

# The Exploding Incidence and Prevalence of Diabetes

**This is a basis to support podiatric physicians as part of the primary care provider team.**

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### **Podiatric Medical Practice, People with Diabetes, and the Relationship to Primary Care**

The typical practice of podiatric medicine includes a population that receives care on a more frequent basis than perhaps most patients seen by other medical specialists (e.g. surgeon, ophthalmologist, dermatologist, and otorhinolaryngologist). Patients who receive care from podiatric physicians very often do so several times yearly and often follow such a regimen over several years. Because of this, podiatric physicians with their education and training appropriately could be among the physicians who provide a major segment of primary care.

The frequency of visits to podiatric physicians, especially by those with diabetes, permits podiatric medical practitioners to be significant providers of comprehensive, coordinated, continuous, and collaborative care. For example, while the army of primary care specialists (i.e., family physicians, internists, pediatricians, geriatricians and, in many cases, obstetricians/gynecologists) monitor patients for many

years, there still are significant time gaps in the care they provide that may be months between visits.

However, the podiatric physician is perhaps the only other physician who sees a major component of their patients often more frequently than the traditional primary care provider. For example, a patient with diabetes who visits their internist typically may not have a follow-up visit with that physician for two or three months. Such patients typically have other health issues (e.g., hypertension). During the time gap between visits to the internist, they may also have one or more scheduled appointments with their podiatric physician. This provides DPMs with the opportunity to inquire about and assess the patient's hypertensive status (e.g., has the patient been taking medication prescribed by the internist?).

In addition, during the initial podiatric medical examination and also during follow-up visits, the podiatric physician not infrequently may identify patients with undiagnosed diabetes. This may be due to the dis-

covery of absent or diminished vibratory sensation, impaired two-point discrimination, peripheral vascular impairment, or a cutaneous ulcer. As part of the evaluation of these signs, the podiatric physician may find it appropriate to assess a patient's blood glucose level as part the diagnostic assessment, not infrequently identifying the presence of diabetes.

### **The Growing Crisis of Primary Care Physician Shortages**

In a study published June 26, 2020 by the Association of American Medical Colleges (AAMC), it was estimated that by 2033 there could be a shortage of primary care physicians amounting to between 21,400 and 55,200. The study emphasized that this shortage will be further challenged as a result of the continuing growth of the population and increase in age. It also reminds us that a large portion of the physician workforce is nearing retirement. The AAMC also noted that there must be a multi-pronged solution to increase access

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to care to ensure that the nation is prepared to respond to public health needs and emergencies (e.g., COVID-19). Prior to the COVID-19 pandemic, physician shortages were already being felt by Americans nationwide.<sup>1</sup>

## **The Significance of Diabetes in the Older Population**

Diabetes is an important health condition in all ages but especially so for the aging population. Approximately one-quarter of people over the age of 65 years have diabetes and one-half of older adults have pre-diabetes, and the number of older adults living with these conditions is expected to increase rapidly in the coming decades. Diabetes management in older adults requires regular assessment of medical, psychological, functional, and social domains. Older adults with diabetes have higher rates of premature death, functional disability, accelerated muscle loss, and co-existing illnesses (such as hypertension, coronary heart disease, and stroke) than those without diabetes.

Screening for diabetes complications in older adults should be individualized and periodically revisited, as the results of screening tests may impact patient management. At the same time, older adults with diabetes also are at greater risk than other older adults for several common geriatric syndromes, such as polypharmacy, cognitive impairment, depression, urinary incontinence, injurious falls, and persistent pain. These conditions may impact older adults' diabetes self-management abilities and quality of life, if left unaddressed.<sup>2</sup>

## **Prevalence of Diabetes (Diagnosed and Undiagnosed)**

Among the overall U.S. population, crude estimates of type 2 diabetes for 2018 were: 34.2 million people of all ages—or 10.5% of the U.S. population, and 34.1 million adults aged 18 years or older—or 13.0% of all U.S. adults. In addition, 7.3 million adults aged 18 years or older who met laboratory criteria for diabetes were not aware of or did not report having diabetes (i.e., those with undiagnosed diabetes). This number

represents 2.8% of all U.S. adults and 21.4% of all U.S. adults with diabetes. The percentage of adults with diabetes increased with age, reaching 26.8% among those aged 65 years or older. 210,000 children and adolescents younger than age 20 years—or 25 per 10,000 U.S. youths—had diagnosed diabetes. This includes 187,000 with type 1 diabetes.

Among U.S. adults aged 18 years or older, age-adjusted data for 2017–2018 indicated that the prevalence of diagnosed diabetes was highest among American Indians/Alaska Natives (14.7%), people of Hispanic origin (12.5%), and non-Hispanic blacks (11.7%), followed by non-Hispanic Asians (9.2%) and non-Hispanic whites. Among adults of Hispanic origin, Mexicans (14.4%) and Puerto Ricans (12.4%) had the highest prevalence, followed by Central/

betes based on both elevated fasting plasma glucose and A1C levels, and 15.3% of adults with pre-diabetes reported being told by a health professional that they had this condition. Among U.S. adults aged 18 years or older, age-adjusted data for 2013–2016 indicated that a higher percentage of men (37.4%) than women (29.2%) had pre-diabetes.<sup>5</sup>

## **Incidence of Diagnosed Diabetes (Newly Diagnosed Diabetes)**

The crude estimates for 2018 of the incidence among U.S. adults aged 18 years or older, were: 1.5 million new cases of diabetes or 6.9 per 1,000 persons. Incidence rates of diagnosed diabetes were higher among adults aged 65 years and older. Among U.S. adults aged 18 years or older, age-adjusted data for 2017–2018 indicated that non-Hispanic blacks (8.2 per 1,000

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South Americans (8.3%) and Cubans (6.5%). Among non-Hispanic Asians, Asian Indians (12.6%) and Filipinos (10.4%) had the highest prevalence, followed by Chinese (5.6%). Other Asian groups had a prevalence of 9.9%. Among adults, prevalence varied significantly by education level, which is a major indicator of socioeconomic status. Specifically, 13.3% of adults with less than a high school education had diagnosed diabetes versus 9.7% of those with a high school education and 7.5% of those with more than a high school education.<sup>3,4</sup>

## **Prevalence of Pre-diabetes Among Adults**

An estimated 88 million adults aged 18 years or older had pre-diabetes in 2018. Among U.S. adults aged 18 years or older, crude estimates for 2013–2016 included 34.5% of all U.S. adults having pre-diabetes, based on their fasting glucose or A1C level. 10.5% of adults had pre-dia-

persons) and people of Hispanic origin (9.7 per 1,000 persons) had a higher incidence compared to non-Hispanic whites (5.0 per 1,000 persons).

## **Impact of Diabetes on the Health of Americans**

In 2017, diabetes was the seventh leading cause of death in the United States. This finding is based on 83,564 death certificates in which diabetes was listed as the underlying cause of death (crude rate, 25.7 per 100,000 persons). In 2017, there were 270,702 death certificates with diabetes listed as the underlying or contributing cause of death (crude rate, 83.1 per 100,000 persons). Furthermore, as the proportion of older people in our nation continues to increase, they are more likely to have a chronic disease like diabetes:

- 34.2 million Americans—just over 1 in 10—have diabetes.
- 88 million American adults—approximately 1 in 3—have pre-diabetes.

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- New diabetes cases were higher among non-Hispanic blacks and people of Hispanic origin than non-Hispanic Asians and non-Hispanic whites.

- For adults diagnosed with diabetes:
  - New cases significantly decreased from 2008 through 2018.

- The percentage of existing cases was highest among American Indians/Alaska natives.

- 15% were smokers, 89% were overweight, and 38% were physically inactive.

- About half of all people with diabetes have some kind of diabetic neuropathy that may include numbness, tingling, pain, impaired ability to feel pain, heat, or cold, and sensory loss.<sup>6</sup>

## Diagnosis of Diabetes

Diagnostic testing for diabetes should be performed by the podiatric physician in any clinical situation in which such testing is warranted. The confirmation of chronic hyperglycemia is a prerequisite for the diagnosis of diabetes mellitus. The state of glycemia may be classified within three categories—diabetic type; borderline type; and normal type. Diabetic type is defined when fasting plasma glucose (FPG) is 7.0 mmol/l (126 mg/dl) or higher, and/or plasma glucose 2 h after 75 g glucose load (2hPG) is 11.1 mmol/l (200 mg/dl) or higher. A casual plasma glucose (PG) > or = 11.1 mmol/l (200 mg/dl) also indicates diabetic type. Normal type is defined when FPG is below 6.1 mmol/l (110 mg/dl) and 2hPG below 7.8 mmol/l (140 mg/dl). Borderline type includes those who are neither diabetic nor normal types.

These cut-off values are for venous PG measurements. However, the fasting plasma glucose (FPG) test is preferred in clinical settings because it is easier and faster to perform, more convenient, acceptable to patients, and less expensive. Also, it is important to consider that certain drugs, including glucocorticoids and nicotinic acid, may produce hyperglycemia. In screening for disease, it is crucial that an interpretation of the screening test results be provided to the patient and that follow-up evaluation and treatment are made available.<sup>7</sup>

## Guide to Screening for Diabetes:

- Evaluation for type 2 diabetes should be performed within the healthcare setting.

- Diabetes risk factors include a family history of diabetes; overweight defined as BMI  $\geq 25$  kg/m<sup>2</sup>; habitual physical inactivity; belonging to a high-risk ethnic or racial group; previously identified impaired fasting glucose (IFG) or impaired glucose tolerance (IGT); hypertension, dyslipidemia; history of gestational diabetes mellitus (GDM) or delivery of a baby weighing > 9 lbs; and polycystic ovary syndrome.

## Monitoring Glycemia

The A1C test values remain a valuable tool for monitoring glycemia, but it is not currently recommended for the screening or diag-

the interval between their next visit to the primary care physician may identify such problems, bringing them to the attention of the physician treating the patient's diabetes. Such prompt intervention could serve to reduce or even eliminate serious complications that the patient might otherwise experience. Given the serious nature of such complications and the continuing growing prevalence of diabetes, it is imperative for the podiatric medical community to actively participate in this aspect of primary care.

## But Are Podiatric Physicians Qualified to Be a Member of the Primary Care Team?

While an argument might have been made in the 1950s and 1960s about the qualifications of podiatric physicians accepting the responsibil-

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nosis of diabetes. Pencil and paper tests, such as the American Diabetes Association's risk test, may be useful for educational purposes but do not perform well as stand-alone tests. Capillary blood glucose testing using a reflectance blood glucose meter has also been used but because of the imprecision of this method, it is better used for self-monitoring rather than as a screening tool.

## Importance of the Podiatric Physician and the Continuity of Care of People with Diabetes

The importance of podiatric physicians participating in providing primary care cannot be overestimated. It is not at all in the best interest of a patient with diabetes who, after visiting their primary care physician, develops an elevated glucose level or blood pressure that may be dangerously high, not knowing so for several months after that visit. As part of the team that could participate in providing vital continuity of care, the podiatric physician who may see that patient even more than once during

ities inherent in providing primary care, the basis for that perception has long since disappeared. The education and training received by those licensed to practice podiatric medicine has for many years become quite similar to that received by the doctor of medicine and doctor of osteopathic medicine. Basic science instruction for all of these professions today is virtually identical. In addition, the curriculum in podiatric medical school includes both didactic and clinical content (including hospital-based experience) quite similar to that received by students in schools of medicine and schools of osteopathic medicine. Podiatric medical students acquire the ability to complete a medical history and perform a physical examination.

In the last half of the 20th century, any perceived deficits that may have been identified were eradicated during the required hospital-based residency that graduates of podiatric medical schools receive to obtain a license in all states in the nation. Beginning in the last quarter of the 20th century,

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residency training in podiatric medicine was extended to three years in duration, erasing any gaps that may have been present, resulting in the doctor of podiatric medicine earning the title of physician. Podiatric physicians are now permitted by the Joint Commission on the Accreditation of Healthcare Organizations (JCHCO) to independently admit patients to accredited hospitals, perform and interpret findings derived from the admitting history and physical examination, perform ancillary studies, arrive at a clinical diagnosis, and perform in-patient surgery without the supervision of another physician.

As a result of these evolutionary advances, podiatric physicians have become well qualified to participate as a contributing member of the primary care team. It is virtually inappropriate for and not in the best interest of the patient for podiatric

physicians not be an integral part of this team. Indeed, having to wait one or two months or even longer until a patient with a serious chronic condition such as diabetes and hypertension visits their internist could be critical to their health. Because of the education and training podiatric physicians are required to complete and the experience they acquire, podiatric medical visits that may be scheduled before or after visiting the patient's internist can be most invaluable.<sup>8</sup> **PM**

## References

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- <sup>3</sup> Centers for Disease Control and Prevention. National Diabetes Statistics Report, 2020. Atlanta, GA: Centers for Dis-

ease Control and Prevention, U.S. Dept of Health and Human Services; 2020.

<sup>4</sup> Prevalence of Diabetes (Diagnosed and Undiagnosed) National Diabetes Statistics Report, CDC, 2020, [PDF-768 KB].

<sup>5</sup> National Diabetes Statistics Report, 2020; Prevalence of Diabetes.

<sup>6</sup> <https://www.healthypeople.gov/2020/topics-objectives/topic/diabetes>.

<sup>7</sup> Takeshi, Kuzuya et al., Diabetes Res Clin Pract. Report of the Committee on the classification and diagnostic criteria of diabetes mellitus, 2002 Jan; 55(10): 65-85, DOI: 10.1016/s0168-8227(01)00365-5.

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