

Supplement to

**DIABETIC**

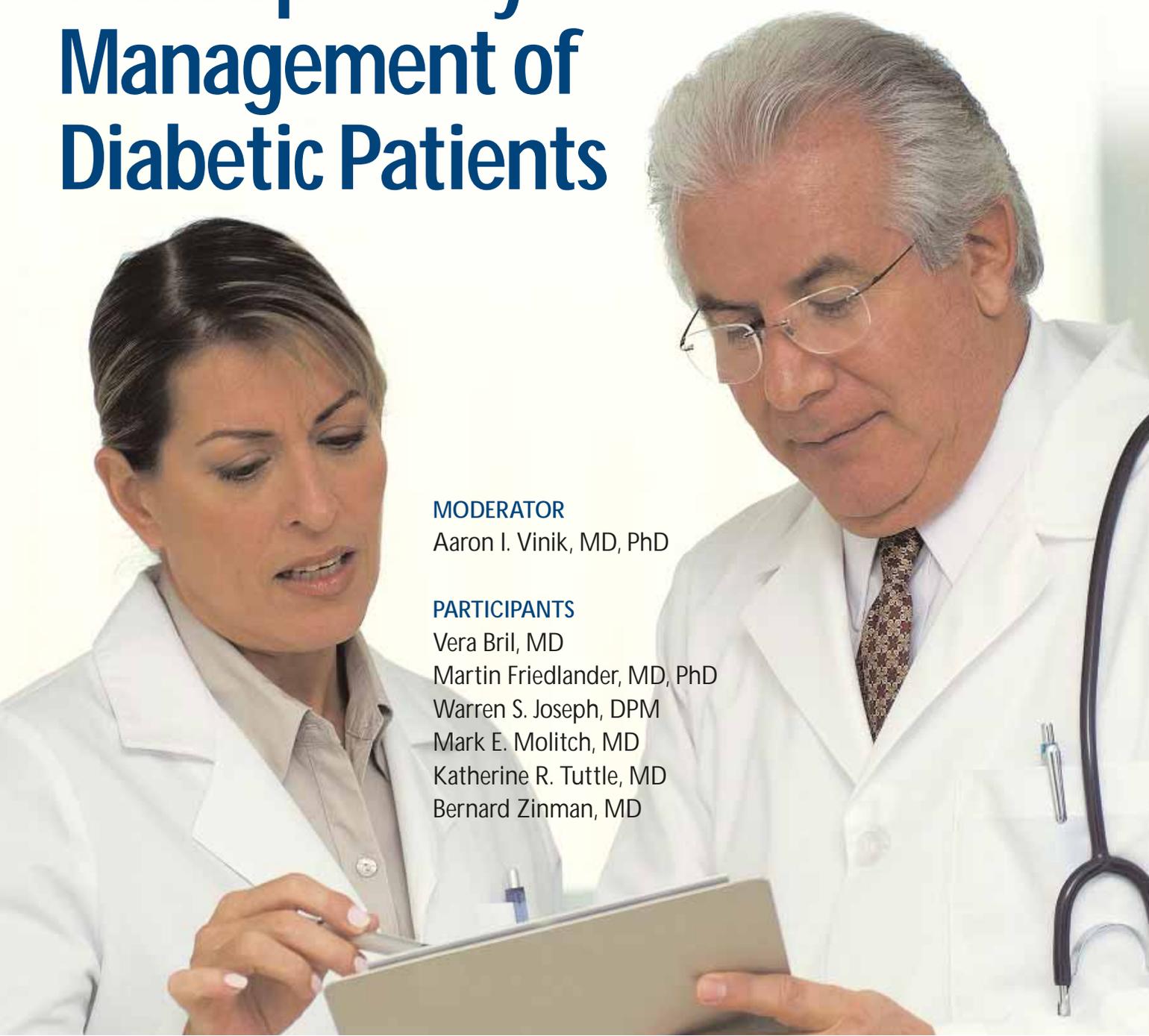
# Microvascular Complications

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## TODAY

September/October 2005

## Cross Specialty Management of Diabetic Patients



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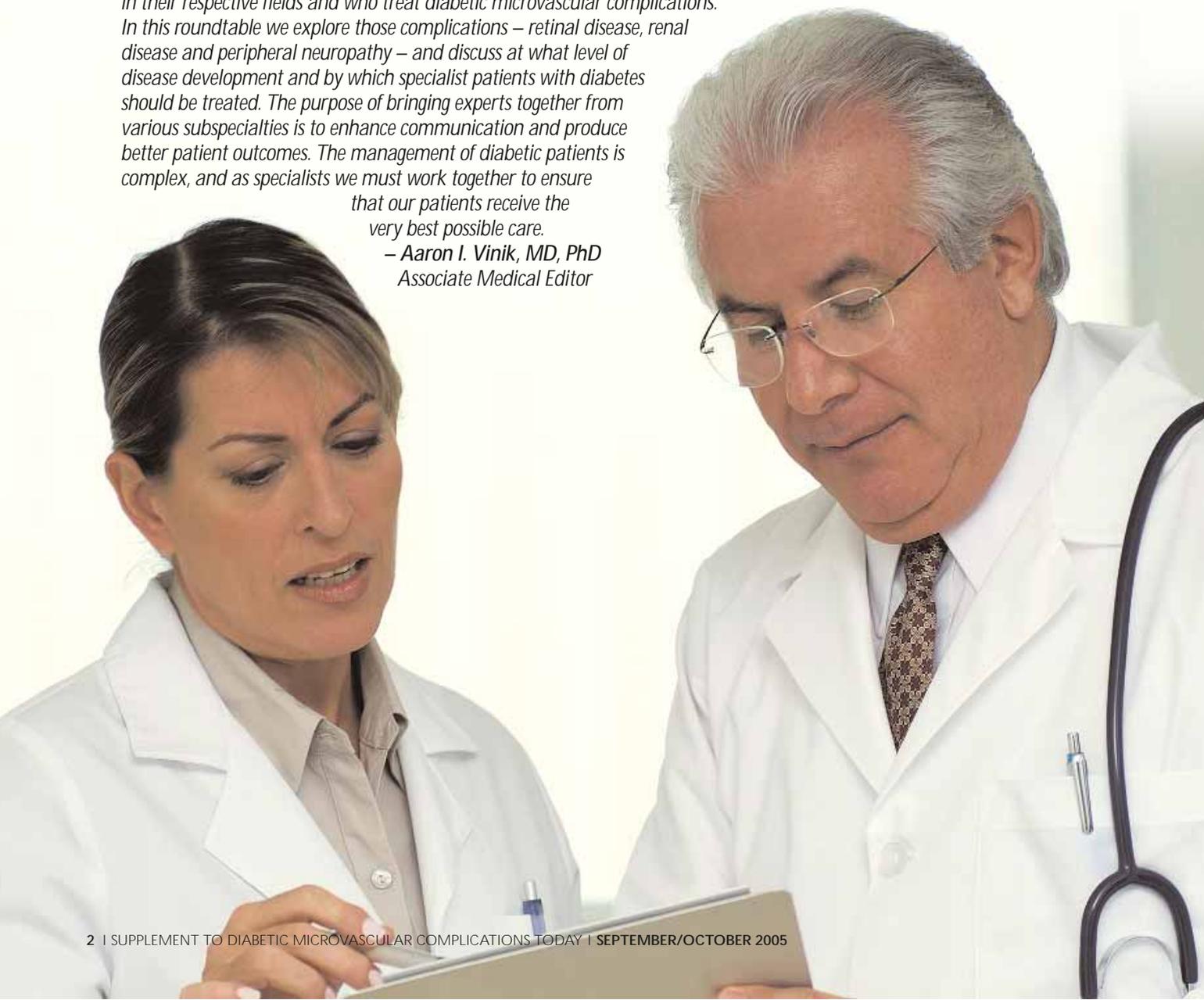
Bernard Zinman, MD

# Cross Specialty Management of Diabetic Patients

*This roundtable was held by Diabetic Microvascular Complications Today, during the American Diabetes Association 65th Annual Meeting and Scientific Sessions, in San Diego. We invited specialists to participate who are experts in their respective fields and who treat diabetic microvascular complications.*

*In this roundtable we explore those complications – retinal disease, renal disease and peripheral neuropathy – and discuss at what level of disease development and by which specialist patients with diabetes should be treated. The purpose of bringing experts together from various subspecialties is to enhance communication and produce better patient outcomes. The management of diabetic patients is complex, and as specialists we must work together to ensure that our patients receive the very best possible care.*

*– Aaron I. Vinik, MD, PhD  
Associate Medical Editor*



# Meet the Panel

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**Aaron I. Vinik, MD, PhD (Moderator)**

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**Mark E. Molitch, MD**

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**Katherine R. Tuttle, MD**

Medical and Scientific Director, Providence Medical Research Center  
and The Heart Institute of Spokane  
Professor of Basic Medical Sciences, WWAMI Program, Washington State University  
Clinical Associate Professor of Medicine, University of Washington School of Medicine



**Bernard Zinman, MD**

Professor of Medicine, University of Toronto  
Director of the Leadership Sinai Centre for Diabetes,  
Mount Sinai Hospital, Toronto

**AARON I. VINIK, MD, PHD:** Dr. Zinman, what is your idea of a complete diabetes management team?

**BERNARD ZINMAN, MD:** In addition to the patient, any diabetes management team includes most importantly nurse educators, dietitians and family practitioners. As physicians, we cannot be effective without that support staff. At the Leadership Diabetes Centre, Mount Sinai Hospital, patients are referred by their primary care physician and receive care in the context of our multidisciplinary diabetes unit. A nurse educator/dietician and physician make joint decisions on patient management. It is extremely important that we have a common philosophy of diabetes management and this encompasses the ophthalmologists, nephrologists, neurologists and other physicians who see diabetic patients.

**AV:** In terms of patient management, do you use the Canadian or the ADA guidelines for microvascular complications?



*"The key is to make the guidelines simple. Decide what the priorities are, simplify what family practitioners should do to recognize microvascular complications, and facilitate the initiation of therapy earlier."  
– Bernard Zinman, MD*

**BZ:** We use the Canadian guidelines, and the Canadian guidelines are the only evidence-based guidelines. They can be found at [www.diabetes.ca](http://www.diabetes.ca). Each guideline recommendation is fully referenced and rated as to the evidence supporting this recommendation. Most other guidelines certainly use the literature to justify recommendations, but they do not have the recommendation reviewed by a panel of evidence-based medicine experts. In Canada, an expert panel assigns a level of evidence to each recommendation.

Nonetheless, the big challenge in developing guidelines is not in the writing of the guidelines but in the

implementation. We have to develop strategies to make it easy to implement the new recommendations.

**AV:** What can we do to enhance the general practitioner's ability to recognize diabetes complications and know that he/she should be referring a patient into a system like yours?

**BZ:** The key is to make the guidelines simple. Decide what the priorities are, simplify what family practitioners should do to recognize microvascular complications and facilitate the initiation of therapy earlier. While family doctors should initiate some therapies, they need to know when to refer a patient to a specialist.

**AV:** Dr. Friedlander, what is the process in your institution and how are patients referred to you?

**MARTIN FRIEDLANDER, MD, PHD:** I work at a very large health care provider in San Diego. We have several hundred thousand patients, most of whom are in managed care. We have about 550 physicians and specialists scattered over nine facilities in the county. We have a large endocrinology and diabetes group.

Our physicians are well educated about early recognition of diabetic complications and the importance of referring them to the appropriate specialist. In terms of ophthalmology, patients typically see one of our general ophthalmologists first. If there is any sign of retinopathy, they are referred to me or someone else in my division.

One problem I see is that patients think that all they have to do is control their blood sugar. I have patients with perfectly controlled blood sugars and diabetic retinopathy, and I have patients with perfect eyes who have terrible blood sugars. I am not minimizing blood sugar control, but what I am saying is I think that patients are misled. Patients need to understand that just because their blood sugars are good it does not mean that they will not develop complications and should not seek regular examinations by properly trained subspecialists.

**BZ:** The evidence is very strong that intensifying glucose control greatly reduces microvascular disease.

**MF:** I agree. The first question I ask my patients is, "How is your blood glucose control?" However, in terms of developing microvascular complications,

these patients need to be screened. If they make an appointment because they are already not seeing well, it is often a much more difficult battle to stabilize their retinal disease.

**AV:** Irrespective of diabetes control, do we need to focus on the eye? If it is not only glycemic control, what are other important measures to take to ensure maximum protection of the eye and other organs?

**MF:** We do not necessarily need to *focus* on the eye. You need to monitor the eye, however, so that you can monitor other tissues with high blood flow like the kidneys, heart and brain. The eye is exquisitely sensitive to microvascular changes. It is readily examined with sufficient detail by the physician so that microvascular changes can be detected in the clinic by direct examination. The earlier we identify these patients, the better we can control them.

The second point I want to make in terms of the eye is how devastating a complication like hypertension can be to patients. A lot of patients don't think about blood pressure control the same way they think of blood sugar control. I'm not speaking for everyone's practice, but a lot of my patients come in with perfectly well controlled blood sugars and seriously elevated blood pressure. Patient education in this regard is extraordinarily important.

**AV:** Do you get patients for retinal evaluation directly from the family practitioner?

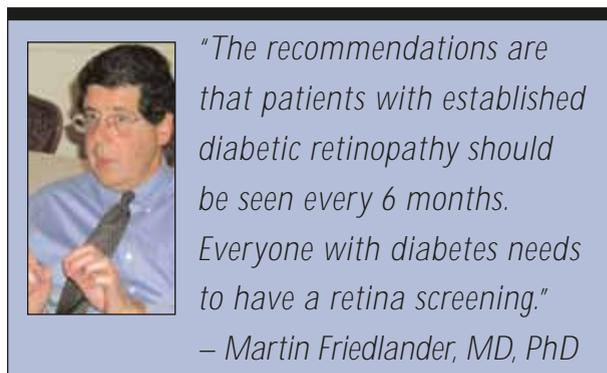
**MF:** Typically, and as they should be, patients are referred to an endocrinologist. Primary care is important because patients are not going to walk in and see me first. Having said that, some patients' first clinical change caused by diabetes may be alterations in their vision, and these patients may come to us without first seeing an endocrinologist. Some patients also have their diabetes managed by family practitioners and are directly referred to us.

**VERA BRIL, MD:** Should we be surveying patients with diabetes yearly?

**MF:** Yes. The recommendations are that patients with established diabetic retinopathy should be seen every 6 months. Everyone with diabetes needs to have a retina screening. Whether it is with an optometrist or

a primary care physician, someone has to do a dilated eye exam in those patients.

**MARK E. MOLITCH, MD:** I would not have the primary care physician screen the eye. I don't think an endocrinologist should be doing it, either. They need to have a dilated retinal exam.



**AV:** What about other areas? Dr. Molitch mentioned endocrinologists not being able to assess the eye. There was a report on endocrinologists and nonendocrinologists not being able to recognize neuropathy. They could not recognize it two-thirds of the time when it was mild and even one-third of the time when it was very severe. What are your thoughts?

**MM:** I think that primary care, internal medicine and endocrinology specialists do not know how to perform good foot exams. We have not properly educated them in foot care, and they still do not know what the monofilament is for. They use it, but they have no idea what it actually means. I think it is a failure on our part as their trainers.

**WARREN S. JOSEPH, DPM:** I agree that the average general and family practitioner is not properly trained on foot examination techniques. You mentioned that they do a 5.07-monofilament test and that is it. I would be happy with just that. I do not think we are seeing a lot of practitioners that do monofilament testing.

I went in for a physical 2 or 3 years ago at a family medicine practice. When they closed the door, there was a big sign on the back of the door that said: "If you have diabetes, please take off your shoes and socks." It is amazing how many diabetes patients I see that do not have their feet regularly examined when they go to their family physician. This is especially true within the issues

of managed care. Time is of the essence. Many doctors are concerned with checking blood glucose levels and screening for hypertension that they tend to check the feet last or not at all. I would be thrilled if we routinely had the patient take off their shoes and socks and look for any lesions and, if applicable, make a diagnosis of peripheral neuropathy. If peripheral neuropathy is present, patients should be referred to a specialist who can further diagnose and treat the problem.

I work in the VA system, and new diabetes patients must have a podiatry evaluation. We have to get physicians more in tune with the foot and more in tune with how to do a better lower extremity evaluation in patients with diabetes. But, it's baby steps. Let's get the shoes and socks off of diabetes patients first and let's get at least a gross overview of the foot to look for lesions and neuropathy.

**AV:** Dr. Molitch, what do you think about our failure as trainers? Can we educate people on proper care?

**MM:** At Northwestern University, I noticed that our residents do not look at the feet of a diabetes patient on

their first day rotating on the diabetes/endocrine service. This means that during their education, they have not learned to check the feet. In a diabetes patient the feet need to be looked at on an initial physical exam and at every visit. The patient needs to be educated about foot care, and the primary care physicians who are seeing a great majority of these patients certainly are not doing it as good as we are.

**WJ:** The nurse educators are doing a better job.

**BZ:** I think microvascular complication surveillance is critical. The problem in family practice is that physicians often do not have a flow chart for someone with diabetes. They need to use a structured approach with a microvascular surveillance system so as to do timely examinations. Thus, they will be able to keep track of when the last foot exam, microalbuminuria measurement, eye exam, as well as other screenings was performed.

**AV:** I like the idea of closing the door in a family practice office, and on the back of the door it says, "If you are diabetic take your shoes and socks off." That would be a

### NDEP AIMED AT REDUCING MORBIDITY, MORTALITY CAUSED BY DIABETES

A collaborative effort from the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC) is under way to reduce the morbidity and mortality from diabetes and its complications. As a result, the National Diabetes Education Program (NDEP) was formed to increase diabetes awareness across the professional and public sectors.

One of the tools available from NDEP is "Guiding Principles for Diabetes Care." These guidelines, available for download at [www.ndep.nih.gov](http://www.ndep.nih.gov), encompass seven evidence-based principles for health care providers to supply quality diabetes care to their patients.

The principles are:

**Principle 1:** Identify People with Prediabetes and Undiagnosed Diabetes

**Principle 2:** Provide Ongoing, Patient-centered Care

**Principle 3:** Offer Diabetes Education

**Principle 4:** Treat Diabetes Comprehensively

**Principle 5:** Monitor Blood Glucose Control Using the HbA1c Test

**Principle 6:** Prevent Long-term Diabetes Problems

**Principle 7:** Identify and Treat Long-term Diabetes Problems

By using the principles listed above, health care providers may perform essential components of quality diabetes care. With continued care aimed specifically at diabetes patients, health care providers can continue to treat, educate and empower their patients to lead healthier lives. *(For a detailed description of each principle, please see page 14).*

Source: National Diabetes Education Program. Guiding Principles for Diabetes Care: For Health Care Providers. 2004. Publication No. 99-4343.

good idea to have something simple like that for the eyes and kidneys as well. Dr. Tuttle, what do you think about diabetes care?

**KATHERINE R. TUTTLE, MD:** I work in a health care system with a large, rural encatchment area. We care for about 1.5 million people from Washington, Idaho, Montana and northeast Oregon. These issues are germane because most of these people are being taken care of by primary care physicians, either internal medicine or family medicine practitioners.

The University of Washington emphasizes training primary care physicians throughout the Northwest – through the Washington-Wyoming-Alaska-Montana-Idaho (WWAMI) training program. There are a number of barriers to care in a rural environment. One of the things that is useful to providers is knowing what they can do in their office. Many patients drive 5 hours to see me. They can't come every month or even every 3 months. So, some type of outreach effort is needed. There is a lot of rural health care in this country, and that would be a great target for an outreach program.

**BZ:** We have geographical barriers in Canada as well. To overcome this, a mobile eye unit visits small communities.

**MF:** We have similar community outreach/screening programs, but these only reach a small fraction of the patients who need such care. I think that you are talking about the need for a more formalized system.

**KT:** There should be a regional outreach program. There are over 500 physicians of various specialties treating patients in our area, but the diabetes burden is huge.

Nephrologists often lament that we see patients too late. By the time we see patients, they often need to start dialysis. If we saw them earlier, we could have done something. In terms of surveillance and initiating therapy, in most cases this should be done in primary care or in diabetology, depending on your setting. Nephrology consultation should be reserved for when there are questions about the diagnosis or if the patient isn't responding to therapy.

The National Kidney Foundation (NKF) established a chronic kidney disease (CKD) staging system – stages 1 thru 5 – through the Kidney Disease Outcomes Quality Initiative (K/DOQI). As patients progress into stage 3, then the nephrologist should play a bigger role. One of the things that Dr. Molitch and I discussed was that



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when patients progress to this stage, it doesn't mean that the diabetes team, the primary care team, retina specialists or neurologists exit the case at this point. The nephrologist is too often left standing alone with these patients. Once they are on dialysis or they have a kidney transplant, they are some of the most complicated diabetic patients. We nephrologists should do better at controlling glycemia, and remember retinal exams and to look at their feet. But, quite frankly, when the primary concern is maintaining a transplanted organ, it may be lower on the priority list. Not that it's unimportant, but you have to choose your battles. Therefore, a team approach is needed to help monitor other complications.

**BZ:** Diabetologists, internists and endocrinologists will continue to see the patient, but when they are undergoing end stage renal disease treatment, diabetes management seems to be defaulted to the nephrologist. We really need a multidisciplinary complications clinic.

**AV:** I would like to take it back to what Dr. Molitch was saying: We haven't educated physicians to do the primary evaluation. One of the things that happens when you talk about generalists, internalists and endocrinologists is that when the patient has progressed to renal insufficiency, they feel incompetent and unable to manage the situation. So, what are we doing then to increase or enhance the competence of the person who is taking care of the patient?



*"Patients often have their symptoms of neuropathy for a long while without knowing it because health care providers have never talked to them about neuropathy or treated them for it."*

*– Vera Bril, MD*

**KT:** One of the things that the NKF is doing is a large outreach effort to primary care physicians. They have as part of the K/DOQI process a program called the Kidney Learning System. There is a patient component where they are doing outreach in collaboration with the National Kidney Disease Education Program. In addition, there are opportunities, especially one-on-one opportunities to teach residents and students. We should teach them when to screen for nephropathy, how often to screen and what to do with the positive results.

**AV:** Can you talk about glomerular filtration rate (GFR) versus microalbuminuria? What should the primary care physician be doing?

**KT:** In diabetology, the screening mainly has been for albuminuria. In addition to screening for albuminuria and deciding whether it is micro- or macroalbuminuria, we are emphasizing the importance of estimating the level of kidney function by using the serum creatinine. An estimate of GFR (eGFR) is an indication of function. The preferred formula is the modified Modification of Diet in Renal Disease (MDRD) formula. The formula can be downloaded from [www.kidney.org](http://www.kidney.org). All you have to know is the age, sex, ethnicity (black or not black) and the serum creatinine level of the patient.

The point is to not only know whether the patient has albuminuria, but to stage them by level of eGFR. What you will find, especially in type 2 diabetic patients with either no or minimal albuminuria, is that many of them have substantial or advanced kidney disease defined by low eGFR. So, the albuminuria should not be the only screen.

**AV:** I think that is a very important message to start bringing out because most people just rely on the microalbumin excretion. The current guidelines for diabetes management only focus upon microalbuminuria, and the point you make is crucial since the rate of change of GFR determines progression to renal failure. We should be alert to this in terms of multifactorial intervention.

**BZ:** I want to emphasize a point, as I do not think that we are focusing on the key issue for a family physician. They need to do the microalbumin-to-creatinine ratio in order to put the patient on an angiotensin-converting enzyme (ACE) inhibitor and monitor blood pressure.

**KT:** People who have been appropriately treated with an ACE inhibitor or an angiotensin receptor antagonist may have low level albuminuria to the point that it may even be undetectable. However, their eGFR may be very low. There are other issues that need to be addressed, like the development of anemia or hyperparathyroidism, which may be missed if we have no idea what their level of kidney function is.

**AV:** Dr. Bril, let's now talk about neuropathy.

**VB:** Nobody will argue about screening for retinopathy or nephropathy. However, when it comes to neuropathy, a widely prevalent opinion is that it makes no difference. Why should we bother? That's why patients are not taking shoes and socks off in the physician's office. If physicians were convinced that there was something beyond what they are already doing for the patients, then the physicians would screen for neuropathy. Screening for neuropathy has always lagged behind that for retinopathy and nephropathy because of this viewpoint.

Primary care physicians look after most of the type 2 diabetes patients. Patients often have their symptoms of neuropathy for a long while without knowing it because health care providers have never talked to them about neuropathy or treated them for it. Yet, these patients do receive medications to lower blood sugars. My view is that physicians should start evaluating patients for neuropathy, and do proper foot care in the same way as they evaluate patients for retinopathy and nephropathy. Obviously screening for neuropathy becomes more important if there are disease-modifying medications available. Despite the availability or lack of

such disease-modifying medications, I still think it is important to screen patients for neuropathy.

In my view, it would be sufficient if the physicians performed a monofilament examination and examined the feet of their diabetes patients. I do not think that testing of reflexes is required since it is highly variable, difficult and intimidating for many physicians. It is not necessary to do a full neurological exam. The physician should simply do a proper monofilament test and screen the patients for neuropathy by this means.

**AV:** Dr. Tuttle was talking to us about eGFR, microalbuminuria and the association between them. Most of the monofilament recommendations detect fairly advanced neuropathy and the prediction of foot ulcerations. Do we want to be able to detect neuropathy earlier now that there is the possibility that we may be able to abrogate the progression of the disease?

**VB:** There is a level in monofilament testing beyond “insensate” or “sensate” that informs about impairment. Roughly, if a patient misses half of the applied stimuli during a monofilament test, they have neuropathy. That testing is simple to do. Any screening test must be simple in order to be used routinely. If several screening instruments are required, such as a tuning fork and a monofilament and a pin and a reflex hammer then the screening tests are much less likely to be done.

The failure to examine patients for neuropathy starts early in medical school when neurologists teach about the necessity for the full neurological examination. Many physi-

cians are afraid that they do not know how to do it. Neurologists have thought simple screening instruments to be inadequate and misleading. Now, podiatrists will use a monofilament, routinely, and that has led to an increased usage of the monofilament by family practitioners examining patients for insensate feet. With minor modifications in the testing paradigm, physicians use the monofilament to determine whether sensitivity to the monofilament is normal, reduced or absent, and therefore, they can detect neuropathy at an earlier stage.

**WJ:** We cannot argue the efficacy of the monofilament in determining protective sense and whether you should use vibrometers. To me, the beauty of the monofilament is that it is simple. Anyone can buy it, anyone can have it, and anyone can be taught to use monofilament examination. Above and beyond that, it forces the physician to look at the foot. At least they are down there. At least they are touching the toes with the monofilament. It is so variable, but at least it is a gross screen test and it gets the practitioner down at the foot level so that they can look at the foot for other lesions like ulcerations, acute tinea pedis or onychomycosis. These are things that are associated with diabetes that can lead to problems down the line.

**AV:** We teach patients to use monofilaments and tell them that there is magic in a monofilament. If they use them on a regular basis, they are less likely to develop foot ulcers. Of course what we are doing is changing behavior and encouraging patients to examine their feet on a daily basis. We and others have shown that this reduces the ulcer rate by 60% because minor lesions are caught early and attended to before the advent of serious complications.

**WJ:** Not all neuropathy is painful, but only the patient with painful neuropathy comes seeking attention. With insensate neuropathy, patients feel like their socks are on all the time. They feel a little numbness and they have some paresthesia. That is not usually enough to bring the patient with diabetes in to see a neurologist or podiatrist.

**BZ:** We need to reinforce what should be done for neuropathy. Foot care education is essential: Patients have to be educated about good foot care. Once a family doctor understands that there is a good reason to determine when a person has neuropathy, they will implement surveillance procedure more carefully.



*“To me, the beauty of the monofilament is that it is simple. Anyone can buy it, anyone can have it, and anyone can be taught to use monofilament examination. Above and beyond that, it forces the physician to look at the foot.”*

– Warren S. Joseph, DPM

**VB:** We need to be aware that testing for neuropathy is important in patients with diabetes. General practitioners should be aware that their patients have neuropathy, and although it is likely a diabetes-related neuropathy, there are other types of neuropathy found in patients with diabetes. I agree that proper foot care is of major importance, but it must be kept in mind that every neuropathy is not related to diabetes.



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*— Aaron I. Vinik, MD, PhD*

**WJ:** Look at the statistics of neuropathy. We need to get a simple message across: The vast majority of people with diabetes within a few years will have neuropathy. Neuropathy leads to ulceration. Ulceration, 50% of the time within the life of the diabetic ulceration, will have clinical signs of infection and will need an antibiotic therapy. There are 90,000 lower extremity amputations per year because of diabetes. Eighty-five percent of them have ulceration as a predisposing factor. The 5-year survival rate of a unilateral diabetic amputee is only about 50%. Patients go from neuropathy to ulcer to infection to amputation to death.

People may just brush off neuropathy and say, "I don't want to bother with it, and there is no single pill I can take to get rid of it." Patients have to be alerted of the fact that when they have neuropathy it can end up being fatal to the patient.

**AV:** There is another issue regarding neuropathy. The American Diabetes Association just conducted what they called an Omnibus survey of 8,119 people. Seventy percent of the people had symptoms compatible with neuropathy and most of the symptoms they asked about were pain and numbness, tingling, burning and

lack of pain. Even though 70% of the patients had symptoms, only 46% were actually aware that their symptoms might be related to diabetes. Only one in four people had been told by their physician that this could be neuropathy and this could be related to their diabetes. That is very alarming.

**MF:** We should be saying this to the patient, not the physician.

**AV:** That is the point that I'm getting at. We need to educate patients to recognize their symptoms. In my clinic all of my patients get monofilaments. We reduced our ulcer rate by 60%. It is a behavioral thing, and now patients are empowered to do it themselves. It is like the sign on the back of the door. When they get up in the morning they do the monofilament test.

**MF:** We do the same thing with ophthalmology. I can't examine a patient every day. If I see them once or twice a year, the odds are the disease will progress. You give them a really simple test. For example, if they read the newspaper, ask them to cover one eye at a time and read with the uncovered eye. They need to look for alterations in monocular vision: Are straight lines crooked? Are there areas of graying in their vision? Are letters distorted or jumbled? This should be done every day, just like brushing their teeth. It's a simple thing. If the patient notices a significant change from one day to the next, they need to see their ophthalmologist. By testing one eye at a time there is a much greater chance they will detect abnormalities earlier. Most people won't notice that there is a problem in one eye unless they test each eye individually. Most of us have a dominant eye and this one takes over if the other is impaired.

**VB:** I think the only additional comment I have is to reiterate the need for screening and early detection for neuropathy. When I see a diabetes patient who has had a kidney transplant or is on dialysis, I tend to defer to the nephrologists concerning the medications I suggest, the side effects they may have, and the potential drug-drug interactions. These patients are always advised to consult with their kidney doctors about whether they can take the drugs that I suggest for them.

**MM:** But, you did not pass the patient on, which is the key point. You made a recommendation. That is not passing anything on, that is collaboration.

**KT:** And it is important to do that, because I would be uncertain about what kind of drugs to give a patient for their feet. One of the things we talked about is simplicity. Primary care providers are expected to know a stack of guidelines. We should get this down to a very simple message because diabetes care guidelines, not to mention all sorts of other guidelines, are overwhelming. We have to keep that on the radar screen, not only when we think about diabetes care, but in interacting with primary care providers, keeping in mind everything else they do.

**MM:** Some guidelines are overlapping, for instance the diabetes guideline overlaps with the cardiology guideline. So, it may seem like there are 20 different guidelines, but in fact there are corresponding elements. It would be nice to bring it together and make it simpler.



*"Our recommendation has always been to check urine albumin and the microalbumin-to-creatinine ratio. In the last 10 years, the frequency with which physicians perform this test has dramatically increased."*

— Mark E. Molitch, MD

**AV:** Dr. Tuttle, in your opinion, what is the experience of the diabetes patient and what can they do to help combat complications?

**KT:** Actually, many patients become discouraged when they seem to lose control over their lives. I think by checking their feet as well as blood glucose, blood pressure and maybe their eyes and urine, they can take back some control. It encourages people, and they enjoy life more. They are also more likely to adhere to their complex regimens. We should tell our patients that there is hope.

In my field, we usually can't give the patient back the kidney function they have lost. So, the best that I can tell them is that they are stable. That is empowering, too. That is the message: There is hope. Stable is good.

**MF:** The earlier they come in, the fewer the complications and the greater the chance that they are not so far down

that line. If you stabilize patients earlier rather than later, that is much better.

**AV:** What would we be recommending for foot care, the eyes and for the kidneys? Foot care is really critical because when you make the diagnosis of neuropathy, it predicts foot ulcer and amputation. Foot care is the critical thing to prevent that. It may not stop neuropathy, but that is a whole other issue.

**MF:** I want to remind you, once again, that the only place in the body where you can look directly at the microvasculature dynamically is in the eye. So, it is incredibly important to empower patients and give them some simple tests they can do to tell us when things are going wrong. You must also have a good careful retina exam by a retina specialist because early microvasculopathy is typically an indicator of to what is going on with the rest of the body in a diabetic patient.

If patients ignore their early symptoms and suddenly experience vision loss or blurring, it may be too late for effective therapeutic intervention. You need to catch it very early. I see more patients that have vision loss in type 2 diabetes or clinically significant macular edema than I do from proliferative diabetic retinopathy. These patients often don't come in early enough for effective treatment.

One thing patients can do is test one eye at a time. It is simple, and it is a good sensitive test because if there are some microvascular abnormalities that involve the macula, it will show up as a little gray area. They should test their eyes each day to look for squiggly lines or gray areas in their vision. This is very simple. They have to look at something up close, like a newspaper. I tell my patients to put a newspaper on their refrigerator door or their bathroom mirror and every morning they look at it, one eye at a time.

**MM:** I think for early detection of kidney disease, it has been made pretty simple. Our recommendation has always been to check urine albumin and the microalbumin-to-creatinine ratio. In the last 10 years, the frequency with which physicians perform this test has dramatically increased. Traditionally, physicians have not done the creatinine because we haven't asked them to do it, but I think they would if we asked. Next year's ADA recommendations will probably emphasize that. I think the management is also very simple: Blood sugar control and blood pressure control are the critical items for nephropathy. Lipid control is another issue.

**MF:** For ocular complications, blood pressure and blood sugar are very important.

**WJ:** From the foot standpoint, as far as simple things that people can do in their specialties, we really covered what the primary care physician needs to do in terms of looking at the feet. Potentially, they should be doing a 5.07-Weinstein and checking for neuropathy, if for nothing else to at least get their eyes at the level of the foot.

I think educating the patient is important. Just as every patient should be checking their eyes by reading the newspaper, every patient is putting on socks or stockings in the morning, and they should be looking at their feet and checking them for any obvious signs of ulceration, and even some less obvious signs such as reddening and lumps and bumps wherever there is a deformity.

I often tell my colleagues that family practitioners should have patients take their shoes off, but we as podiatrists also have to check our patients with their shoes on. Patients with neuropathy tend to wear shoes that are too tight because they don't feel the shoe. So, look every day for signs of irritation from the shoe on the foot. Have the patient look into the shoe, and put their hand into the shoe.

**AV:** Patients with impaired cognitive function may not be aware of foreign objects in their shoes, and keys, pins, needles, rings, etc may inflict a lot of injury on the insensate foot.

**WJ:** Unfortunately, patients with type 2 diabetes as well as other patients with neuropathy tend to be obese and older and may not have flexibility. They may not be able to look at the bottom of their feet. Take a hand mirror and put it on the floor to look at the bottom and top of the feet.

Patients should do simple screenings every day to try and make sure they do not develop ulcerations that may go on to amputation and infection. We need to educate the primary care physician and the patient about getting a full foot exam if they see anything suspicious on the foot.

**KT:** As a nephrologist, I regularly look in people's eyes. Although I may not be qualified to address their retinal disease, the eye is a window into the circulation. Ophthalmoscopy is an excellent way to assess severity of hypertension, for example. I teach residents that the ophthalmoscope should be used to evaluate persons with diabetes and hypertension. We recognize that treatment of hypertension is one of the most important things we can

do for most of the vascular complications.

Of course, controlling blood glucose is critically important, but we should not have tunnel vision about glycemia or we will miss other important problems such as hypertension. It is critical to emphasize multiple risk factor management, and try to develop simple tools to monitor risk factors. It should not be too difficult with some reasonable structure.

**BZ:** Another thing we tried to do is to let patients have their own scorecard. In other words, the patient should have a card where they can record the date of the visit, the blood pressure results, the microalbumin-to-creatinine ratio and the HbA1c. They update this at every office visit.

**VB:** I would like to add something for neuropathy to the scorecard. Some of the patients do daily diaries with their blood sugars, and they could simply add symptoms such as numbness, tingling or pain, and score these daily. Then a record of their symptoms on a day-to-day basis would be available and helpful when they visit their physician.

**AV:** Patients should have a scorecard on their refrigerator so that every time they go to the refrigerator, they see the scorecard and are reminded to test their blood sugars. I like the idea of placing a newspaper on the refrigerator as well to test their vision on a daily basis.

**BZ:** There is evidence that having the current HbA1c at the patient-doctor visit improves glucose control.

**KT:** We almost always have their lab values ahead of time. For what I do, I am quite limited without their lab work. But, I certainly believe that there is value in home monitoring as well.

**AV:** The person we have sort of hurdled over is the family practitioner. Family practitioners have been made to feel very incompetent in diabetes. I lecture to the American Academy of Family Practitioners twice a year, and every time I get up there they want me to tell them how to recognize diabetes and give them one thing to do. We need to come up with some strategy to get the family practitioner to increase his comfort level for what he sees and to give him an easy answer in regards to diabetes detection and treatment.

**KT:** It is an accountability issue. If something is going to be checked, human nature is such that you pay more atten-

tion. Is there a way we can use accountability to encourage primary care providers rather than having them become overwhelmed with the tasks before them?

I think it goes back to training programs and educational efforts for providers who are out of training. We should start getting them trained now and continue that process one-on-one as consultants. Recently, I had an encouraging referral from a rural family physician. The patient already had been evaluated with an eGFR and a microalbuminuria test, was taking an ACE inhibitor, had excellent blood pressure control and good glycemic control, and was taking a statin and aspirin. My response was: "Congratulations, great job. I don't have any additional recommendations. Let me know if things change or kidney function deteriorates."

I think treating primary care providers as partners in the care of complicated diabetic patients is very important. I am in awe of all the problems they care for every day.

**MM:** There is a communication problem between the specialties. Obviously getting reports back from the ophthalmologist, nephrologist, neurologist and podiatrist, and to the primary care doctor is important. It is improving, but we need to be better at making sure that report is filed with the primary care physician.

**MF:** I don't think that we will be curing diabetes tomorrow or the next day, but there have been very significant therapeutic advances, and this is certainly true for ophthalmology in terms of treating microvascular complications. Hopefully, we won't be lasering patients in several years; we will be using a variety of drugs. Many are under going clinical trials now. There are also other areas on the horizon such as adult bone marrow-derived stem cells that can stabilize immature and diseased vessels such as those seen in diabetic retinopathy.

The problem in diabetic retinopathy is ischemia, or lack of adequate blood flow. Rather than destroy retinal tissue with lasers to decrease the amount of tissue demanding oxygen from too few and inadequate retinal blood vessels, we need to think about rebuilding functional blood vessels. It appears as though we can do this in mice today and, hopefully these advances in stem cell technology will be applicable to humans one day. We need to give our patients hope that there are tremendous strides being made in terms of research. This isn't going to happen tomorrow or next month, but there is a good reason to keep yourself stable and in good condition because once the eye is gone, I can't

replace that. If you have a few vessels that I can replace or treat with drugs, then we will make a big difference for patients as these newer treatment modalities become clinical reality.

**KT:** Maybe the key point here is, where there are clinical trials available, consider participating. One of the things we have found is that people involved in trials that they don't want to leave studies when they end because their care has been so adequate.

**AV:** We are becoming patient advocates to see what we can get the patient to do to empower them. One of them is they should be asking what trials they can participate in. I agree people in trials get better care. They are more aware of their numbers, what their target goals should be and of course strive to achieve those goals.

**KT:** Yes. A lot of people participate in trials because they want to give something back. It is a way that they can contribute by allowing us to learn from them.

**AV:** Thank you, Dr. Tuttle for that comment. I would like to thank everyone for participating. This roundtable has been a tremendous opportunity for us, as experts in our respective fields, to discuss how we can enhance patient care, produce favorable outcomes in our patients and also better understand our unique roles in the treatment of diabetes patients. The key points from our discussion are:

- It is important to remember that managing diabetes to prevent and treat microvascular complications is a partnership between the disciplines and the patient. Proper diabetes management requires improved communication between these disciplines.
- Introducing user-friendly screening tests to identify organ involvement (ie monofilaments to detect insensate feet, mirrors to examine the soles, reading a newspaper to check the eyes) into our practices will allow us to monitor progress of the complications as well as empower patients to take better care of themselves.
- It is our duty to encourage physician use of albumin excretion as well as creatinine for eGFR. This is the best means of determining progression of renal disease.
- If patient and physician education is enhanced at every level, and communication is improved between the disciplines, we will be better equipped to control diabetes complications.
- There is a need for multifactorial treatment to prevent progression of the diabetes complications. ■

## NDEP'S SEVEN PRINCIPLES OF QUALITY CARE

### Principle 1: Identify People with Prediabetes and Undiagnosed Diabetes

- Health care providers should screen their patients for diabetes and know who is at increased risk.
- Patients who have impaired fasting glucose (IFG) or impaired glucose tolerance (IGT) are at increased risk.
- IFG is fasting plasma glucose between 100 and 125 mg/dL after overnight fasting. IGT is defined as a 2-hr post 75 g glucose challenge between 140 and 199 mg/dL.
- Risk factors for prediabetes and diabetes:
  - Age, especially in patients  $\geq 45$  years.
  - Weight, or overweight patients with a body mass index  $\geq 25$  kg/m<sup>2</sup>.
  - Ethnicity, where African-Americans, American Indians, Asian Americans, Hispanics, Latino Americans and Pacific Islanders have an increased risk.
  - Family history, especially if a first-degree relative has diabetes.
  - History of gestational diabetes or birthing a baby  $> 9$  lbs.
  - Hypertension, with a blood pressure  $> 140/90$ .
  - Abnormal lipid levels, HDL  $< 40$  mg/dL for men and  $< 50$  mg/dL for women and triglycerides  $> 250$  mg/dL.

### Principle 2: Provide Ongoing, Patient-centered Care

- Diabetes patients should have health care that is patient-centered, which means a supportive environment free from barriers to health care. Health care providers should strive to give diabetes patients timely care.
- Patients should have access not only to primary health care providers, but also physician specialists that can help them detect and treat diabetes complications.
- Health care providers should address the special needs of high-risk groups.
- Avoid patient discrimination in all health care settings.

### Principle 3: Offer Diabetes Education

- Health care practitioners should make it their role to provide patients with accurate information about diabetes and its complications. The more patients are educated about the topic, the better equipped they are.
- Information includes physical, medical and emotional needs of diabetes patients.
- Diabetes education should be continuous. Start by explaining diabetes self-care and medication.
- Enlist the help of diabetes educators and dieticians to provide additional outlets for education.

### Principle 4: Treat Diabetes Comprehensively

- Remember the ABC's of diabetes: A1c ( $< 7\%$ ), blood pressure ( $< 130/80$ ) and cholesterol ( $< 100$  mg/dL).
- Appropriate levels should be individualized and obtained with an overall assessment of patient health.

- Address the need for physical activity on a daily basis and the importance of adopting a healthy diet.
- Create an individualized treatment plan for patients. This will include diet, exercise, oral antidiabetic agents and insulin.

### Principle 5: Monitor Blood Glucose using the HbA1c Test

- Regularly check glucose control by using the HbA1c test, which indicates the average blood glucose from the previous 8 to 12 weeks.
- Encourage patients to check their own blood glucose by using blood glucose meters and test strips on a regular basis. This will increase diabetes control.
- Do not use high blood glucose as a guide for judging glucose control. This is an inaccurate measure of glucose control.

### Principle 6: Prevent Long-term Diabetes Problems

- Health care providers should guide patient care by asking patients to eat healthy, control portions, exercise, take medications, perform foot care, visit health care providers and stop smoking.
- All patients should take appropriate measures to control hypertension and cholesterol.
- If a patient has prediabetes, they should be encouraged to lose weight.
- For diabetes patients, health care providers should encourage blood glucose control.

### Principle 7: Identify and Treat Long-term Diabetes Problems

- The complications associated with diabetes may be preventable if they are treated early on. Health care providers should treat the complications as soon as they are detected.
- Use this guide as a long-term diabetes treatment guide:
  - At each visit, check:
    - Blood pressure
    - Weight
    - Feet
  - Once a year, check:
    - Lipids
    - Dilated eye examination
    - Nerve damage, by means of a physical examination
    - Feet for signs of loss of sensation and changes in shape
    - Serum creatinine and urinalysis
    - Microalbumin, microalbumin-to-creatinine ratio
  - Twice each year, check:
    - HbA1c
    - Teeth
- Make sure diabetes patients have the following vaccinations:
  - Influenza
  - Pneumococcal

Source: National Diabetes Education Program. Guiding Principles for Diabetes Care: For Health Care Providers. 2004. Publication No. 99-4343.



