Health disparities among highly vulnerable populations in the United States: A call to action for medical and oral health care. *Med Educ Online*. Published online 2013 March 26.

  Oral health disparities continue to plague the U.S. health care system. Interprofessional education and teamwork have been demonstrated to improve patient outcomes and provide benefits to participating health professionals. The implementation of interprofessional education and teamwork may be a solution to meet the increasing oral and systemic health care demands of highly vulnerable U.S. populations.

Resources for Patients

- Diabetes and Oral Health
  National Institute of Dental and Craniofacial Research

  This resource outlines the oral health problems people with diabetes can face; explains how problems can be avoided; and identifies additional resources, clinical trials, and news releases.

- Diabetes: Dental Tips
  La diabetes: Consejos sobre la salud oral (Diabetes: Dental Tips)
  National Institute of Dental and Craniofacial Research

  These web pages provide dental tips for individuals with diabetes.

- Oral Health and Hygiene
  American Diabetes Association

  This guide to oral health and hygiene is geared specifically toward the special oral health needs of individuals with diabetes. The website covers the potential problems people with diabetes experience with oral health, warning signs, and tips for avoiding oral health problems such as gum disease.

- Oral Health Topics—Diabetes
  American Dental Association

  This overview explains the special oral health needs and complications that individuals with diabetes may face and how they can work with their dentist to avoid oral health problems.

- Prevent Diabetes Problems: Keep Your Mouth Healthy
  Cómo prevenir los problemas de la diabetes: Mantenga la boca sana (Prevent Diabetes Problems: Keep Your Mouth Healthy)
  National Diabetes Information Clearinghouse

  This website provides answers to common questions, focusing on the complications diabetes can cause and ways in which patients can maintain their oral health. Information about finding a diabetes teacher, dietitian, and other valuable resources are also listed.

- *Want Some Life Saving Advice?*
  American Dental Hygienists' Association (ADHA)

  According to ADHA, dental hygienists often detect symptoms of diabetes during routine oral health examinations. This fact sheet explains the various warning signs of diabetes that may be visible in your patients' oral health and the best ways patients can care for their teeth.

- Diabetes Health Concerns: Oral Health
  CDC Division of Diabetes Translation

  This website offers tips on overall health if you have diabetes, including how to keep your gums and teeth healthy.

- Dental Health and Diabetes
  Joslin Diabetes Center

  This site suggests tips on caring for your teeth and a list of warning signs to watch for if you have diabetes.

Resources About Culturally Competent Care

Resources for Providers

- Think Cultural Health
  Office of Minority Health (OMH)

  It is important for health care providers to develop cultural and linguistic competency in health care to deliver respectful, understandable, and effective services to their patients. The flagship initiative of the OMH Center for Linguistic and Cultural Competence in Health Care offers the latest resources and tools.

- *Compendium of Cultural Competence Initiatives in Health Care*
  Henry J. Kaiser Family Foundation

  This report presents an overview on public and private sector activities to reduce cultural and communication barriers to health care.

- Cultural Competence
  CDC National Prevention Information Network

  Health and human service organizations are recognizing the need to enhance services for culturally and linguistically diverse populations. Providing culturally and linguistically appropriate health care services requires an understanding of cultural competence. This resource offers providers a deeper understanding of cultural competence and how it applies to health.

- Culture, Language and Health Literacy
  Health Resources and Services Administration (HRSA)

  This HRSA list contains its online cultural competency resources, including culture/language-specific and disease/condition-specific resources, guidelines for clinicians, research, online training resources, and health professional education resources.

- Effective Communication Tools for Healthcare Professionals 100 (Course ID 1010508)
  HRSA

  This is a free, online, go-at-your-own-pace training course that helps health care professionals and students improve patient-provider communication.

- *Health Literacy in Dentistry Action Plan 2010–2015*
  American Dental Association (ADA)

  Health literacy in dentistry is "the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions." ADA affirmed that limited health literacy is "a potential barrier to effective prevention, diagnosis and treatment of oral disease" and "clear, accurate and effective communication is an essential skill for effective dental practice." The ADA Council on Access, Prevention and Interprofessional Relations (CAPIR) and its ad hoc advisory committee on health literacy in dentistry developed this strategic action plan as a set of principles, goals and, in some cases, specific strategies to provide guidance to the association and its councils and commissions, dental professionals, policy makers, and others to improve health literacy.

- Health Literacy Program
  American Medical Association

  Health literacy is the ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions and follow instructions for treatment. More than 89 million American adults have limited health literacy skills. Limited health literacy affects medical diagnosis and treatment. This resource offers tools and materials to raise awareness about health literacy.

- Pharmacy Health Literacy Center
  Agency for Healthcare Research and Quality

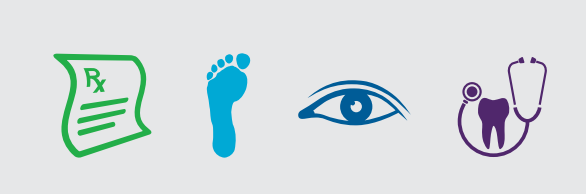
  Pharmacy health literacy is the degree to which individuals are able to obtain, process, and understand basic health and medication information and the pharmacy services needed to make appropriate health decisions. Only 12% of adults have proficient health literacy (e.g., can interpret the prescription label correctly). Medication errors are likely higher for patients with limited health literacy, as they are more likely to misinterpret the prescription label information and auxiliary labels. Studies document an association between low literacy and poor health outcomes.

PPOD-related Organizations List

This section includes links to pharmacy, podiatry, optometry, and dentistry (PPOD)-related organizations to give you a starting point for networking, making connections across specialties, and finding relevant resources. This list includes only a sampling of the many excellent organizations doing important work in PPOD areas and diabetes prevention, care, and education.

Pharmacy Organizations

- Academy of Managed Care Pharmacy
- American Association of Pharmaceutical Scientists
- American College of Clinical Pharmacy
- American Pharmacists Association
- American Society of Consultant Pharmacists
- American Society of Health-System Pharmacists
- Association of Black Health System Pharmacists
- National Alliance of State Pharmacy Associations
- National Association of Chain Drug Stores
- National Community Pharmacists Association
- Pharmacy benefit management organizations such as Express Scripts and Caremark all conduct diabetes education.



Podiatry Organizations

- American Academy of Podiatric Practice Management
- American Association of Colleges of Podiatric Medicine
- American Association of Hospital & Healthcare Podiatrists
- American Board of Podiatric Medicine
- American College of Foot and Ankle Surgeons
- American College of Foot & Ankle Orthopedics & Medicine
- American Podiatric Medical Association
- American Society of Podiatric Dermatology
- American Society of Podiatric Medical Assistants
- American Society of Podiatric Surgeons
- National Podiatric Medical Association

Optometry and Ophthalmology Organizations

- American Academy of Ophthalmology
- American Academy of Optometry
- American Optometric Association
- American Society of Retina Specialists
- Association of Schools and Colleges of Optometry
- Centers for Disease Control and Prevention Vision Health Initiative
- Lions Clubs International
- National Institutes of Health, National Eye Institute
- National Optometric Association
- Prevent Blindness America

Dentistry Organizations

- Academy of General Dentistry
- American Academy of Oral Medicine
- American Academy for Oral Systemic Health
- American Academy of Periodontology
- American Association of Public Health Dentistry
- American Dental Association
- American Dental Education Association
- American Dental Hygienists' Association
- Centers for Disease Control and Prevention Division of Oral Health
- Hispanic Dental Association
- Indian Health Service Division of Oral Health
- National Dental Association
- National Dental Hygienists' Association
- National Institute of Dental and Craniofacial Research
- Oral Health America

National Organizations and Associations—General

- Alliance of Independent Academic Medical Centers
- American Diabetes Association
- American Psychological Association
- Association for the Advancement of Wound Care
- Association of Academic Health Centers
- Indian Health Service
- International Diabetes Federation
- National Kidney Foundation

Medical Associations

- American Academy of Family Medicine
- American Academy of Family Physicians
- American Academy of Physician Assistants
- American Association of Clinical Endocrinologists
- American Association of Nurse Practitioners
- American College of Physicians (Internal Medicine)
- American Medical Association
- Association of American Indian Physicians
- The Endocrine Society
- National Hispanic Medical Association
- National Medical Association

Nutrition and Diabetes Education Organizations

- Academy of Nutrition and Dietetics
- American Association of Diabetes Educators
- Centers for Disease Control and Prevention Community Health Workers/Promotores de Salud
- Community Health Worker National Education Collaborative
- Visión y Compromiso (from Promotores and Community Workers)

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Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

National Diabetes Education Program
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