

# DISEASE STATE MANAGEMENT™

*Managing Chronic Illness Across the Continuum*

## INSIDE

■ **Cover story:**

Reality is short of the national asthma care guidelines

■ **Asthma:**

NHLBI guidelines for diagnosis, management . . . 135

■ **Ipratropium:**

Old drug, new use . . . . . 136

■ **Diabetes:**

Link between cholesterol control, coronary risk . . . 137

Untreated wounds lead to amputations . . . . . 138

Inspection for foot ulcer control . . . . . 141

Dos and donts of foot care . . . . . 142

Inside: *DSM 1998 Index*

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## Everyone's dropping the ball on asthma management

*Fingers pointed at managed care, physicians, and patients*

“**S**hocking!” “Disturbing!” Sounds like the hype from the supermarket tabloid headlines? Actually, it's the reaction from doctors and patient educators left breathless by two recent asthma surveys that show patients don't know much about their disease, they are not managing their asthma well, and their doctors are doing a dismal job of helping them.

The two surveys are *Asthma in America*, commissioned by Glaxo Pharmaceuticals which included 2,509 asthma patients, 512 doctors and 1,000 members of the general public; and the *Asthma Survey* by the American Lung Association, which surveyed 781 asthma patients aged 16 and older, and 536 parents of children with asthma.

The bottom line of each: asthma is not being controlled as well as it should be.

And experts are mostly pointing their fingers at harried primary care physicians driven by the juggernaut of managed care with little or no time to educate their patients.

Standards of care for asthma fall far short of the guidelines established by the National Heart, Lung and Blood Institute (NHLBI) in Bethesda, MD, according to the *Asthma in America* survey.

## KEY POINTS

- Two major surveys show that asthma patients don't know much about their disease, are not managing their illness well, and doctors are doing a poor job of helping them
- Experts press for more education for everyone: physicians, nurses, pharmacists, and other health care practitioners — and particularly for patients.
- There is a call for patients to take more responsibility for managing their disease, and for doctors to make patients part of their own disease management team.

- The national goal: Patients should maintain normal activity levels. The survey: 48% say asthma limits their ability to take part in sports and recreation; 36% say it limits their normal physical exertion; and 25% say it interferes with their social activities.

- The national goal: Asthma symptoms should not disrupt sleep. The survey: Almost one in three asthma patients (30%) is awakened with breathing problems at least once a week.

- The national goal: no missed school or work because of asthma. The survey: 49% of children and 25% of adults with asthma missed school or work due to the disease in the past year.

More surprisingly, the *Asthma in America* survey showed that only 9% of all patients could name asthma's underlying cause (inflammation).

### Out of control

The ALA survey shows disease management is out of control; and while 15 million Americans have asthma, 84% of patients and 78% of parents say it has had a negative impact on their lives.

While asthma is a major public health concern, both surveys show patients feel helpless in the face of the disease.

"Physicians are not performing any of the four components of the guidelines at anything like the level they should be," says **Harold Nelson**, senior staff physician in the Department of Medicine at the National Jewish Medical and Research Center in Denver.

He elaborates: "I think physicians are deficient in terms of using objective measurements (spirometry). I think physicians are under-performing in exploring the factors that make asthma worse. I think they are derelict in education, providing peak flow meters and instructing people how to use them. And finally, I think physicians are derelict in prescribing inhaled steroids where they are appropriate."

While Nelson's colleagues may be less harsh, they are united in the solution: education. This

means more education for doctors, nurses, pharmacists and other health care practitioners, but primarily for patients.

### Take more responsibility

In addition, some experts call on patients to take more responsibility for managing their disease and for doctors to make patients part of their own disease management team.

"People are not taking it as seriously as they should, and they don't need to lower their expectations in terms of standards of living," says **Robert Mellins**, MD, professor of pediatrics at Columbia-Presbyterian Medical Center in New York City.

"I think the answer is reasonably clear that most people with asthma should be able to live normal lives," Mellins says. "Before one settles for less, one needs to be sure one is making use of all the information that is currently available."

He points out that while "it could be the fault of the health care professional, but people often don't seek help until too late. The mindset of the public has to be changed."

Many experts note that patients are inclined to focus on the "quick fix" to relieve acute attacks and stop the long-term anti-inflammatory therapy as soon as they feel better, creating a downward spiralling disease cycle.

The NHLBI "applauds" the *Asthma in America* study for its "extensive" contribution to what has already been known about asthma. "This information confirms we certainly still have a lot of work to do," says **Rob Fullwood**, MSPH, coordinator of the National Asthma Education and Prevention Program at the NHLBI.

"This survey has just raised the national agenda, and the needs for different organizations to come together to get our physicians and health care professionals all to really embrace those recommendations more fully," Fullwood says.

The NHLBI has streamlined guidelines for primary care physicians, who treat the vast

## COMING IN FUTURE MONTHS

■ Trends in chronic pain management

■ Using telemedicine in diabetes treatment

■ CHF program cuts readmissions by 83%

■ Parents explore alternative therapies for pediatric asthma patients

■ Strategies for achieving buy-in for diabetes guidelines

# Guidelines for asthma diagnosis, management:

## **D** diagnose asthma and initiate partnership with the patient:

- **Diagnose asthma by establishing:**
  - a history of recurrent symptoms;
  - reversible airflow obstruction using spirometry;
  - the exclusion of alternative diagnoses.
- **Establish a patient-clinician partnership:**
  - Address patient's concerns.
  - Agree upon the goals of asthma therapy.
  - Agree upon a written action plan for patient self-management.
- **Reduce inflammation, symptoms, and exacerbations:**
  - Prescribe anti-inflammatory medications to patients with mild, moderate and severe persistent asthma (i.e. inhaled steroids, cromolyn or nedocromil).
  - Reduce exposures to precipitants to asthma symptoms.
  - Assess patient's exposure and sensitivity to individual precipitants (e.g. allergens, irritants).
  - Provide written and verbal instructions on how to avoid or reduce factors that make the patient's asthma worse.
- **Monitor and manage asthma over time:**
  - Train all patients to monitor their asthma.
  - All patients should monitor symptoms.
  - Patients with moderate-to-severe persistent asthma should also monitor their peak flow.
- **See patients at least every 1-6 months:**
  - Assess attainment of goals of asthma therapy and patient concerns.
  - Adjust treatment, if needed.
  - Review the action plan with the patient.
  - Check patient's inhaler and peak flow technique.

- **Treat asthma episodes promptly:**
  - Prompt use of short-acting inhaled beta2-agonists; and, if episode is moderate to severe, a 3- to 10-day course of oral steroids.
  - Prompt communication and follow-up with clinician.

## **Patient education after diagnosis:**

**Identify** the concerns the patient has about being diagnosed with asthma by asking: "What worries you most about having asthma? What concerns do you have about your asthma?"

**Address** the patient's concerns and make at least these key points:

- **Asthma can be managed and the patient can live a normal life.**
- **Asthma can be controlled when the patient works together with the medical staff.** The patient plays a big role in monitoring asthma, taking medications and avoiding things that cause asthma episodes.
- **Asthma is a chronic lung disease characterized by inflammation of the airways.** There may be periods when there are no symptoms, but the airways are swollen and sensitive to some degree all of the time. Long-term anti-inflammatory medications are important to control airway inflammation.
- **Many things in the home, school, work or elsewhere can cause asthma attacks (e.g. second-hand tobacco smoke, allergens, irritants).** An asthma attack (also called episode, flare-up or exacerbation) occurs when the airways narrow, making it harder to breathe.
- **Asthma requires long-term care and monitoring.** Asthma cannot be cured, but it can be controlled. Asthma can get better or worse over time and requires treatment changes.

Patient education should begin at the time of diagnosis and continue at every visit. ■

— *Source:* National Heart Lung and Blood Institute, Bethesda, MD.

majority of asthma patients in the United States, to make adherence easier since the full document weighs five pounds, Fullwood says.

NHLBI has also begun what Fullwood calls a "very aggressive program" on the local level that includes physicians visiting primary care physicians to train them in their own offices.

Others advocate direct patient education. Nelson says, "I think maybe it is time to go to the patient, tell the patient that this is what they ought to get if they have asthma, and if they don't get it from their primary care providers, they should have access to a specialist."

The NHLBI is even taking a more adversarial

stance in terms of patients' rights.

"The dissemination is over with," Fullwood says. "We're finished sending out the guidelines. We're going straight to the community. The guidelines really mean something and we want them to take it seriously."

It is time to prepare patients to ask the right questions and to press doctors to respond in language they can understand, Fullwood says. "They have a right to do that."

**Bob Milo**, MD, incoming president of the American College of Allergy, Asthma and Immunology, practicing in Lynchburg, VA, takes a somewhat conciliatory approach to primary care physicians, especially those burdened with the "rat race" created by managed care.

Milo and Nelson, as specialists in daily practice, say they spend a minimum of one hour with a newly diagnosed patient; but they recognize that primary care physicians may find their jobs in jeopardy if they spend that much time with a single patient.

While some managed care companies, especially the larger closed ones like Kaiser, are recognizing the value of early and full treatment to avoid costly emergency care and hospitalization, Fullwood says. "Many don't realize yet you have to spend a little money to save a lot."

The national specialty societies must come up with a way to help primary care doctors, Milo contends. "We need to have care teams and help our colleagues in primary care who are catching the brunt of this."

Educational videos and literature coupled with quality time with the physicians can help, but Milo's organization is also exploring the possibility of certifying asthma educators to help patients learn to help themselves. ■

## New use for ipratropium: Pediatric emergencies

*Long used to treat adult COPD*

An old drug is getting new attention for the treatment of acute asthmatic episodes in children. The addition of ipratropium to standard drug treatments reduced the overall incidence of hospital admissions in children treated in the emergency room by nearly 9%, and the hospitalization of children having severe attacks

by 15.1%, according to findings by researchers at the Children's Hospital of the King's Daughters at Eastern Virginia Medical School in Norfolk, VA.

In the first pediatric outcome study using a randomized double-blind placebo-controlled group of 434 children ages 2 to 18; researchers found those who received 2.5 ml of ipratropium bromide added to the second and third doses of a nebulized solution of albuterol (2.5 or 5 mg per dose, depending on body weight) were less likely to be hospitalized than those in the control group who received 2.5 ml of normal saline instead of the ipratropium.

All patients also received a corticosteroid (2 mg of prednisone or prednisolone per kilogram of body weight) given orally with the second dose of albuterol.

Overall, doctors found in the ipratropium group that 27.4% of the children were hospitalized, compared to 36.5% in the control group.

For those with moderate asthma (defined as peak expiratory rate of 50% to 70% of the predicted value or a score of 8 to 11 on a 15-point scale), hospitalization rates were similar between the ipratropium group and the control group at 10.1% and 10.7%, respectively.

However, the results were dramatic in the group of children with severe asthma (defined as peak expiratory flow rate of less than 50%, or an asthma score of 12 to 15 on a 15-point scale). Only 37.5% of the ipratropium group required hospitalization compared to 52.6% in the control group.

### *One more tool for severe asthma*

The use of ipratropium is not a panacea, says **Arno Zaritsky**, MD, chairman of the Department of Pediatrics at the Children's Hospital of the King's Daughters and co-author of the study published in the *New England Journal of Medicine* in October. "It's just one more thing that we now know to be useful in kids with severe asthma to help get them turned around."

Zaritsky thinks ipratropium might be particularly helpful because patients on home albuterol sometimes find the drug may in time lose its effectiveness. "It's giving you another way of treating that constriction the airways when you've lost some of the responsiveness to the albuterol because you've been using it frequently at home."

And it is cost-efficient, since a dose is

approximately \$3.

It is sold under the brand name Atrovent, but is available in generic form.

Ipratropium has long been available in a metered dose inhaler for adults with chronic obstructive pulmonary disease, but the King's Daughters study is the first in children. Zaritsky speculates the drug may be even more effective in severe attacks in adults.

Zaritsky says the drug helps relax the airways by working on the parasympathetic nervous system.

Unlike atropine, which has been used in similar situations for decades, Zaritsky says, "Ipratropium was developed because it acts only on the airways; it is not absorbed. We looked very carefully for side effects, and for all intents and purposes, side effects are minor at best."

Some patients reported the drug caused dry mouth, so if it is used on a long-term basis, ipratropium could cause drying of the mucous membranes, Zaritsky says.

"It is not really clear that it is going to be helpful to use on a long-term basis," Zaritsky adds. "The data is just not out there." ■

## Add cholesterol control to your diabetes playbook

*New studies show reduced coronary risks*

**A**ggression has become the watchword in addressing complications of diabetes. Study after study show that diabetic patients respond favorably to the intensive management of the disease.

Until recently, there has been little or no data available on the effects of lowering cholesterol in diabetics because patients with diabetes generally have been excluded from clinical trials.

Now, a researcher at the University of Miami is preparing to publish his analysis of data from two major lipid studies — the *4S (Scandinavian Simvastatin Survival Study)* and the more recent *CARE (Cholesterol and Recurrent Events Trial)* — revealing that aggressive therapy significantly reduces future coronary events and mortality among diabetics.

**Ronald Goldberg, MD**, chief of the division of diabetes and metabolism and professor of medicine at the University of Miami presented

some of his research results at the American Diabetes Association conference in June, and is preparing to publish his findings in the journal *Circulation*.

The five-year double-blind *CARE* study included 4,000-plus subjects; 518 of them Type 2 diabetics, all of whom had average cholesterol levels of under 240 mg/dL. All were treated with pravastatin (Pravachol, Bristol-Myers Squibb, Princeton, NJ).

The results showed:

- A 25% reduction in cholesterol in the diabetic subgroup as well as in the entire cohort.
- A 28% reduction in cardiovascular events in the diabetic group, a 27% reduction in the cohort as a whole.
- Even in patients with more or less average cholesterol levels, cholesterol lowering therapies substantially reduced coronary events.

In the *4S* study, diabetic subjects reaped even greater benefits than non-diabetics. The study included 4,000-plus members; 200 of them diabetics (mostly Type 2). All members had previous coronary events ranging from angina to myocardial infarctions, as well as cholesterol levels ranging from 200 to 300 mg/dL. The entire group was treated with simvastatin (Zocor, Merck, West Point, PA) and given dietary counseling.

The results:

- The entire group under simvastatin treatment showed a mean reduction in total cholesterol of 25% and lowered LDLs by 35%. The diabetic group showed a similar reduction.
- Diabetic patients had a 45% reduction in coronary events.
- The treatment group experienced a 34%

### KEY POINTS

- Two major lipid studies show that aggressive cholesterol therapy significantly reduces future coronary events and mortality among diabetics.
- Results may lead to a re-thinking of guidelines for cholesterol levels in all diabetics, regardless of their coronary health status.
- Diabetics with even one coronary risk factor should be treated as if they have heart disease and a target LDL of 100.

reduction in major coronary events and a 42% reduction in mortality.

“This was considered very significant and therefore at least as good, if not better than what was seen in the population as a whole,” Goldberg says.

In addition, Goldberg points out, taking into account the two- to fourfold increase in the coronary heart disease risk factor for diabetics, the results weigh even more heavily in favor of aggressive cholesterol lowering treatment.

### **Rethinking cholesterol guidelines**

**James R. Gavin, MD, PhD**, senior scientific officer at the Howard Hughes Medical Institute in Chevy Chase, MD, and until recently, a chairman of the ADA’s expert committee on classification and diagnosis, calls Goldberg’s results “impressive.”

“What that confirms is that it is extremely important (to) be very aggressive in achieving the therapeutic goals of cholesterol lowering in people with diabetes, even those who have already had coronary events.”

The result is a re-thinking of guidelines for cholesterol levels in all diabetics, regardless of their coronary health status.

The ADA and the American Heart Association have set a goal of 130 mg/dL for all diabetics without heart disease. “But for those who have just one risk factor, which so many diabetics have — high blood pressure or smoking, or kidney problems, or high triglycerides or low HDL, the good cholesterol, just one risk factor — we should presume they have heart disease and aim for an LDL of 100,” Goldberg says.

While this is more aggressive than for a non-diabetic without heart disease, Goldberg insists his study supports the measures in terms of palpable declines across the entire spectrum of coronary events.

Gavin wholeheartedly agrees.

“I think that (aggressive treatment) is not unreasonable because people with diabetes are at such high risk, particularly women,” Gavin says. “I think the good news is that, in spite of that risk, you can in fact mitigate it. You can, in fact, achieve significant lowering of event rates in people with diabetes who are already at high risk by being aggressive with cholesterol-lowering therapy.”

How long it will take such thinking to filter down into common medical practice is anybody’s guess, Gavin says.

By the demonstration of the benefits of aggressive treatment, Gavin says, “It is hoped . . . you would in some ways change their attitude . . . and change practice. That hasn’t always happened, but at least it’s Step One.”

He continues, “We know that people benefit from cholesterol lowering therapy. For those who have had their levels determined and are known to be at risk, only about 20% are (actually) receiving treatment.”

Gavin says the kind of data now available through Goldberg’s study, and an emerging variety of meta-analysis from the DCCT. “This kind of insight will have significant effect on treatment behavior.”

Gavin says he also hopes managed care “will understand the benefit of these kinds of interventions and exert some influence.” ■

## **Diabetic foot ulcers pose challenge for caregivers**

### *Many untreated wounds lead to amputation*

**F**oot ulceration is the main reason for hospital admissions among patients with diabetes mellitus in the United States and Europe. One source says 6% of people with diabetes are hospitalized annually in the United States for foot ulcers.<sup>1</sup>

And, says **David Armstrong, DPM**, assistant professor, Department of Orthopedics at the University of Texas Health Science Center in San

*(continued on page 140)*

#### **KEY POINTS**

- Despite the prevalence of diabetes, many misconceptions about the risk factors, assessment and treatment of diabetic foot ulcers remain.
- Patients with neuropathy, deformity and a history of previous ulcers or amputation are nearly 36 times more likely to have an ulcer develop than are patients with diabetes without these risk factors.
- Risk factors for non-healing ulcers and amputation are slightly different, but lie on the same continuum.

### Category 0: No Pathology

- Patient diagnosed with Diabetes Mellitus
- Protective sensation intact
- Ankle Brachial Index (ABI) >0.80 and toe systolic pressure >45 mmHg
- Foot deformity may be present
- No history of ulceration

#### POSSIBLE TREATMENT FOR CATEGORY 0

- Two to three visits a year to assess neurovascular status, dermal thermometry, and foci of stress
- Possible shoe accommodations
- Patient education

### Category 2: Neuropathy with Deformity

- Protective sensation intact
- Ankle Brachial Index (ABI) >0.80 and toe systolic pressure >45 mmHg
- No history of neuropathic ulceration
- No history of Charcot's joint
- Foot deformity present (focus of stress)

#### POSSIBLE TREATMENT FOR CATEGORY 2

Same as category 1 plus:

- Pedorthic/orthotist consultation for possible custom molded/extra depth shoe accommodation
- Possible prophylactic surgery to alleviate focus of stress (eg. correction of hammertoe or bunion deformity)

### Category 4A: Neuropathic Wound

- Protective sensation absent
- Ankle Brachial Index (ABI) >0.80 and toe systolic pressure >45 mmHg
- Foot deformity normally present
- Non-infected neuropathic ulceration (**ALL UT STAGE A wounds**)
- No acute diabetic neuropathic osteoarthropathy (Charcot's Joint) present

#### POSSIBLE TREATMENT FOR CATEGORY 4A

Same as category 3 plus:

- Pressure reduction program instituted
- Wound care program instituted

### Category 5: The Infected Diabetic Foot

- Protective sensation may or may not be present
- Infected wound
- (Charcot's Joint) may be present
- **ALL UT STAGE "B" wounds**

#### POSSIBLE TREATMENT FOR CATEGORY 5

- Debridement of infected, necrotic tissue and/or bone, as indicated
- Possible hospitalization, antibiotic treatment regimen
- Medical management

### Category 1: Neuropathy, No Deformity

- Protective sensation absent
- Ankle Brachial Index (ABI) >0.80 and toe systolic pressure >45 mmHg
- No history of ulceration
- No history of diabetic neuropathic osteoarthropathy (Charcot's Joint)
- No foot deformity

#### POSSIBLE TREATMENT FOR CATEGORY 1

Same as category 0 plus

- Possible shoe gear accommodation (pedorthic/orthotist consultation)
- Quarterly visits to assess shoe gear and monitor for signs of irritation

### Category 3: History of Pathology

- Protective sensation absent
- Ankle Brachial Index (ABI) >0.80 and toe systolic pressure >45 mmHg
- History of neuropathic ulceration
- History of Charcot's joint
- Foot deformity present (focus of stress)

#### POSSIBLE TREATMENT FOR CATEGORY 3

Same as category 2 plus:

- Pedorthic/orthotist consultation for possible custom molded/extra depth shoe accommodation
- Possible prophylactic surgery to alleviate focus of stress (eg. correction of bunion or hammertoe)
- More frequent visits may be indicated for monitoring

### Category 4B: Acute Charcot's Joint

- Protective sensation absent
- Ankle Brachial Index (ABI) >0.80 and toe systolic pressure >45 mmHg
- Non-infected neuropathic ulceration may be present
- Diabetic neuropathic osteoarthropathy (Charcot's Joint) present

#### POSSIBLE TREATMENT FOR CATEGORY 4B

- Pressure reduction program instituted
- Thermometric and radiographic monitoring
- If ulcer is present, treatment same as for category 4A

### Category 6: The Ischemic Limb

- Protective sensation may or may not be present
- Ankle Brachial Index (ABI) >0.80 or toe systolic pressure >45 mmHg or Pedal Transcutaneous Oxygen Tension <40 mmHg.
- Ulceration may be present
- **ALL UT STAGE "C" and "D" wounds**

#### POSSIBLE TREATMENT FOR CATEGORY 6

- Vascular consult, possible revascularization
- If infection present, treatment same as for category 5. Vascular consultation concomitant with control of sepsis.

Source: University of Texas Health Science Center, San Antonio.

Antonio, 25% of all hospital admissions of diabetics in the United States and Britain are the result of infected foot ulcers. Diabetic foot ulcers, if not promptly identified and addressed, are precursors to amputation.

The potential for widespread trouble becomes obvious when there is an estimated 16 million people with diabetes in the United States alone, many of whom aren't doing a good job of monitoring and controlling proper blood glucose levels.

According to research conducted by **Michael Rudolph**, PharmD, executive director of community practice at the University of Southern California in Los Angeles, one third of diabetic patients don't even monitor their blood glucose levels.

Despite the prevalence of the disease, many misconceptions about the risk factors, assessment and treatment of diabetic foot ulcers remain commonplace, according to specialists such as **Jeffrey Jensen**, DPM, clinic director of the Diabetic Foot and Wound Center in Denver. One such falsehood, he says, is the notion that patients with diabetes often have small-vessel disease in their lower extremities that prevents wounds from healing.

"There's no such thing as small-vessel disease, yet some people still believe it is a factor in the healing of diabetic foot ulcers," Jensen says. In general, he adds, there is a dearth of solid clinical knowledge of how to deal with diabetic foot ulcers.

### **Medical and local factors**

Risk factors for getting diabetic foot ulcers can be divided into the categories of medical factors and local factors, says Armstrong. Medical factors include:

- the length of time a patient has had diabetes;
- glucose control;
- gender.

Men are at greater risk than women for foot ulcers primarily because they are less compliant with medical instructions and self-care, such as blood glucose monitoring and control. In addition, men participate less frequently in "wellness" visits.

Local factors include peripheral neuropathy and neuropathy accompanied by structural deformity. Neuropathy is clearly considered the most important risk factor linking diabetes to foot ulcers. Neuropathy simply can be defined as a "loss of protective sensation." The inability of many diabetic patients to feel pain in the lower

extremities means they may not be aware of skin breakdown and incipient wound formation.

"We must teach patients and health care providers to be aware and respond to the absence of pain," says Armstrong.

Researchers have found that the insensate foot is one of three independent predictors of foot ulceration. The others are absence of the Achilles tendon reflex, and a transcutaneous oxygen tension of less than 30 mm Hg,<sup>2</sup> that is the strongest quantifiable predictor of all.

The *Diabetes Control and Complications Trial* found that 39% of the patients had clinical manifestations of diabetic neuropathy at the time they entered the study,<sup>3</sup> says **Marvin Levin**, MD, professor of clinical medicine and the director of the Endocrinology, Diabetes and Metabolism Clinic at Washington University School of Medicine in St. Louis.

In another study cited by Levin, peripheral neuropathy was present in 60% of all patients with diabetic foot ulcers. Yet, neuropathy does not preclude the simultaneous presence of painful symptoms, adds Levin. "I have found that the development of pain in a previously painless ulcer may indicate worsening infection and penetration into the deeper tissues of the foot, even though the ulcer appears unchanged," he writes.<sup>3</sup>

The most common sites of ulceration due to neuropathy are over the metatarsal heads and on the plantar surface of the great toe, says Levin. When the ulcer appears on the side of the foot, the most likely causes are ill-fitting shoes and ischemic-pressure necrosis.<sup>3</sup>

### **Deformity increases risk**

Add deformity to the equation and the risk grows even greater. Armstrong says that foot deformities result in areas of abnormal pedal pressure. These regions of focused stress are at increased risk for ulceration in the insensate foot.<sup>4</sup> Deformities can include claw toes, hammer toes, cocked-up toes, and Charcot foot.

Another local factor is prior ulceration or amputation. "That person clearly has all of the ingredients to produce another [foot ulcer]," says Armstrong. He notes that patients with neuropathy, deformity, and a history of previous ulcers or amputation are nearly 36 times more likely to have an ulcer develop than patients with diabetes without these risk factors.

Even amputation of a single toe can lead to subsequent deformities in adjoining toes and

development of wounds, according to researchers.

### Different risk factors

Risk factors for non-healing ulcers and amputation are slightly different but lie on the same continuum, according to Armstrong. A neuropathic ulcer is an important risk factor for amputation, as is infection, ischemia, and peripheral vascular disease. The latter is the only risk factor that can lead to amputation itself, explains Armstrong. A foot ulcer can lead to amputation only if it becomes infected.

The *University of Texas Diabetic Foot Classification System*, formulated by Armstrong and his colleagues, summarizes the risk factors for diabetic foot ulcer development and for amputation. (See chart, p. 139.) Categories 0 through 4 deal with risk factors for ulcers; categories 5-8 cover risk factors for amputation.

### References

1. Relber GE, Boyko J, Smith DG. Lower extremity foot ulcers and amputation in individuals with diabetes. In: Harris MI, Cowle CC, Stern MP, et al, editors. *Diabetes in America*. 2nd ed. Washington, DC: US Govt Printing Office, DHHS publ. No 95-1468;1995.
2. McNeely MJ, Boyko EJ, Ahroni JH, et al. The independent contributions of diabetic neuropathy and vasculopathy in foot ulceration: How great are the risks? *Diab Care*. 1995;18:216-219.

3. Levin, M. Prevention and treatment of diabetic foot wounds. *JWOCN*. 1998;3:129-143.

4. Armstrong DG, Lavery LA, Wunderlich RP. Risk factors for diabetic foot ulceration: A logical approach to treatment. *JWOCN*. 1998;25:123-128. ■

## Close inspection needed for foot ulcer control

*Most diabetic patients get too-quick exams*

Determining which diabetic patients are at higher risk for foot ulcers is often a simple matter of inspection and a few direct questions that can be asked by a primary care provider. Often, however, the examination of the foot is cursory and insufficient, experts say.

Inspection does not mean just a quick glance at the feet and palpation of pedal pulses, says David Armstrong, DPM, assistant professor, department of orthopedics at the University of Texas Health Science Center in San Antonio. Instead, the clinician should look closely at all areas of the foot and pay particular attention to the plantar aspect, the posterior heel, and the interdigital spaces. Armstrong laments that many diabetic patients in an outpatient setting are treated similarly to non-diabetics with respect to foot examinations. He adds that only

## Diabetic Wound Classification System

Grade

	0	1	2	3
A	Pre or postulcerative lesion completely epithelialized	Superficial wound, not involving tendon, capsule, or bone	Wound penetrating to tendon or capsule	Wound penetrating to bone or joint
B	with infection	with infection	with infection	with infection
C	with ischemia	with ischemia	with ischemia	with ischemia
D	with infection and ischemia	with infection and ischemia	with infection and ischemia	with infection and ischemia

Source: University of Texas Health Science Center, San Antonio.

# Foot Care Do's and Don'ts

## Don'ts:

- Don't smoke.
- Don't apply external heat.
- Don't expose your feet to cold.
- Don't wear tight garters or socks with elastic tops.
- Don't wear shoes that bind, rub or are new and stiff.
- Don't expose your feet to cuts, scratches or bruises.
- Don't use chemical compounds for corns or calluses.
- Don't cut or trim corns or calluses.
- Don't continue to walk about when sores (cracks, blisters, ulcers) appear on feet.
- Don't apply tape to your skin.

## Dos:

- Wash your feet daily with non-irritating soap. Dry your feet well, especially in between toes.
- Apply a moisturizing cream to feet/legs twice daily.
- Cut toenails straight across, being careful not to nip the skin. (Do not dig into the corners to get out an ingrown nail.)
- Report for treatment to your podiatrist if athlete's foot appears.
- Get off your feet immediately if any lesions appear.
- Call your podiatrist immediately.
- Wear warm woolen socks if your feet are cold.
- Avoid tobacco in any form.
- Walk slowly. You will get there sooner and with less pain.

Source: Primary Foot Care Center, North Miami Beach, FL.

## Patients are also given the following instructions:

- Closely monitor and control glucose levels via intravenous insulin or oral agents and weight control.
- Inspect feet daily, especially between toes. Heels and legs should also be checked.
- Never perform any type of "bathroom" surgery on feet or legs, such as removing a callus or corn.
- Seek medical attention immediately if you find any areas of concern, such as redness, swelling, unusual smells, cracks or a rash. Do not self-treat.
- Wear good supportive shoes at all times and never walk barefoot; it dries the skin and exposes you to parasites, fungus, infections and foreign bodies.
- Wear light cotton socks unless it's too cold, and never wear shoes without socks
- When washing your feet, don't use hot water.
- Avoid hot water bottles or heating pads on your feet or legs. You may burn yourself and not feel the pain.
- Don't soak your feet except under the direction of a doctor.
- Visit your primary care physician and podiatrist regularly.
- Inspect shoes for foreign objects, torn linings, or nails wearing through the insoles.
- Have shoes fitted by a specialist in orthotics.
- Think about diabetic foot care as an everyday, life-long process that requires inspection, patience and diligence.

10% to 19% of diabetic patients receive even a cursory foot evaluation by their primary health care providers.

Patients who are at high risk for foot ulcers should carefully follow a plan of care outlined by their physician or podiatrist. At the Primary Foot Care Center in North Miami Beach, FL, **Tamara Fishman**, DPM, sends patients home with a list of dos and don'ts. (See above.) Patients who are vigilant and understand the potentially serious consequences of neglecting their health care can play a tremendous role in preventing diabetic foot wounds.

Such ulcers may go unnoticed because neither the patient nor the health care provider examines the feet regularly. This, stresses Armstrong, should be a routine part of patient care.

Armstrong and his colleagues at the University of Texas developed a simple matrix to help classify diabetic foot wounds. (See chart, p. 141.) The matrix takes into consideration the presence or

absence of infection, the depth of the wound, and the degree of epithelialization.

## First step is assessment

When a patient develops an ulcer, the first step should be an assessment of the wound that includes an evaluation of the lower-extremity vascular supply, says **Jeffrey Jensen**, DPM, clinic director at the Diabetic Foot and Wound Center in Denver. Vascular status can be measured using methods such as toe systolic pressure, pulse volume recordings, or transcutaneous oxygen pressure.

"These give an indication of whether the patient has the ability to heal a wound from a vascular point of view," says Jensen. If the tests show poor vascular supply, blockage at the macrovascular level is a likely cause. In severe cases, bypass surgery may be required to revascularize the leg. If the blocked vessel is large, it

can be bypassed, Jensen explains. If the blocked vessel is small, then overall circulation will not be seriously compromised and proper wound care should result in healing.

### ***Ruling out other factors***

Patients who are not candidates for revascularization, such as the very elderly or those who are undergoing dialysis, may suffer from foot wounds that are very difficult to heal. In this respect, says Jensen, the sometimes-controversial label of “nonhealing diabetic foot wound” may be an accurate description.

X-rays of the ulcer can be used to rule out osteomyelitis, gas formation, the presence of foreign objects, and asymptomatic fractures.

If no vascular blockage is found, the clinician should look for signs of infection. Infection is the leading cause of amputation among patients with diabetic ulcers. Any infection must be treated aggressively with well-matched antibiotics. If left unchecked, an infection can lead to disastrous complications, such as microthrombi formation, further ischemia, necrosis, and progressive gangrene.

Aggressive antibiotic treatment is indicated for infected diabetic foot wounds, but proper culturing and identification of pathogens must be completed first. Pathogens that are common in diabetic wounds include aerobic gram-positive staphylococci and streptococci. Culturing technique is important, experts say. “Simply swabbing the ulcer is not satisfactory. Instead, curettage at the base of the ulcer after debridement is the method of choice. Anaerobe and aerobic cultures should be obtained,” writes **Marvin E. Levin, MD.**<sup>1</sup>

When an infected wound does not respond to aggressive antibiotic treatment, debridement and reculturing should be repeated. A recurrent or resistant infection may be a sign of osteomyelitis, according to Jensen.

### ***Debridement must be sufficient***

Appropriate debridement is an important step in the care of diabetic foot wounds. “The wound has to be debrided of all nonviable tissue and its depth also needs to be determined. Not doing so is one of the biggest mistakes made with these wounds,” says Jensen. “Often, the clinician doesn’t take off enough tissue.” He adds that healing also relies on proper blood glucose control. “If a patient has a hemoglobin

A1C level of 20, that wound has a very difficult time healing,” he adds.

Because of the extent of debridement needed for these wounds, a whirlpool is not the best choice; the water doesn’t remove enough necrotic tissue. In addition, whirlpools can cause edema, harbor *Pseudomonas*, and lead to excessive hydration and maceration. For patients with poor vascularization, revascularization should be done before or at the same time as debridement.

Limited mechanical debridement can be done without anesthesia for some patients with an insensate foot; but for more extensive debridement, the clinician should also consider performing the procedure with anesthesia in the operating room. Debridement reportedly can result in long-term limb salvage of 75% among high-risk patients with diabetic ulcers.

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## Wound dictates dressing

The choice of wound dressings is dictated by the nature of the wound. Diabetic ulcers tend to produce a low amount of exudate, so a dressing with high absorption characteristics could absorb too much moisture and dry out the wound. Jensen often uses amorphous hydrogels, which enables him to keep the wound bed moist and only require daily dressing changes.

Offweighting of the foot becomes crucial once an ulcer has developed, Jensen adds. "Because patients have neuropathy, their motivation to stay off their feet is not as great as with someone who can feel pain," he says. "Sometimes it's a challenge to get patients to comply with these instructions. Asking them to use a wheel chair or crutches is often futile."

One clinician calls the contact cast "the best method for achieving non-weight-bearing in the appropriately selected patient."<sup>1</sup> The device allows patients to walk while still offweighting the ulcerated foot because it reduces pressure on the wound area.

Jensen emphasizes that appropriate care of patients with diabetic foot ulcers requires a multi-disciplinary team.

"If a patient with diabetes comes into the clinic with a foot ulcer, is on dialysis, has compromised lack of blood supply to the foot and has an infection, it stands to reason they need an internal medicine specialist to treat them for their diabetes; a nephrologist for the dialysis; a vascular surgeon to restore blood supply; an infectious disease specialist to determine what antibiotics would work best; and a podiatrist to address the local problems of the foot wound — and of course, you need the nursing staff and all of the other support," says Jensen.

"The term 'multidisciplinary' is used a lot, but it's not always followed. All it means is that a patient's needs are addressed by the people who know how best to address them."

## Reference

1. Levin, M. Prevention and treatment of diabetic foot wounds. *JWOCN*. 1998; 3:129-143. ■

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