

Kansas Diabetes and Prediabetes Facts

What is Diabetes and Prediabetes?

Diabetes is a chronic disease characterized by elevated blood sugar (blood glucose). High levels of blood glucose result from inadequate production of insulin or a resistance to the effects of insulin, a hormone produced by the pancreas.^{1,2}

- ◇ **Type 1 Diabetes (T1DM):** Occurs when the body is unable to produce insulin. T1DM cannot be prevented and typically accounts for approximately 5% of all diagnosed cases of diabetes in adults.
- ◇ **Type 2 Diabetes (T2DM):** Occurs when cells in the body become resistance to the effects of insulin. Onset is more gradual than in T1DM and can be prevented. This accounts for about 90-95% of all diagnosed cases of diabetes in adults.
- ◇ **Gestational Diabetes:** Diabetes that develops during pregnancy and can lead to complications for the infant if not managed appropriately. It is usually diagnosed through prenatal screening. Women who develop gestational diabetes during pregnancy have significant risk for developing diabetes later in life.

Prediabetes or borderline diabetes is a condition in which the blood sugar levels or hemoglobin A1c (HbA1c) are higher than normal but not high enough to be classified as diabetes. People with prediabetes are at high risk of developing diabetes.

How is Diabetes Diagnosed?¹

Diabetes is diagnosed with several blood tests (Table 1). The fasting plasma glucose (FPG) test checks for fasting blood glucose level. The oral glucose tolerance test (OGTT) is a two-hour test that checks for blood glucose levels before and two hours after drinking a special sweet drink. The glycated hemoglobin (HbA1c) test measures the average blood glucose for the past two to three months.

Table 1: Diagnostic test criteria for prediabetes and diabetes

Test	Normal	Prediabetes	Diabetes
Fasting Plasma Glucose (FPG)	<100 mg/dL	100-125 mg/dL	>125mg/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. Classification and diagnosis of diabetes. Sec. 2. Standards of Medical Care in Diabetes-2016. *Diabetes Care* 2016;39(Suppl.1): S13–S22.

Diabetes* and Prediabetes in Kansas

In 2014, 10.3% of Kansas adults aged 18 years and older reported ever being diagnosed with diabetes.



That is about **1 out of every 10** Kansans adults

6.5% of Kansas adults had ever been diagnosed with prediabetes.



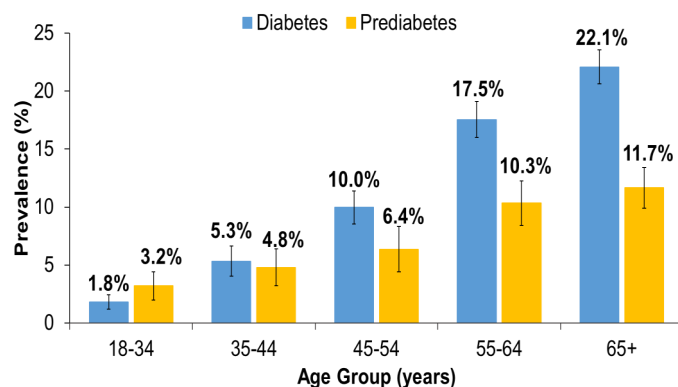
Approximately **1 out of 15** Kansas adults had prediabetes

*Unless specified otherwise, diabetes refers to both type 1 and type 2 diabetes, but not gestational diabetes.
Source: 2014 KS BRFSS, Bureau of Health Promotion, KDHE.

Diabetes* and Prediabetes in Kansas

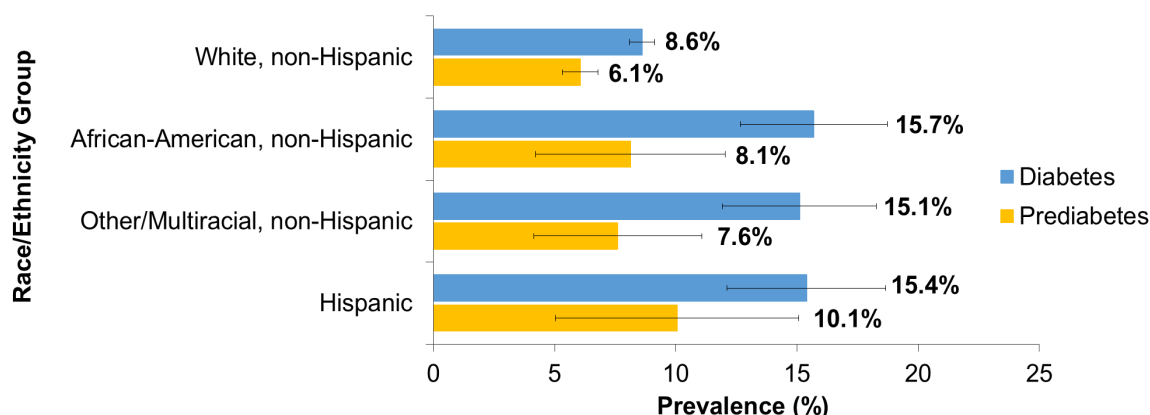
- Prevalence of diabetes and prediabetes among Kansas adults increases with increasing age. Highest prevalence of diabetes and prediabetes is among adults 55 years and older (Figure 1).
- Diabetes is more prevalent among non-Hispanic African-Americans and Hispanics than among non-Hispanic whites. Prevalence of prediabetes does not differ significantly by race/ethnicity group (Figure 2)**.
- Prevalence of diabetes and prediabetes do not differ significantly by gender.
- Higher prevalence of diabetes and prediabetes is seen among those with co-morbid health conditions (Figure 3).

Fig. 1: Prevalence of diabetes and prediabetes among adults aged 18 years and older by age group, Kansas 2014



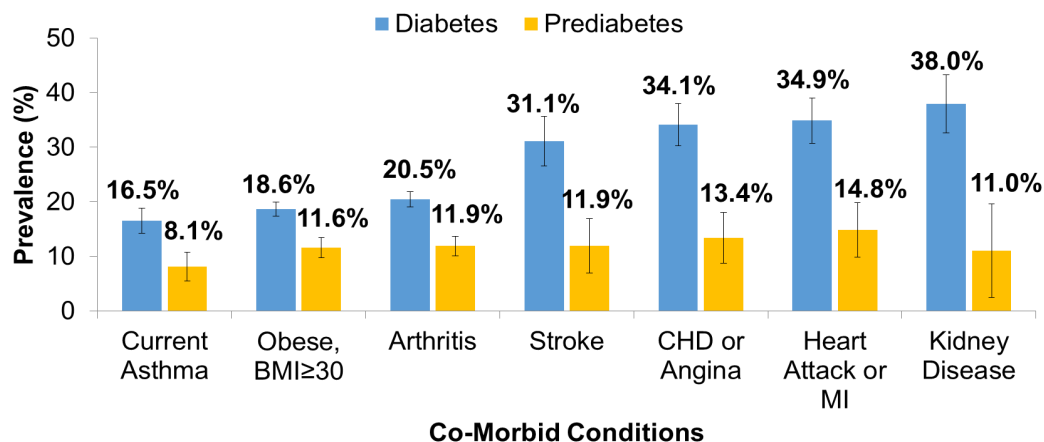
Source: 2014 KS BRFSS, Bureau of Health Promotion, KDHE.

Fig. 2: Age-adjusted prevalence of diabetes prediabetes among adults aged 18 years and older by race/ethnicity group, Kansas 2014**



Source: 2014 KS BRFSS, Bureau of Health Promotion, KDHE.
 **Rates were age-adjusted to the U.S. 2000 standard population.

Fig. 3: Prevalence of diabetes and prediabetes among adults aged 18 years and older by co-morbid conditions, Kansas 2014



Source: 2014 KS BRFSS, Bureau of Health Promotion, KDHE.

* Unless specified otherwise, diabetes refers to both type 1 and type 2 diabetes, but not gestational diabetes.

What are the Risk Factors³ for Diabetes and Who is at Risk?

- ◇ Non-modifiable risk factors for diabetes include older age, a family history of T2DM and race/ethnicity.
- ◇ Modifiable risk factors for diabetes include overweight/obesity, physical inactivity, high blood pressure, high blood cholesterol and smoking.
- ◇ Additional risk factors specific to women include gestational diabetes and having a baby weighing more than 9 pounds.

The American Diabetes Association (ADA) Diabetes Risk Test (DRT) questionnaire assesses an individual's risk of developing T2DM based on age, sex, history of delivery of a baby weighing more than 9 pounds (among women), family history of diabetes, high blood pressure status, physical activity status[†] and weight status. Points are assigned for each reported risk factor (Table 2). A cumulative score of 5 or higher is categorized as "High Risk."⁴

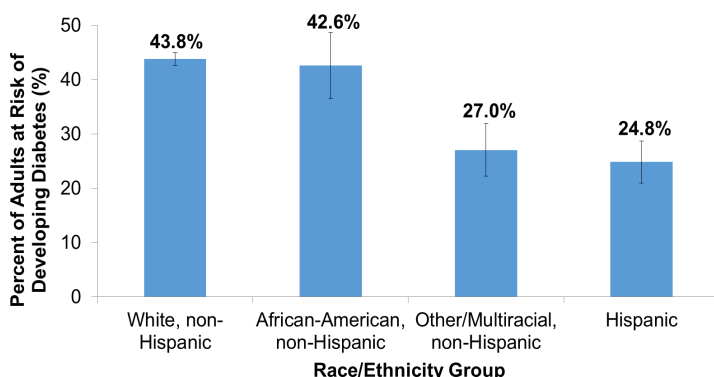
- In 2013, based on the DRT scores, 2 in every 5 (41%) Kansas adults are at increased risk of developing T2DM.
- Non-Hispanic (NH) whites and NH African-Americans have higher prevalence of being at risk for developing diabetes compared with NH other/multiracial adults and Hispanics (Figure 4).
- Lower education levels are associated with greater prevalence of being at risk for developing T2DM (Figure 5).
- Adults living with a disability have higher prevalence of being at risk for developing diabetes compared with those living without a disability (data not shown).

Table 2: Diabetes Risk Test (DRT) scoring system

Factors	DRT Scores (Points)	
Age	Less than 40 years	0
	40—49 years	1
	50—59 years	2
	60 years or older	3
Gender	Male	1
	Female	0
History of gestational diabetes or delivered a baby that weighed more than 9 pounds	Yes=1 No=0	
Family history of diabetes	Yes=1 No=0	
Medical history of diagnosed hypertension	Yes=1 No=0	
Physically inactive[†]	Yes=1 No=0	
Weight status	BMI < 24.9 kg/m ²	0
	BMI = 24.9 kg/m ² – 29.89 kg/m ²	1
	BMI = 29.9 kg/m ² – 39.89 kg/m ²	2
	BMI ≥ 39.90 kg/m ²	3

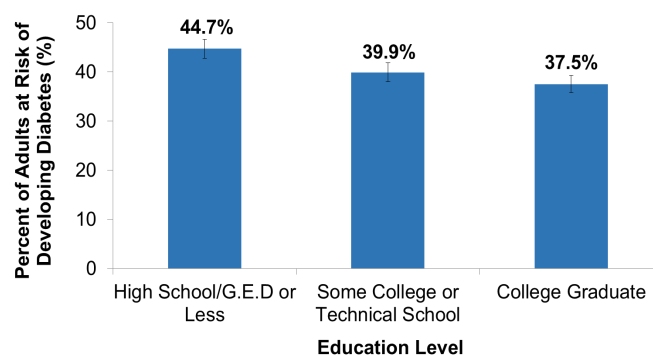
Source: Are You At Risk for type 2 diabetes? Diabetes Risk Test. American Diabetes Association. <http://main.diabetes.org/dorg/PDFs/risk-test-paper-version.pdf>

Fig.4: Percentage of Kansas adults aged 18 years and older at risk of developing diabetes by race/ethnicity group, 2013



Source: 2013 KS BRFSS, Bureau of Health Promotion, KDHE

Fig. 5: Percentage of Kansas adults aged 18 years and older at risk of developing diabetes by education level, 2013



Source: 2013 KS BRFSS, Bureau of Health Promotion, KDHE.

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[†]Physically active is defined as participated in at least 150 minutes of moderate physical activity (or vigorous equivalent minutes) per week and exercises to strengthen muscles at least 2 times per week.

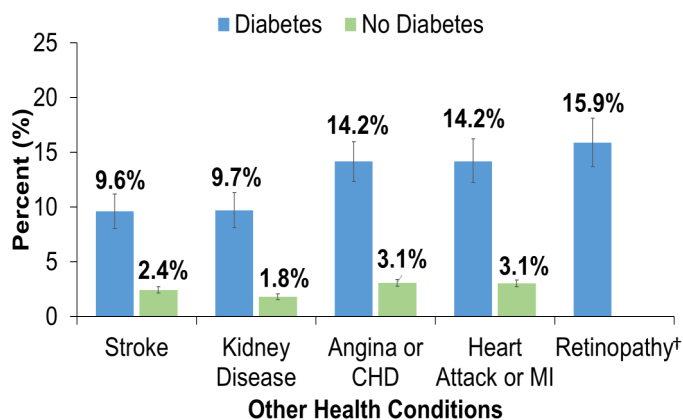
Health Impacts of Diabetes

Diabetes is associated with serious complications, including heart disease, stroke, retinopathy that can lead to blindness, kidney failure (nephropathy) and peripheral neuropathy that can lead to lower-limb amputation.⁵

Prevalence of adverse health conditions is significantly higher among adults with diabetes compared with those without diabetes (Figure 6).

- ◊ In 2013, among Kansas adults with diabetes, more than 15% reported they had been diagnosed with diabetic retinopathy.
- ◊ In 2014, more than 14% reported they ever had a stroke or coronary heart disease (CHD).

Fig.6: Percent of Kansas adults aged 18 years and older with diabetes who report having other health conditions, Kansas 2014



Source: 2014 KS BRFSS, Bureau of Health Promotion, KDHE.
†Retinopathy data obtained from 2013 KS BRFSS.

Table 3: Age-adjusted diabetes mortality rates by race/ethnicity group, Kansas 2010-2014

Race/Ethnicity Group	Total Deaths	Age-Adjusted Death Rate (per 100,000)	95% Confidence Interval
White, non-Hispanic	2749	18.6	17.9-19.3
African-American, non-Hispanic	248	38.3	33.5-43.6
Other, non-Hispanic	81	24.9	19.3-31.8
Hispanic	151	26.7	22.3-31.7

Source: 2010-2014 Kansas Vital Statistics, Bureau of Epidemiology and Public Health Informatics, KDHE. Rates were age-adjusted to the U.S. 2000 standard population. Diabetes was defined as ICD-10 codes E10-E14.

Diabetes is the seventh leading cause of death in both the U.S. and in Kansas. In 2014, more than 1,900 Kansas deaths included diabetes listed as a contributing cause. Among those, 638 deaths listed diabetes as the underlying cause of death.

- ◆ During the time period 2010-2014, age-adjusted diabetes mortality rates were significantly higher among non-Hispanic African-Americans compared with non-Hispanic whites and Hispanics (Table 3).

The total estimated burden associated with diagnosed diabetes, undiagnosed diabetes, gestational diabetes and prediabetes exceeded \$322 billion in the United States in 2012, of which \$245 billion is the estimated cost of diagnosed diabetes.^{6,7} People with diagnosed diabetes, on average, have medical expenditures approximately 2.3 times higher than what expenditures would be in the absence of diabetes.⁷ People with diagnosed diabetes incur average medical expenditures of about \$13,700 per year, of which about \$7,900 is attributed to diabetes.⁷

Treating diabetes costs Kansas an estimated of \$2.6 billion, direct and indirect costs⁶.

- Diagnosed diabetes: Approximately \$2.0 billion
- Prediabetes: \$363 million direct cost
- Gestational diabetes: \$12 million direct cost
- Undiagnosed diabetes: Approximately \$263 million



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Management and Prevention of Diabetes

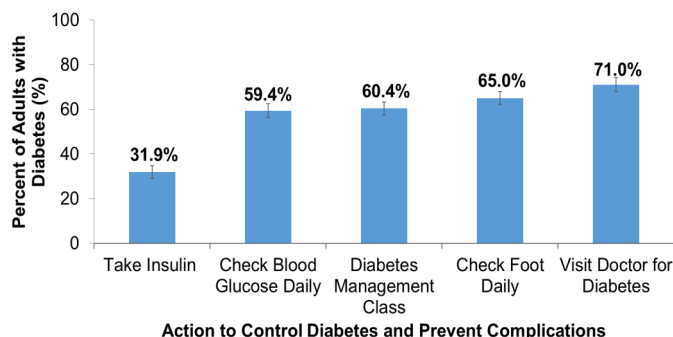
In 2013, among Kansas adults with diagnosed diabetes, more than 71.0 percent reported having screening test for foot ulcers and retinopathy in the past year. However, only 44.9 percent reported having a HbA1c test 3 or more times in the previous 12 months (Table 4). Approximately 31.9 percent reported currently taking insulin and 71.0 percent had seen a doctor for diabetes at least two times in the past 12 months (Figure 7).

Table 4: Percent of adults aged 18 years and older with diabetes reporting on care received during the previous 12 months, Kansas 2013

Test	Percent
Foot Exams (1 or more times)	72.6%
Dilated Eye Exam (1 or more times)	71.2%
Hemoglobin A1c Test (3 or more times)	44.9%

Source: 2013 KS BRFSS, Bureau of Health Promotion, KDHE.

Fig. 7: Adults aged 18 years and older with diabetes who are taking action to control diabetes and prevent diabetes complications,



Source: 2013 KS BRFSS, Bureau of Health Promotion, KDHE.

Early detection of prediabetes provides an opportunity to prevent or delay development of diabetes and diabetes complications. Research studies have found that healthy lifestyle modifications can prevent or delay T2DM among adults at high risk.^{1,8} Recommendations are as follows:

- ◆ Increase fiber-rich foods, fruits and vegetables, and reduce saturated fat consumption
- ◆ Increase moderate-intensity physical activity (such as brisk walking) to at least 150 min/week
- ◆ Maintain a healthy body weight
- ◆ Annual screening and clinical blood test (e.g. eye exam, foot exam, cholesterol test)

In addition to the recommendations above, adults with diabetes should follow a comprehensive care plan to control diabetes and prevent diabetes complications.^{1,8,9}

- ◆ Annual diabetes-focused doctor visit and follow-up per doctor's recommendation
- ◆ Testing your own blood sugar a number of times each day (self-monitoring blood glucose)
- ◆ Check blood pressure (self-monitor blood pressure)
- ◆ Getting an HbA1c test from health care provider about every 3 months
- ◆ Take medication as prescribed
- ◆ Participate in diabetes management class

Kansas Diabetes and Prediabetes Resources:

To learn more about our Diabetes Prevention Program (DPP), Diabetes Self-Management Program (DSMP), and Chronic Disease Self-Management Program (CDSME), please visit: www.toolsforbetterhealthks.org/



To take the ADA Diabetes Risk Test, please visit: www.diabetes.org/are-you-at-risk/diabetes-risk-test/

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