

### What is diabetes?

- Diabetes is a group of diseases marked by high levels of blood glucose (sugar) resulting from defects in the production or action of insulin, a hormone that regulates blood glucose levels.
- Diabetes can lead to serious complications and premature death, but people with diabetes, working together with their support network and their health care providers, can take steps to control the disease and lower the risk of complications.
- Type 2 diabetes accounts for about 90% to 95% of all diagnosed cases of diabetes in adults.

### How many people have diabetes?

- Diabetes is the seventh leading cause of death in both the United States and North Carolina.<sup>1,2</sup> In 2014, diabetes was the primary cause for 2,685 deaths (3.2% of all deaths) and a contributing cause to many more deaths in North Carolina.<sup>2</sup>
- An estimated 25.8 million adults in the United States have diabetes, and of these, over a quarter (7 million individuals) do not know that they have the disease.<sup>3</sup> In North Carolina, almost 827,000 adults report having been diagnosed with diabetes by a health care professional.<sup>4</sup> Assuming that national rates also apply to North Carolina, then up to an additional 280,000 North Carolinians may have diabetes but are unaware of their condition.
- There were 18,744 hospital discharges in North Carolina in 2014, with diabetes listed as the principal diagnosis.<sup>5</sup>
- Almost 57,000 new cases of diabetes were identified in North Carolina in 2012.<sup>6</sup>

### What are the risk factors for diabetes?

- Non-modifiable risk factors include older age, a family history of type 2 diabetes (parent, brother or sister) and race/ethnicity (African-Americans, Hispanics and other minority groups).
- Modifiable risk factors (Figure 1) include overweight/obesity, physical inactivity, high blood cholesterol, high blood pressure and smoking.
- Additional risk factors specific to women include history of polycystic ovary syndrome (a common condition characterized by irregular menstrual periods, excess hair growth and obesity), gestational diabetes (abnormal blood sugar during pregnancy) and having a baby weighing over 9 pounds.

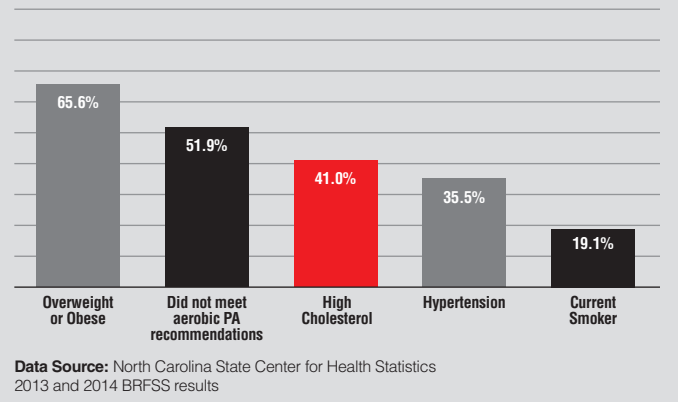
### What are the complications of diabetes?

- Diabetes affects multiple areas of the body and can lead to serious complications including but not limited to: heart disease and stroke, hypertension, blindness and other eye problems, kidney disease, nervous system disease (e.g., impaired sensation or pain in the feet or hands, slowed digestion of food in the stomach, carpal tunnel syndrome, erectile dysfunction), amputations (mainly of the lower limbs), dental disease (especially of the gums), excessively large babies, diabetic coma, increased susceptibility to pneumonia and influenza and depression.

### How is diabetes diagnosed?

- Fasting Blood Glucose (FBG), Oral Glucose Tolerance Test (OGTT) and Glycated Hemoglobin (HbA1c) are blood tests used to diagnose diabetes as shown in Table 1.

**Figure 1. Prevalence of modifiable risk factors for diabetes, North Carolina, 2013-2014**



- In North Carolina, only three out of every five adults (60%) without a known diagnosis of diabetes have had a blood sugar test within the past three years.<sup>7</sup>

### What are the treatment options for diabetes?

- Three key components of diabetes treatment, the ABC of diabetes control, include optimal control of blood glucose, blood pressure and blood cholesterol. The ABC treatment goals for most people with diabetes are:
  - A. A1c less than 7
  - B. Blood pressure less than 130/80 mmHg
  - C. Cholesterol-LDL less than 100 mg/dl
- Many people with type 2 diabetes can control their blood glucose by following a healthy meal plan and exercise program, losing excess weight, taking oral medication and/or, in some cases, taking insulin.
- Diabetes Self-Management Education (DSME)—training that focuses on self-care behaviors such as healthy eating, being active and monitoring blood sugar—is a key step in improving health outcomes and quality of life in diabetics. People with diabetes should receive DSME when their diabetes is diagnosed and as needed thereafter. To obtain information about accredited DSME programs in North Carolina, email [contact@communityclinicalconnections.com](mailto:contact@communityclinicalconnections.com).
- Many people with diabetes also need to take medications to control their cholesterol and blood pressure.

**Table 1: Diagnostic test criteria for prediabetes and diabetes**

Test	Normal	Prediabetes	Diabetes
Fasting Blood Glucose (FBG)	<100 mg/dl	100–125 mg/dl	>125 mg/dl
Oral Glucose Tolerance (OGTT)	<140 mg/dl	140–199 mg/dl	>199 mg/dl
HbA1c	<5.7%	5.7%–6.4%	>6.4%

**Source:** American Diabetes Association, Clinical practice recommendations, 2014. [http://care.diabetesjournals.org/content/37/Supplement\\_1/S81.full.pdf+html](http://care.diabetesjournals.org/content/37/Supplement_1/S81.full.pdf+html).

## How can complications of diabetes be prevented?

- Adherence to the ABC of diabetes control—optimal control of blood glucose, blood pressure and blood cholesterol.
- Detection and treatment of diabetic eye disease.
- Comprehensive foot care including risk assessment, education, preventive therapy, treatment of foot problems and referral to specialists.
- Detection and treatment of early diabetic kidney disease.
- Vaccination against the flu and pneumonia.

## How can diabetes be prevented?

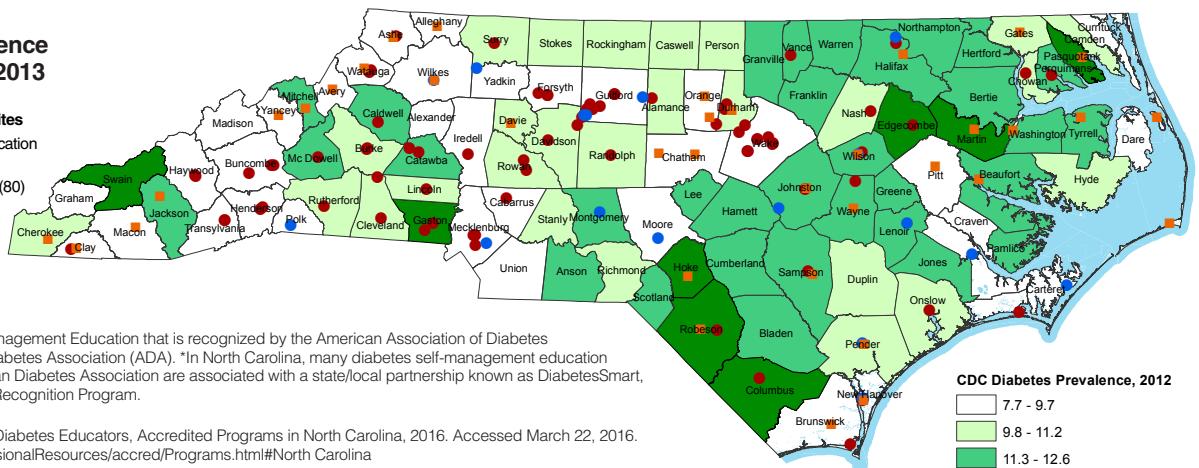
For individuals who do not have diabetes, prevention can be achieved by addressing modifiable risk factors:

- Losing a modest amount of weight (5% to 7% of total body weight) through healthy diet and moderate physical activity (such as brisk walking 30 minutes a day, five days a week) within the context of an intensive lifestyle intervention program, like the CDC's Diabetes Prevention Program or similar programs, has been proven to be the most effective way of delaying or preventing progression from prediabetes to type 2 diabetes.<sup>8</sup> Metformin, a drug used for the treatment of diabetes has also been shown to be effective but is not as effective as lifestyle modification.<sup>8</sup>
- Preventing overweight/obesity through regular physical activity and healthy eating. For general information on physical activity and healthy eating please visit <https://esmmweighless.com>.

**Figure 2. Diabetes prevalence by ODHDSR Region, NC 2013**

**Diabetes Self-Management Program Sites**

- American Association of Diabetes Education (AADE) (18)
- American Diabetes Association (ADA) (80)
- North Carolina Diabetes Education Recognition Program (DiabetesSmart)\* (36)



Insurers reimburse for Diabetes Self-Management Education that is recognized by the American Association of Diabetes Educators (AADE) and the American Diabetes Association (ADA). \*In North Carolina, many diabetes self-management education sites that are recognized by the American Diabetes Association are associated with a state/local partnership known as DiabetesSmart, the North Carolina Diabetes Education Recognition Program.

**Data Source:** American Association of Diabetes Educators, Accredited Programs in North Carolina, 2016. Accessed March 22, 2016. <http://www.diabeteseducator.org/ProfessionalResources/accred/Programs.html#North Carolina>

American Diabetes Association DiabetesPro Professional Resources Online. Accessed March 22, 2016. [http://professional.diabetes.org/ERP\\_List.aspx](http://professional.diabetes.org/ERP_List.aspx)

American Diabetes Association Diabetes Education Recognition Program Chronic Diabetes Database. Data provided December 22, 2015 then updated on March 24, 2016.

National Center for Chronic Disease Prevention and Health Promotion, Division of Diabetes Translation, Diagnosed Diabetes Prevalence 2004-2012. Accessed March 22, 2016. [http://www.cdc.gov/diabetes/atlas/countydata/County\\_EXCELstatelistDM.html](http://www.cdc.gov/diabetes/atlas/countydata/County_EXCELstatelistDM.html)

## REFERENCES

- Centers for Disease Control and Prevention. Leading Causes of Death 2013. Accessed at <http://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm> on November 20, 2015
- North Carolina Department of Health and Human Services, Division of Public Health, State Center for Health Statistics. North Carolina Vital Statistics 2014 – Volume 2, Leading Causes of Death. Accessed at [http://www.schs.state.nc.us/data/vital/lcd/2014/pdf/Vol2\\_2014\\_PPT.pdf](http://www.schs.state.nc.us/data/vital/lcd/2014/pdf/Vol2_2014_PPT.pdf) on November 20, 2015.
- Centers for Disease Control and Prevention. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011.
- North Carolina Department of Health and Human Services, Division of Public Health, State Center for Health Statistics. Behavioral Risk Factor Surveillance System (BRFSS). Accessed at <http://www.schs.state.nc.us/data/brfss/2014/nc/all/DIABETE3.html> on November 20, 2015.
- North Carolina Department of Health and Human Services, Division of Public Health, State Center for Health Statistics. Inpatient Hospital Utilization and Charges by Principal Diagnosis and County of Residence, North Carolina, 2014. Accessed at <http://www.schs.state.nc.us/schs/data/databook/> on November, 20 2015.

- Preventing and/or controlling high blood cholesterol and high blood pressure through lifestyle modification and medications if necessary.
- Avoiding tobacco products and secondhand smoke for non-smokers and quitting for current smokers. For general information about smoking and how to get help quitting please visit [www.quitline.com](http://www.quitline.com) or call 1-800-QUIT-NOW.

## Disparities, inequality and inequity in the burden of diabetes

- Non-Hispanic African Americans (prevalence = 15.0%) are more likely to have been diagnosed with diabetes compared to Non-Hispanic Whites (prevalence = 9.9%) in North Carolina.<sup>4</sup>
- While diabetes is the seventh leading cause of death among whites, it is the fourth leading cause of death for African-Americans and the third leading cause of death for American Indians in North Carolina.<sup>9</sup>
- African-Americans (age-adjusted death rate = 43.5 per 100,000) and American Indians (age-adjusted death rate = 39.4 per 100,000) are more likely to die from diabetes compared to Whites (age-adjusted death rate = 17.1 per 100,000) in North Carolina.<sup>10</sup>
- Type 2 diabetes in children and adolescents, although still rare, is being diagnosed more frequently among American Indians, African-Americans, Hispanic/Latino Americans and Asians/Pacific Islanders.<sup>3</sup>
- There is geographic variation in the burden of diabetes (prevalence, mortality rates and hospitalization rates) as shown in Figure 2.