Diabetes in Arizona:

The 2018 Burden Report

ARIZONA DEPARTMENT
OF HEALTH SERVICES

~ Health and Wellness for all Arizonans ~

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State of Arizona

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DEAR ARIZONA RESIDENTS:

Diabetes is inextricably tied to obesity and physical inactivity. More than one in four (29.0%) Arizona adults surveyed in 2016 were obese, similar to the national median (29.0%) Behavioral Risk Factor Surveillance System (BRFSS, 2016). Type 2 diabetes has more than doubled in the last ten years; close to 600,000 adults now have diabetes in Arizona. In 2011, 9.5% of Arizona adults reported that they had diabetes; in 2016, it had jumped to 10.8%. Even more alarming is the growing epidemic of individuals with pre-diabetes, a condition in which your body does not respond properly to insulin resulting in higher than normal blood sugar. You can reduce your risk of developing diabetes by as much as 58% with a 7% reduction in weight and moderate physical activity. Currently one out of three Americans are unaware that they have prediabetes; this is approximately 500,000 Arizona adults. With timely interventions and education, however, prediabetes can be adverted and diabetes can be managed and controlled.

The Arizona Department of Health Services (ADHS), Bureau of Tobacco and Chronic Disease, Diabetes Prevention and Control Program provides technical assistance to over 250 state-wide partners to maintain an active Diabetes Coalition for the state. As part of a Centers for Disease Control and Prevention (CDC) led initiative, the focus of the Coalition is to promote policies and trainings that better the continuum of care for people with diabetes in Arizona.

ADHS relied heavily on the BRFSS to develop this report on the burden of diabetes in Arizona. It is important to note, the BRFSS does not distinguish Type 1 diabetes from Type 2 diabetes, rather the data is a cumulative total of all reported cases of diabetes. Other data sources used for the development of this report included the Arizona Hospital Discharge Database and Vital Records. It is important to note that for the American Indian population served by Indian Health Services (IHS), the data from this source is not included in the report.

Aggressive prevention and successful management of diabetes will require health systems coordination, policy changes, better management of patient care among providers, and patients taking charge of their own health. Evidence-based programs such as the Diabetes Prevention Program (DPP), Diabetes Self-Management Education (DSME) and the Stanford Diabetes Self-Management Programs (DSMP) provide educational tools for healthy living, prevention, management, and control to combat the burden of diabetes in the State of Arizona.

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EXECUTIVE SUMMARY

Diabetes is the 7th leading cause of death in Arizona (Population Health and Vital Statistics, 2015). Diabetes mellitus is a chronic disease in which the body is unable to utilize blood glucose (sugar) for metabolic and biochemical processes. Public health diabetes prevention and control efforts are a strong force to minimize the burden of diabetes in community settings and delaying the development of secondary complications due to diabetes.

According to the 2016 U.S. Census Bureau, the Arizona population is estimated at 6.9 million people. Since the early 2000s, the percentage of Hispanic, African American, and Asian populations has increased; while a commensurate decrease in the non-Hispanic White population has been observed. Ethnic/racial groups are disproportionately impacted by higher rates of diabetes when compared to the non-Hispanic, White counterparts.

There has been an approximate 10% increase in people diagnosed with diabetes from 2011 to 2016 in Arizona (BRFSS 2011-2016). When considering that a third of the population with diabetes is undiagnosed, it is not unreasonable to estimate that there are nearly 600,000 adults with diabetes in Arizona. There are about 29.1 million people diagnosed with diabetes in the United States or 9.3% of the adult population; approximately 1 out of every 11 people (CDC Fact Sheet, 2015).

In 2016 the Arizona diabetes-related mortality rate was 24.5 per 100,000 people. There were 13,831 emergency department (ED) visits and 10,829 hospital admissions in 2015 for which diabetes was listed as the first diagnosis. The average length of hospital stay in 2015 was 4.8 days.

Diabetes prevalence is an inverse proportion to the socioeconomic status: the higher the income the lower the rate of diabetes. The BRFSS, 2011-2016 data indicates that adults who made $15,000 were 33% more likely to be diagnosed with diabetes than those who made $50,000 or more.

Patients with poorly-controlled or improperly managed diabetes are at greater risk of complications, e.g., diabetic peripheral neuropathy; wound sepsis; lower limb/foot amputation; and diabetic retinopathy, diabetic macular edema, cataract, and glaucoma. The concentration of blood glucose is most often measured in milligrams/deciliter (mg/dl). The fasting test reports normal range is 60-100 mg/dl.

The two preeminent risk factors associated with diabetes are obesity and physical inactivity. In 2016 the obesity prevalence among adults in Arizona rose to 29.0% as compared to 29.9% in the nation's population. Fifty-three point eight percent (53.8%) of Arizona adults reported engaging in physical activity defined as 150 minutes or more of aerobic physical activity per week when compared to 51.3% of the adult population in the United States (BRFSS, 2015). It is important to note, Type 1 diabetes is an autoimmune disease that is not attributed to obesity or physical inactivity.

The American Diabetes Association estimated a total cost of diagnosed diabetes in 2012 at $245 billion (American Diabetes Association, 2017). One hundred seventy-six billion dollars ($176) was attributed to direct medical costs (physician office visits, prescription medications, diabetes supplies, hospital inpatient care) and $66.8 billion were attributed to indirect costs (absenteeism, reduction in work productivity, early disability, and mortality). The cost estimates for Arizona in 2013 totaled $8.1 billion including $3.1 billion in direct costs (absenteeism, early disability, death).

Type 2 diabetes can be prevented, delayed, and managed through lifestyle modifications that include healthy nutrition education, increased physical activity, and routine visits to the doctor. People diagnosed with diabetes can manage the disease to influence better clinical outcomes and reduce medical costs. The Diabetes Prevention Program (DPP), Diabetes Self-Management Education (DSME), and the Stanford Diabetes Self-Management Program (DSMP) are the cornerstone to the prevention and management of diabetes. The overall objectives of these prevention and management programs are to support informed decision making, self-care behaviors, problem solving, and active collaboration with an individual's health care team to improve clinical outcomes, health status, and quality of life.

Chapter 1: Introduction

I. OVERVIEW

What is diabetes? "Diabetes mellitus is a group of chronic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Insulin a hormone, produced by the pancreas, helps the body metabolize glucose." It acts as the "key" that opens the "door" to cells and allows the glucose to move into the cells. Without insulin, or its ineffectiveness in the body, glucose builds up in the bloodstream leading to serious complications (National Institute of Diabetes and Digestive and Kidney Disease [NIDDK], 2017).

Diabetes is common. It affects 422 million people worldwide (WHO, 2017); 29.1 million in the U.S. If one takes into account that a third of the population with diabetes is undiagnosed, it is not unreasonable to estimate that there are nearly 600,000 adults in Arizona who have diabetes (NIDDK, 2017).

Diabetes is serious. It is linked to many serious health complications including cardiovascular disease, stroke, high blood pressure, blindness, kidney failure, neuropathy, and amputations (NIDDK, 2017).

Diabetes is costly. In 2013, the estimate exceeded $420 billion in the US, including well over $3.4 billion in Arizona (NIDDK, 2017).

Diabetes is manageable. Many long-term complications of diabetes can be prevented through improved patient education and self-management, and adequate and timely screening services and medical care (NIDDK, 2017).

Diabetes (Type 2) is preventable. The American Diabetes Association guidelines outline their evidence-based strategies for its prevention that include losing 5-7% of body weight and making changes in diet and physical activity (NIDDK, 2017)

II. TYPES OF DIABETES

The digestive system metabolizes or breaks down food into glucose or blood sugar – the main source of energy for our bodies and the brain. Without insulin, or if it is ineffective in the body, glucose builds up in the bloodstream (hyperglycemia) leading to diabetes (Mayo Clinic, 2014).

Several types of diabetes have been identified.

a. **TYPE 1 DIABETES**

   Type 1 diabetes (insulin-dependent) is a chronic autoimmune disease that results from the destruction of insulin-producing beta cells in the pancreas by the body's immune system. When the pancreas fails to produce insulin the person requires daily injections of insulin. It was previously known as juvenile-onset diabetes because it is often diagnosed during childhood or adolescence. If the insulin is not carefully regulated with diet, cells may not receive the necessary amount of insulin resulting in a chain of metabolic events that can lead to a diabetic coma. Type 1 diabetes is often detected during an acute onset requiring hospitalization, and its risk factors are autoimmune, genetic, and environmental. Symptoms of Type 1 diabetes usually develop over a short period, and may include increased thirst and urination, constant hunger, weight loss, blurred vision, and extreme fatigue. Between 5-10% of all individuals with diabetes have Type 1 diabetes. **There is no known cure or prevention for Type 1 diabetes.**

b. **PREDIABETES**

   Prediabetes is a potentially reversible condition that occurs when blood sugar levels are higher than normal, but not high enough to be classified as diabetes. In 2014, the U.S. Department of Health and Human Services reported that at least 86 million U.S. adults ages 20 and older had prediabetes. The BRFSS 2014 data indicates that 9.1% or 582,000 Arizona adults have prediabetes (See Chapter 2).

c. **TYPE 2 DIABETES**

   Type 2 diabetes occurs when the pancreas is unable to produce enough insulin or the body cannot use insulin efficiently. This condition causes defects in insulin secretion and insulin resistance. Type 2 diabetes is the most common form of diabetes, and about 90% to 95% of people with diabetes have Type 2. Increasingly, children and adolescents are being diagnosed with Type 2 diabetes. African-Americans, Asian-Americans, Hispanics/Latinos and American Indians/ Alaska Natives have higher rates of diabetes. Type 2 diabetes is largely preventable and can be self-managed. Risk factors for Type 2 diabetes include older age, being overweight or obese, family history, prior history of gestational diabetes, impaired glucose tolerance, certain racial and ethnic groups, and physical inactivity. Diet, weight reduction, and oral hypoglycemic drugs usually manage this condition, however some patients may need insulin. Between 90% - 95% of all individuals with diabetes have Type 2, and it is estimated that one third of individuals in the general population who have Type 2 diabetes are undiagnosed (CDC, 2017).

d. GESTATIONAL DIABETES

Another type of diabetes is gestational diabetes, and is first detected during pregnancy. Gestational diabetes occurs in 3% to 8% of pregnancies and is more prevalent among African-Americans, Hispanics/Latinos and American Indians/Alaska Natives (CDC, 2017). Gestational diabetes makes the mother and child more at risk for future development of Type 2 diabetes.

Chapter 2: Diabetes Morbidity and Mortality

I. PREDIABETES PREVALENCE

Prediabetes trends from 2011-2014 show an increase in Arizona. Prevalence rates were captured by responding "YES" to the BRFSS question, "Have you ever been told by a doctor or other health professional that you have prediabetes or borderline diabetes?" In 2012, 2015, and 2016 the prediabetes module and questions were not administered by the Arizona BRFSS. Optional additional disease specific questions are often rotated among chronic diseases due to the cost of each question. The prediabetes module is rotated every year, with the exception of 2016.

Figure 1: Prediabetes Prevalence Trends (2011-2014)
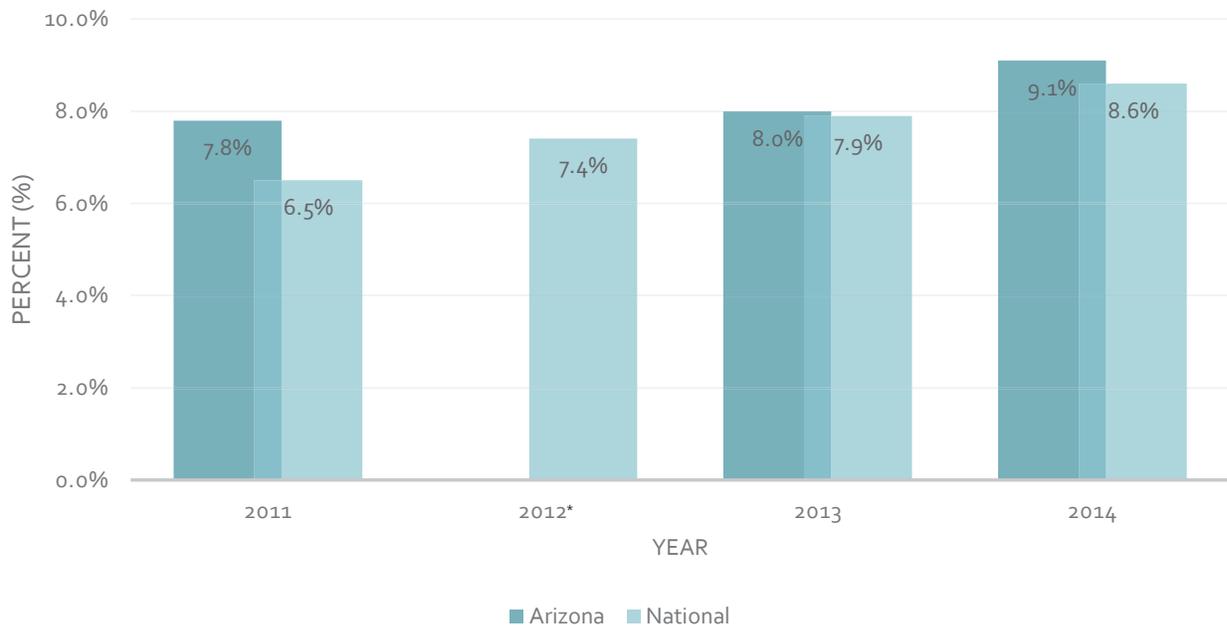
*Arizona did not ask questions regarding pre-diabetes in 2012.
Source: Arizona BRFSS, 2011 – 2014

II. DIABETES PREVALENCE

Arizona diabetes prevalence trends from 2011-2016 show that the percentage of diabetes has been at or above the national prevalence rate (Figure 2).

Figure 2: *Diabetes Trends (2011-2016)*
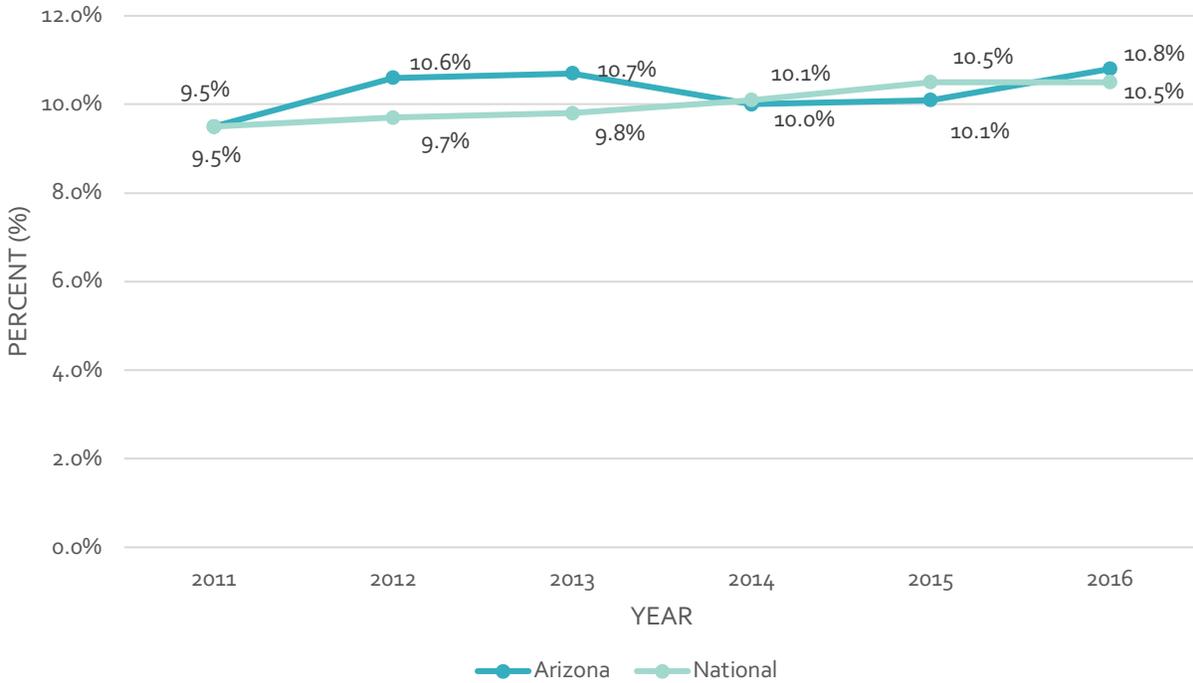
Source: Arizona BRFSS, 2011-2016
The BRFSS does not differentiate between the prevalence rate of Diabetes Type 1 and 2.

Arizona diabetes prevalence by age group trends from 2011-2016 show that the percentage of diabetes among adults greater than 24 years of age has been increasing in the last six years (Figure 3).

Figure 3: *Diabetes Trend by Age Group (2011-2016)*
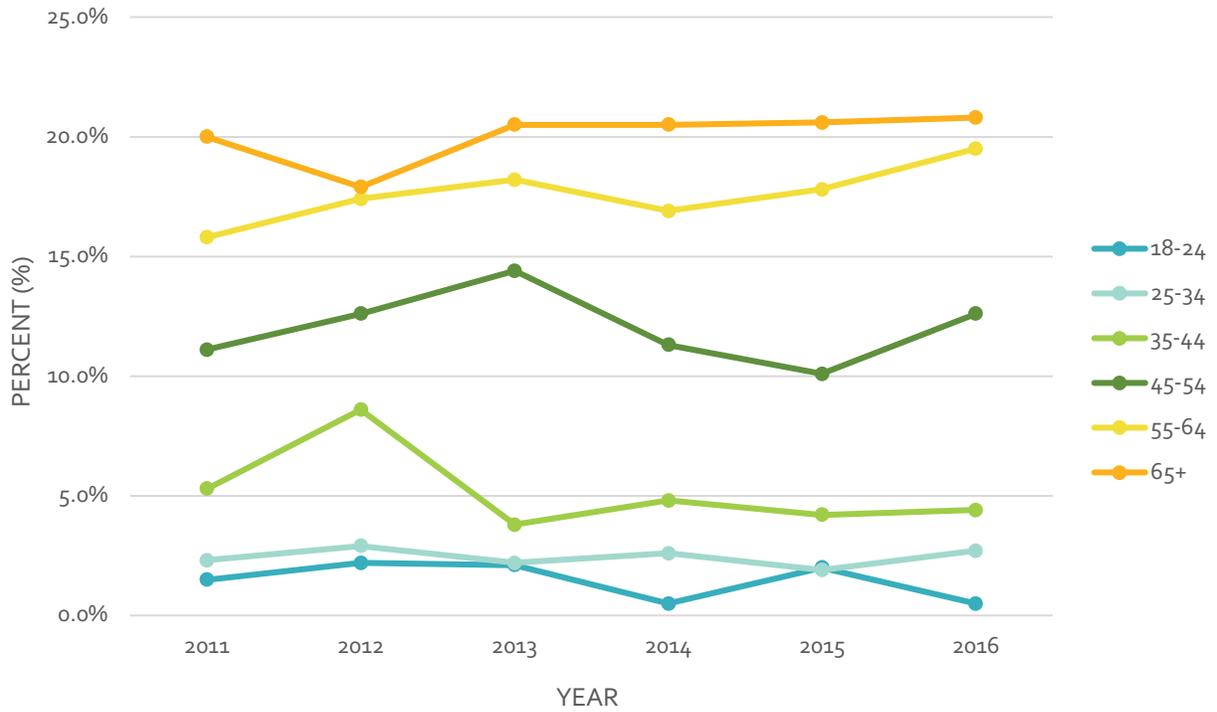
Source: Arizona BRFSS, 2011-2016

Arizona diabetes prevalence by Race/Ethnicity trends from 2011-2016 show that the percentage of diabetes among Black/African American, Hispanic, and non-Hispanic White is increasing, while American Indian/Alaska Native decreased slightly in 2016 (Figure 4).

Figure 4: Diabetes Trend by Race/Ethnicity (2011-2016)
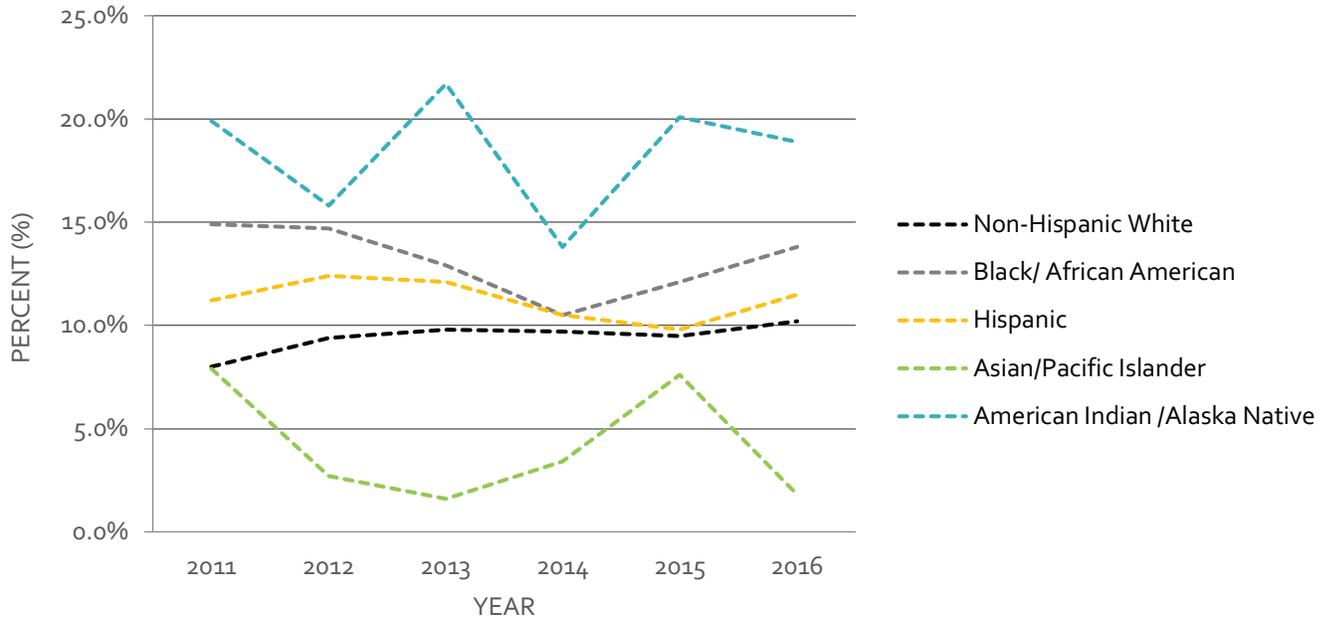
Source: Arizona BRFSS, 2011-2016

Arizona diabetes prevalence trends, by county from 2011-2015 indicate that La Paz, Greenlee, and Apache counties exhibit the highest burden of diabetes standing at 17.4%, 15.6%, and 15.2%, respectively. La Paz and Greenlee counties have no current DSME programs that are accredited or recognized.

Eleven out of the 15 counties had prevalence rates higher than the state and national prevalence rates (Figure 5).

Figure 5: *Diabetes Prevalence, by County (2011-2015)*
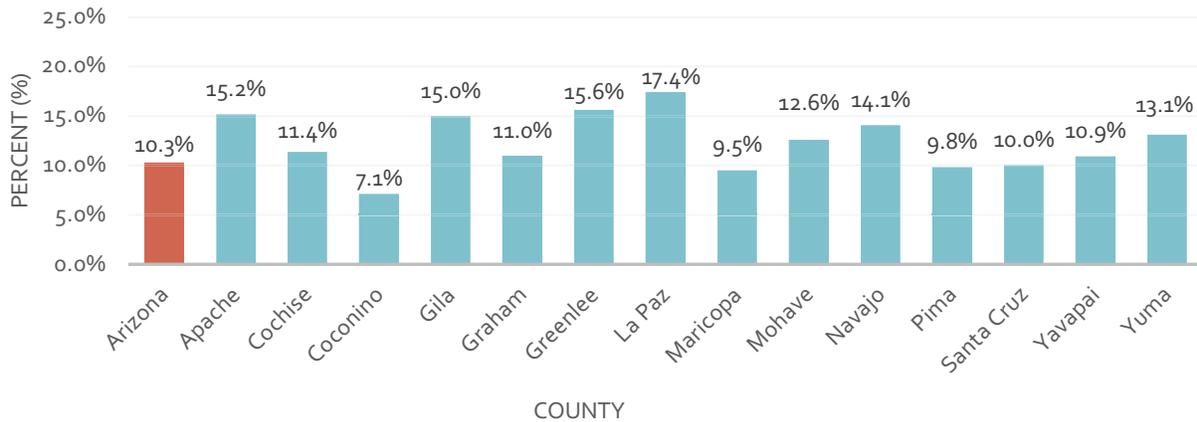
2016 data was not included because Arizona combined counties by region.
Source: Arizona BRFSS, 2011-2015

Arizona diabetes prevalence trends, by gender from 2011-2016 indicate that males are more likely to have a diabetes diagnosis than females (Figure 6).

Figure 6: *Diabetes Prevalence, by Gender (2011-2016)*
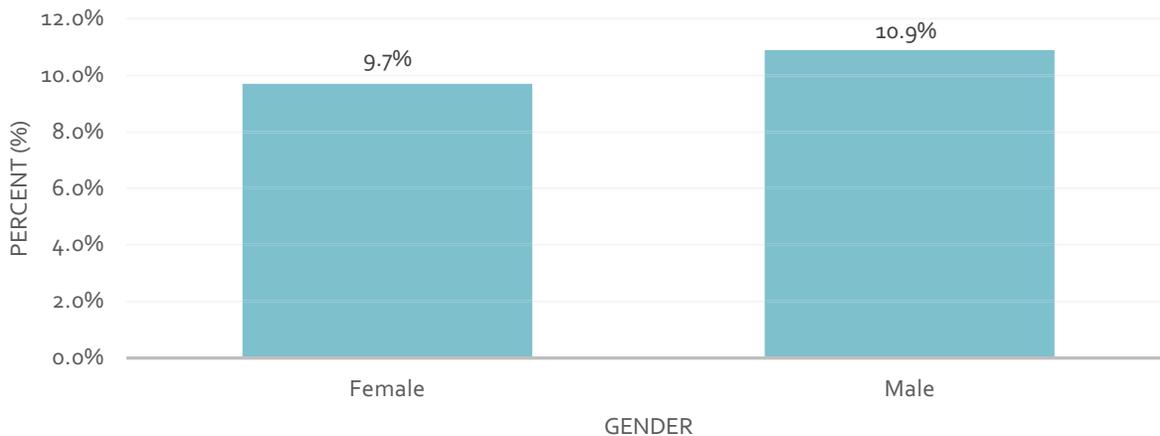
2016 data was not included because Arizona combined counties by region.
Source: Arizona BRFSS, 2011-2015

Arizona diabetes prevalence trends, by age group from 2011-2016 indicate that as the population grows older, the likelihood of being diagnosed with diabetes was greater. Those who were 65+ had a diabetes prevalence rate of 20.1% (Figure 7). This can possibly be attributed to health care access by Medicare, in which the aging population is more likely to be diagnosed and receive treatment.

Figure 7: *Diabetes Prevalence, by Age Group (2011-2016)*
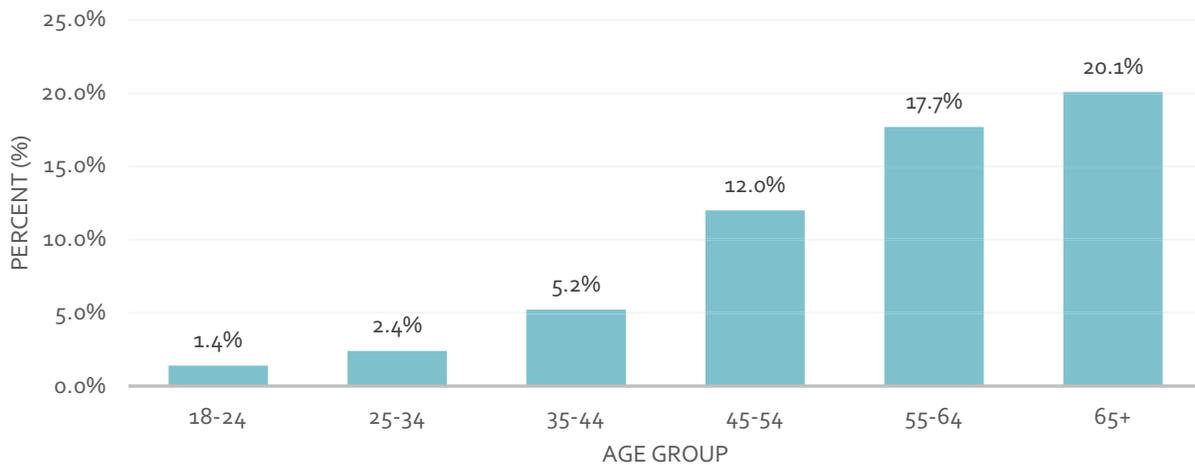
Source: Arizona BRFSS, 2011-2016

Arizona diabetes prevalence by Race/Ethnicity from 2011-2016 show that the percentage of diabetes was highest among American Indian/Alaska Native followed by Black/African Americans (Figure 8).

Figure 8: *Diabetes Prevalence, by Race/Ethnicity (2011-2016)*
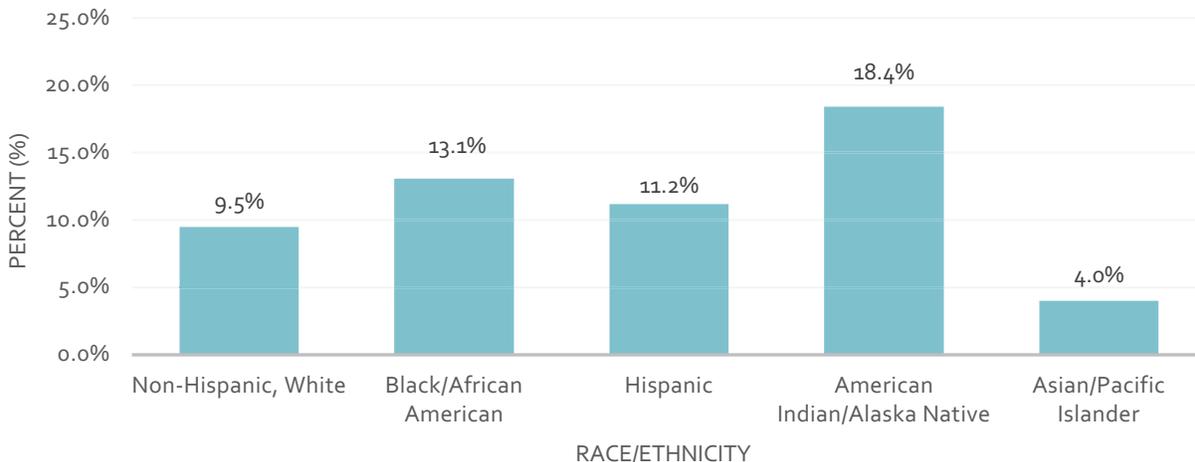
Source: Arizona BRFSS, 2011-2016

III. DIABETES MORTALITY

In 2016, diabetes was the 7th leading cause of death in Arizona. From 2005-2009, Arizona observed a 28% decrease in diabetes related mortality events per 100,000 people. However, in 2010 there was a sharp increase in diabetes mortality events. In 2016, the mortality rate in Arizona was 24.5 per 100,000 people, slightly lower from 2015 (Figure 9).

Figure 9: *Arizona Age-Adjusted Diabetes Mortality (2005-2016)*

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	20.1	18.9	17.0	17.0	15.7	20.1	24.8	23.5	23.6	23.0	25.7	24.5
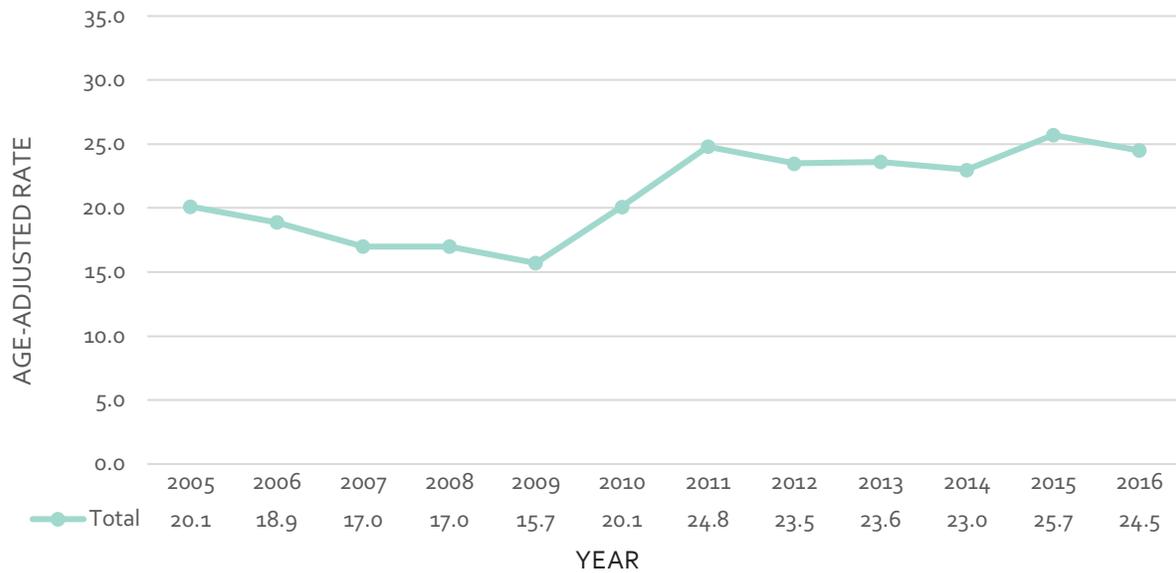
*Deaths are calculated per 100,000 people.
Source: Arizona Vital Records, 2005-2016

Mortality disparities are disproportionately seen among members of racial/ethnic groups. American Indian/Alaska Natives are approximately four times more likely to die from diabetes related events than their non-Hispanic White counterparts. African Americans/Blacks and Hispanics/Latinos are the second groups that are disproportionately impacted by diabetes related deaths in comparison to non-Hispanic Whites (Figure 10).

Figure 10: Arizona Age-Adjusted Diabetes Mortality, by Race/Ethnicity (2005-2016)
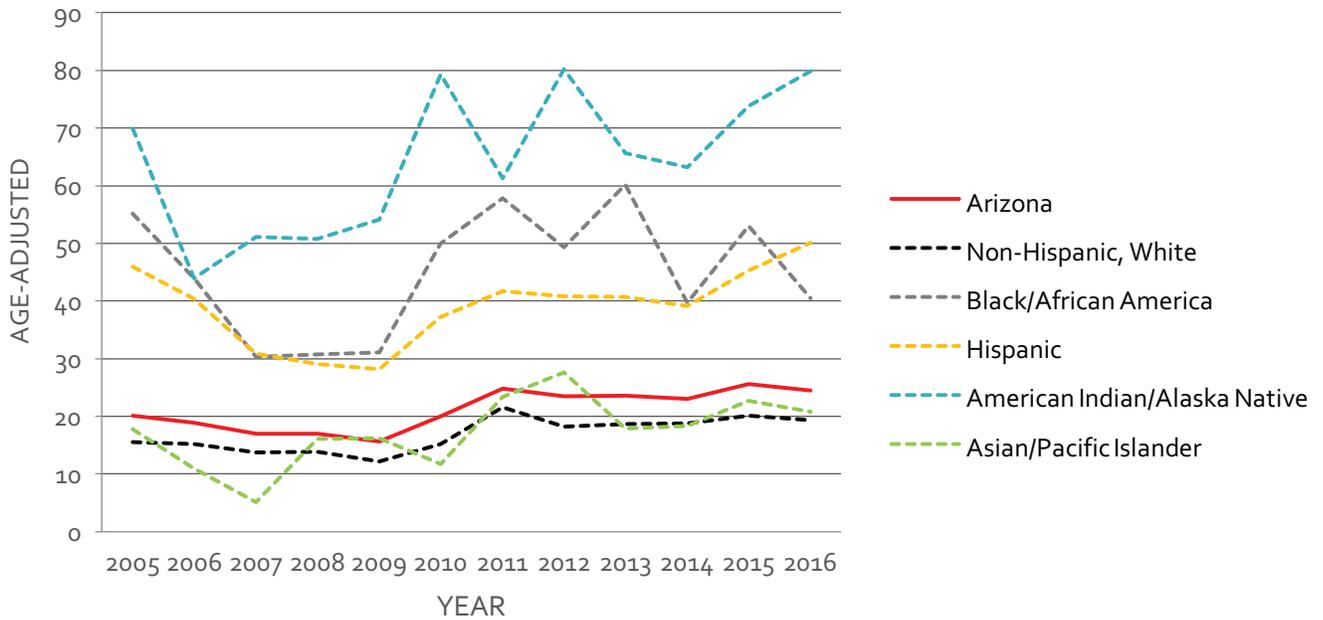
Deaths are calculated per 100,000 people.
Source: Arizona Vital Records, 2005-2016

Historically, diabetes related deaths have been higher among males than females. In 2016, males were more likely to die from diabetes related events when compared to females (Figure 11).

Figure 11: *Diabetes Age-Adjusted Mortality by Gender (2005-2016)*

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Male	24.7	22.5	20.5	20.7	18.2	24.9	30.3	29.2	29.1	28.9	31.8	31.5
Female	16.7	15.9	13.9	13.9	13.5	16.0	20.2	18.6	18.8	17.8	20.4	18.4

GENDER
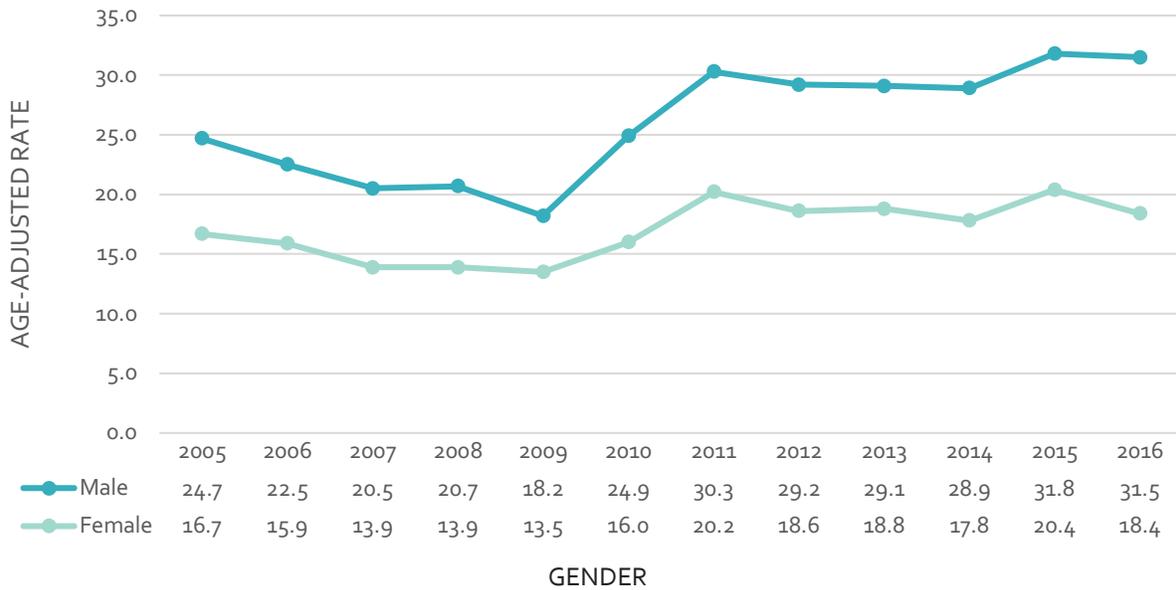
*Deaths are calculated per 100,000 people.
Source: Arizona Vital Records, 2006-2016

Death rates related to diabetes by county in 2015 were much higher in Apache and La Paz counties. Compared to the overall death rate in Arizona (24.5/per 100,000 people), 10 out of 15 counties had a higher rate of deaths due to diabetes than the state rate (Figure 12).

Figure 12: *Diabetes Age-Adjusted Mortality Rate Map by County, 2016*
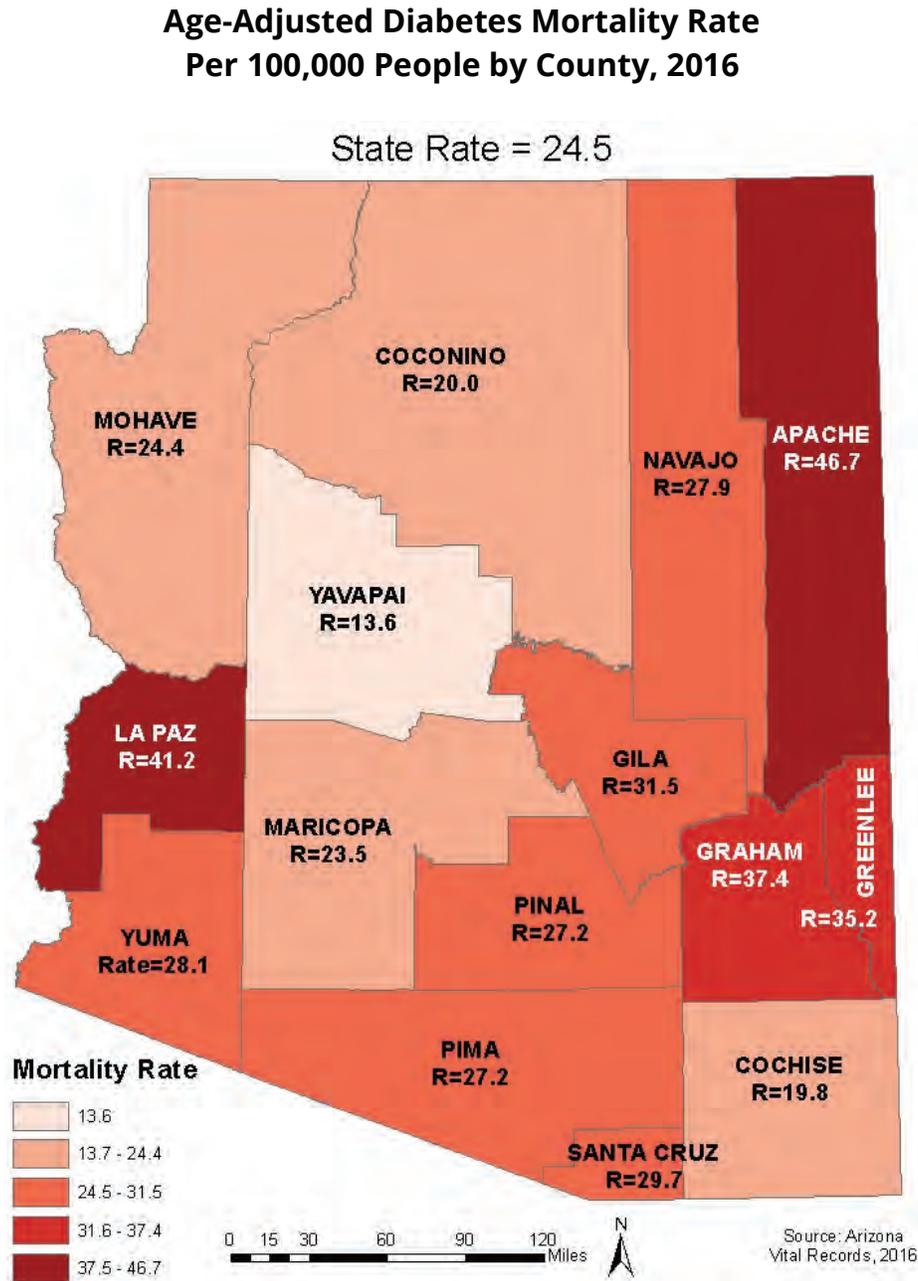
Source: Arizona Vital Records, 2016

Chapter 3:
Diabetes Risk Factors in Arizona

I. PHYSICAL INACTIVITY, OVERWEIGHT AND OBESITY IN DIABETES PATIENTS

This section compares the risk factors that lead to diabetes with the most current BRFSS data and other data that has been collected through external partnerships and national data from the CDC.

The two preeminent risk factors associated with diabetes are obesity and physical inactivity. In 2016, the prevalence of obesity among the general adult population in Arizona and in the United States was 29.0% (BRFSS, 2016). Beginning in 2011, the CDC opted to change the physical activity questions to obtain a more accurate representation of those meeting and not meeting national physical activity recommendations. The recommendation for aerobic physical activity for adults is at least 150 minutes of moderate activity or 75 minutes of vigorous activity per week, and the muscle strengthening recommendation is to participate in muscle strengthening activities at least twice per week. In Arizona, these questions are asked every year, which allows for annual tracking of trends from 2011 forward. Figure 13 shows the percent of Arizona adults who met both aerobic and strength recommendations from 2011-2016. In 2016, 70% of adults did not meet aerobic and strength recommendations (BRFSS).

Over the last decade, there was a steady increase in the percent of obese adults in the United States, as measured by the national-level BRFSS (BRFSS, 2013). Adults with obesity has increased from 2011-2016, while those in the normal weight category have stayed stable (Figure 14). Adults who reported having lower incomes and lower levels of education were more likely to report heights and weights that were classified as overweight (as defined by a body mass index (BMI) between 25.0 kg/m^2 and 29.9 kg/m^2) or obese (defined as a BMI greater than 30 kg/m^2) when compared to those who reported higher income and a higher level of education. In 2016, 9.3% of adults who reported diabetes in Arizona were overweight, whereas 19.7% of Arizona adults who reported diabetes were obese (Figure 15).

Figure 13: *Percentage of Arizona Adults that Met Both Aerobic and Strength Recommendations (2011-2016)*
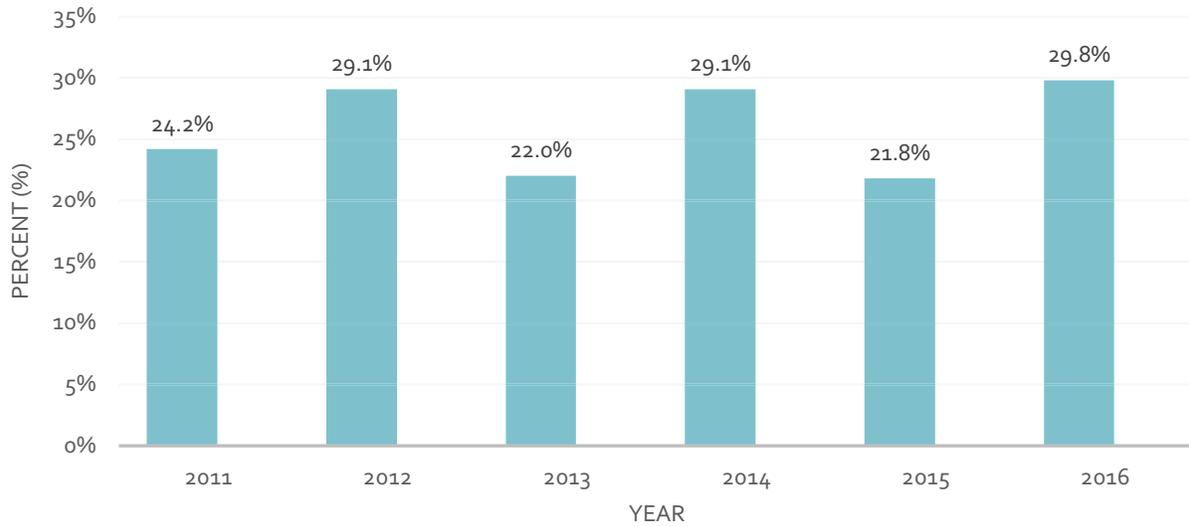
Source: Arizona BRFSS, 2011-2016

Figure 14: *Weight Status of Adults in Arizona (2011-2016)*

Source: Arizona BRFSS, 2011-2016

Figure 15: *Percentage of Arizona Adults with Diabetes by Weight Categories (2011-2016)*
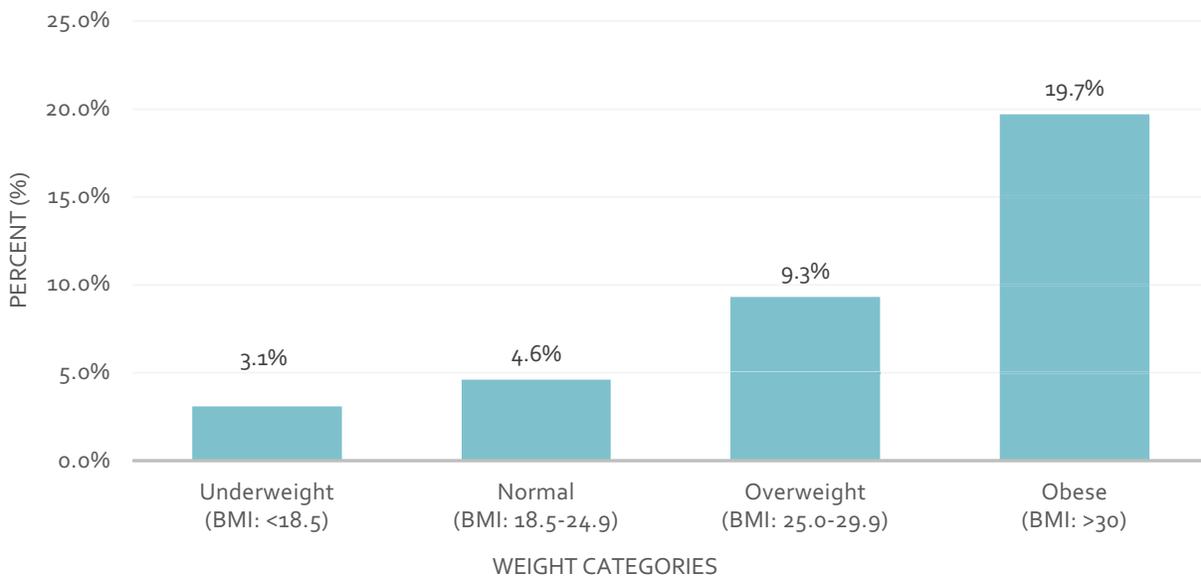
Source: Arizona BRFSS, 2011-2016

II. TOBACCO USE AND DIABETES

Smoking is a major risk factor for patients with diabetes as smoking status can lead to secondary cardiovascular complications, such as high blood pressure and stroke, nerve damage, and kidney disease. People with diabetes who smoke are more likely than nonsmokers to have trouble with insulin dosing and with controlling their disease (U.S. Department of Health and Human Services, 2014). In 2016, 14.7% of adults in Arizona reported smoking (Figure 16). In 2016, 9.4% of Arizona adults who reported diabetes identified themselves as smokers (Figure 17). When comparing Arizona smokers to those with diabetes who reported smoking, we see a similar decreasing trend from 2011-2015, with a slight increase in 2016.

Figure 16: *Percentage of Arizona Adults Who Smoke (2011-2016)*
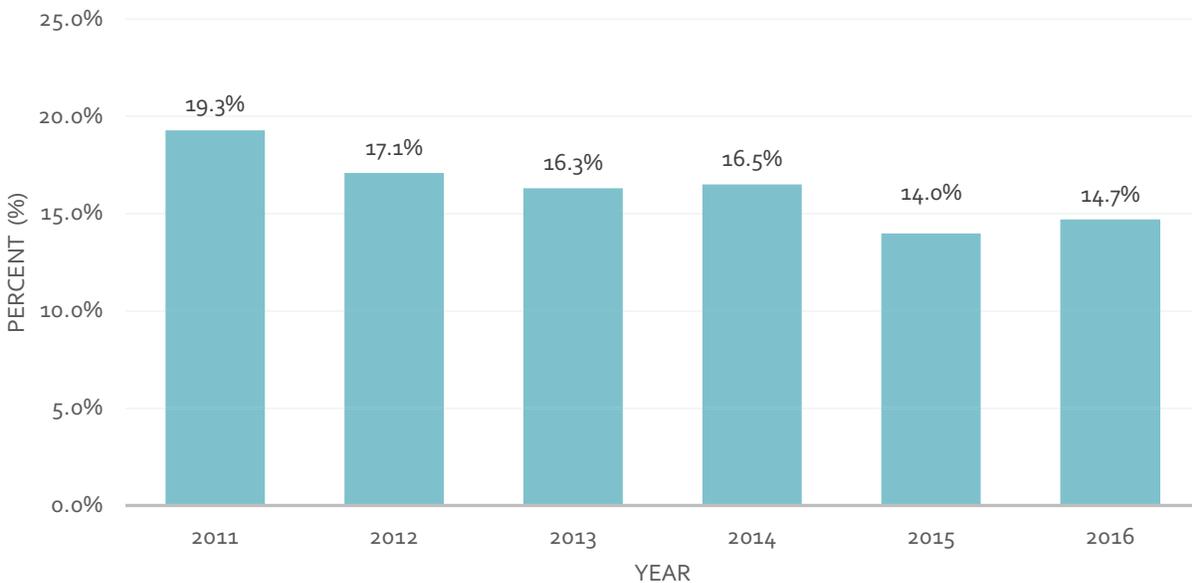
Source: Arizona BRFSS, 2011-2016

Figure 17: *Percentage of Arizona Adults with Diabetes Who Smoke (2011-2016)*
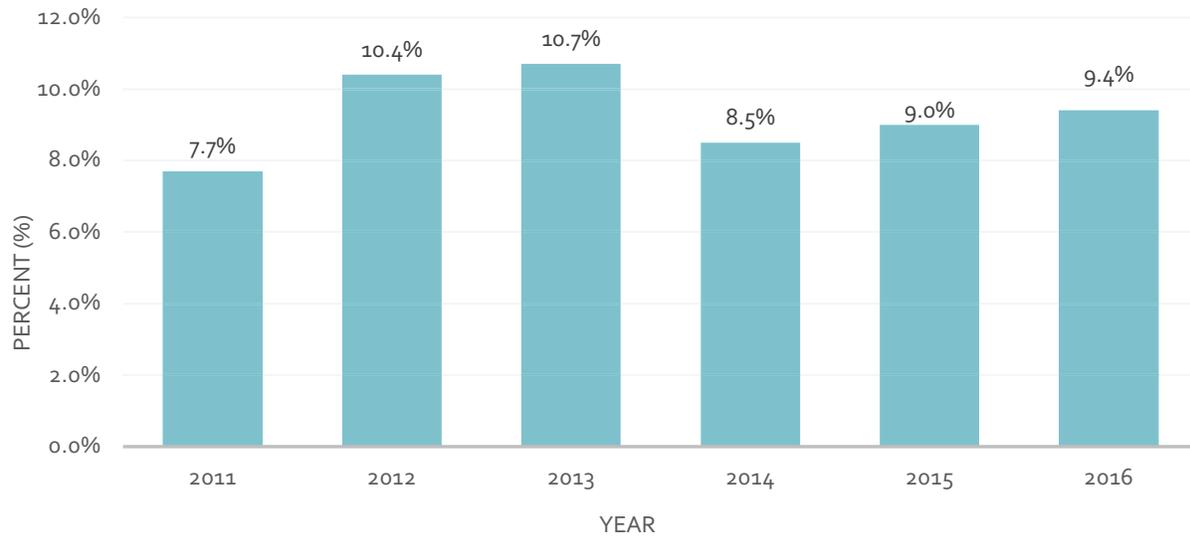
Source: Arizona BRFSS, 2011-2016

III. CARDIOVASCULAR DISEASE

According to the American Heart Association (2017):

- At least 68 percent of people age 65 or older with diabetes die from some form of heart disease; and 16% die of stroke.

- Adults with diabetes are two to four times more likely to die from heart disease than adults without diabetes.

- The American Heart Association considers diabetes to be one of the seven major controllable risk factors for cardiovascular disease.

Diabetes is manageable and can be controlled, but even when glucose levels are under control smoking greatly increases the risk of heart disease and stroke. That's because people with diabetes, particularly Type 2 diabetes, may have the following conditions that contribute to their risk for developing cardiovascular disease:

- High blood pressure (hypertension)

- Abnormal cholesterol and high triglycerides

- Obesity

- Lack of physical activity

Chapter 4:
Economic and Hospitalization Impact of Diabetes in Arizona

I. DIRECT AND INDIRECT COSTS

According to the American Diabetes Association, the total estimated cost of diagnosed diabetes in 2012 was $245 billion (ADA website). $176 billion were attributed to direct medical costs (physician office visits, prescription medications, diabetes supplies, hospital inpatient care). $66.8 billion were attributed to indirect costs (absenteeism, reduction in work productivity, early disability, and mortality). The cost estimates for Arizona in 2013 totaled $8.1 billion including $3.1 billion in direct costs (absenteeism, early disability, death). In 2014, diabetes was the leading expenditure of inpatient and emergency department discharges at $7.8 billion in Arizona (Table 1).

Table 1: Chronic Disease Costs in Arizona, 2014

Disease	Charges
Diabetes	$7,887,188,974
Lung Disease	$3,810,191,045
Coronary Heart Disease	$1,652,315,698
Stroke	$1,231,308,356
Total	**$14,581,004,073**

Source: Arizona Hospital Discharge Database, 2014

II. HOSPITALIZATIONS

In 2014, Medicare beneficiaries had the largest number of hospitalizations in Arizona, consequently leading to the largest total charge per payer at more than $5 billion. Diabetes related inpatient and emergency department discharges (151,362) in Arizona for all payers totaled $8.6 billion in 2014 (Table 2). There were 13,831 emergency department (ED) visits and 10,829 hospital admissions in 2015 for which diabetes was listed as the first diagnosis (data not shown). The average length of hospital stay in 2015 was 4.8 days. Table 3 indicates the number of ED visits and inpatient discharges for diabetes-related events and where diabetes is listed as first diagnosis by county of residence in 2015 (Table 3).

Table 2: *Diabetes Related Inpatient Hospitalizations and Emergency Department Discharges, Arizona 2014*

Payer Type	Number of Discharges	Total Charges	Average Length of Stay (Days)
Medicaid	27,548	$1,412,112,017	5.3
Medicare	92,416	$5,426,410,078	5.4
Private Insurance	26,961	$1,556,673,751	5.0
Philanthropic (Uninsured)	146	$10,769,285	8.2
Other	4,291	$275,348,399	6.0
Total	**151,362**	**$8,681,313,530**	

Source: Arizona Hospital Discharge Database, 2014

Table 3: Diabetes-Related Inpatient Hospitalizations and Emergency Department Discharges
 by County, 2015

County	Number of Diabetes-related discharges	Number of discharges with Diabetes as 1st listed diagnosis
Apache	1,839	189
Cochise	5,474	558
Coconino	5,114	373
Gila	3,252	287
Graham	2,527	188
Greenlee	391	22
La Paz	844	82
Maricopa	180,647	14,296
Mohave	15,848	1,098
Navajo	5,207	390
Pima	48,644	3,778
Pinal	23,817	1,631
Santa Cruz	2,505	182
Yavapai	10,598	819
Yuma	11,881	766
Total	318,588	24,659

Source: Arizona Hospital Discharge Database, 2015

Chapter 5: Prevention and Management of Diabetes

Table 4: *Diabetes Prevention and Management Programs*

National Diabetes Prevention Program (NDPP)	The NDPP is a CDC-recognized lifestyle change program. It is a structured program—in person or online—developed specifically to prevent Type 2 diabetes. It is designed for people who have prediabetes or are at risk for Type 2 diabetes, but who do not already have diabetes. A trained lifestyle coach leads the program to help you change certain aspects of your lifestyle, like eating healthier, reducing stress, and getting more physical activity. The program also includes group support from others who share your goals and struggles. The NDPP is a year-long program focused on long-term changes and lasting results (CDC Diabetes Prevention Program, 2016).
Diabetes Self-Management Education (DSME)	DSME improves hemoglobin A1c (HbA1c) by as much as 1% in people with Type 2 diabetes. Besides this important reduction, DSME has a positive effect on other clinical, psychosocial, and behavioral aspects of diabetes. DSME is reported to reduce the onset and/or advancement of diabetes complications, to improve quality of life and lifestyle behaviors such as having a more healthful eating pattern and engaging in regular physical activity, to enhance self-efficacy and empowerment, to increase healthy coping, and to decrease the

	presence of diabetes-related distress and depression. These improvements clearly reaffirm the importance and value-added benefit of DSME. In addition, better outcomes have been shown to be associated with the amount of time spent with a diabetes educator. (American Diabetes Association, 2016) DSME programs are accredited through the American Association of Diabetes Educators or recognized by the American Diabetes Association.
Diabetes Self-Management Program (DSMP)	The Diabetes Self-Management workshop is given 2½ hours once a week for six weeks, in community settings such as churches, community centers, libraries and hospitals. People with Type 2 diabetes attend the workshop in groups of 12-16. Workshops are facilitated from a highly detailed manual by two trained leaders, one or both of whom are peer leaders with diabetes themselves. Subjects covered include: 1) techniques to deal with the symptoms of diabetes, fatigue, pain, hyper/hypoglycemia, stress, and emotional problems such as depression, anger, fear and frustration; 2) appropriate exercise for maintaining and improving strength and endurance; 3) healthy eating; 4) appropriate use of medication; and 5) working more effectively with health care providers. Participants will make weekly action plans, share experiences, and help each other solve problems they encounter in creating and carrying out their self-management program. Physicians, diabetes educators, dietitians, and other health professionals both at Stanford and in the community have reviewed all materials in the workshop (Stanford Patient Education Research Center, 2017).

Chapter 6:
How To Get Involved

I. ARIZONA DIABETES COALITION

The purpose of the Arizona Diabetes Coalition is to reduce the burden of diabetes on individuals, families, communities, and the health care system, in Arizona. This is done by increasing awareness of diabetes, advocating for and promoting policies and programs that improve access to care, treatment, and outcomes for people with diabetes and those at risk for developing diabetes.

Any individual or organization with an interest in diabetes and a commitment to the goals and purposes of the Coalition are invited to join. For more information, please visit us at:

www.azdiabetes.gov

COALITION WORK GROUPS
The Coalition has five standing work groups. Ad hoc work groups may be appointed or dissolved for special purposes with the concurrence of the Leadership Council.

a. **Advocacy Work Group –** Participate in Advocacy efforts to make DSMT/E available to all persons with diabetes in Arizona.

b. **Diabetes Self-Management/Diabetes Prevention Work Group –** Advances increased utilization of the recognized/accredited DSMT programs in Arizona and actively raises awareness of prediabetes and support evidence based prevention programs.

c. **Health Equity Work Group –** is dedicated to mobilizing the assets of Arizona area to reduce the impact of diabetes in vulnerable populations of Arizona.

d. **Tribal Work Group –** To identify innovative strategies that are culturally and linguistically appropriate for American Indian/Alaska Native communities of Arizona for the prevention and control of diabetes.

e. **Data and Evaluation Work Group –** Members work collaboratively to identify data and evaluation resources to depict the burden of diabetes in Arizona.

For work group meeting information, please email us at **diabetes@azdhs.gov**.

- **Arizona Adult Diabetes Practice Guide**
  The Arizona Diabetes Coalition adapted and adopted the American Diabetes Coalition Clinical Practice Recommendations to prepare this guide. The Coalition supports the guide and works to ensure that all Arizonans with diabetes receive the proper care and treatment.

II. ARIZONA DIABETES LEADERSHIP COUNCIL

The activities of the Arizona Diabetes Coalition are conducted under the direction of the 21 diabetes stakeholders and experts that comprise the Arizona Diabetes Leadership Council. The Arizona Diabetes Leadership Council serves as an advisory board for the Coalition and the ADHS.

The Leadership Council is pivotal in aligning strategic priorities for the Coalition by reinforcing the importance of novel public health interventions and community outreach to reduce the burden of diabetes in the State of Arizona.

ARIZONA HEALTH IMPROVEMENT PLAN (AZHIP)
The development of the Arizona State Health Improvement Plan (AzHIP), Healthy People, Healthy Communities, is the result of the diligent work of numerous public health professionals, advocates and community stakeholders at the state, county and community levels. The AzHIP is a plan for the entire public health system. Stakeholders include state and local government, healthcare providers and health plans, employers, community groups, schools, universities, and many more. The AzHIP provides a structure and a venue to bring together a loosely networked system of partners to align resources and efforts to improve the health of communities and individuals across Arizona. Fifteen health priorities were identified in the AzHIP; diabetes is one those fifteen priorities.

For more information on AzHIP, visit the following website:
http://azdhs.gov/operations/managing-excellence/index.php#ship-sha-home

ARIZONA HEALTH IMPROVEMENT PLAN (AZHIP) 2020 GOAL: REDUCE DEATHS ATTRIBUTABLE TO DIABETES BY 10%

STRATEGIES

Increase the utilization of an integrated, team-based approach to the care and treatment of diabetes.	Promote the use of established diabetes clinical guidelines and increased participation in diabetes self-management education.	Increase awareness of prevention and management practices for diabetes and prediabetes.

TACTICS

Increase engagement of non-physician team members in diabetes self-management healthcare communities.	Educate providers on established clinical guidelines.	Educate on the health and cost-benefits of utilizing diabetes self-management program.	Develop an integrated and comprehensive communications plan.	Educate community and faith-based organizations on available resources related to diabetes and prediabetes.	Educate providers and health care workers on prediabetes.

III. HEALTHY PEOPLE 2020

Healthy People 2020 is the result of a multiyear process that reflects input from a diverse group of individuals and organizations (Office of Disease Prevention and Health Promotion, 2017).

Diabetes Goal: Reduce the disease burden of diabetes mellitus (DM) and improve the quality of life for all persons who have, or are at risk for diabetes. The Healthy People 2020 diabetes objectives are listed below.

Table 5: *Healthy People 2020 Diabetes Objectives*

D-1	Reduce the annual number of new cases of diagnosed diabetes in the population
D-2	(Developmental) Reduce the death rate among persons with diabetes
D-2.1	*(Developmental) Reduce the rate of all-cause mortality among persons with diabetes*
D-2.2	*(Developmental) Reduce the rate of cardiovascular disease deaths in persons with diagnosed diabetes*
D-3	Reduce the diabetes death rate
D-4	Reduce the rate of lower extremity amputations in persons with diagnosed diabetes
D-5	Improve glycemic control among persons with diabetes
D-5.1	*Reduce the proportion of persons with diabetes with an A1c value greater than 9 percent*
D-5.2	*Proportion of the diabetic population with an A1c value less than 7 percent*
D-6	Improve lipid control among persons with diagnosed diabetes
D-7	Increase the proportion of persons with diagnosed diabetes whose blood pressure is under control
D-8	Increase the proportion of persons with diagnosed diabetes who have at least an annual dental examination
D-9	Increase the proportion of adults with diabetes who have at least an annual foot examination
D-10	Increase the proportion of adults with diabetes who have an annual dilated eye examination

D-11	Increase the proportion of adults with diabetes who have a glycosylated hemoglobin measurement at least twice a year
D-12	Increase the proportion of persons with diagnosed diabetes who obtain an annual urinary microalbumin measurement
D-13	Increase the proportion of adults with diabetes who perform self-blood glucose-monitoring at least once daily
D-14	Increase the proportion of persons with diagnosed diabetes who receive formal diabetes education
D-15	Increase the proportion of persons with diabetes whose condition has been diagnosed
D-16	Increase prevention behaviors in persons at high risk for diabetes with prediabetes
D-16.1	*Increase the proportion of persons at high risk for diabetes with prediabetes who report increasing their levels of physical activity*
D-16.2	*Increase the proportion of persons at high risk for diabetes with prediabetes who report trying to lose weight*
D-16.3	*Increase the proportion of persons at high risk for diabetes with prediabetes who report reducing the amount of fat or calories in their diet*

GLOSSARY

Behavioral Risk Factor Surveillance Survey (BRFSS) – A telephone survey that is administered nationally on an annual basis, and asks standardized questions aimed at assessing the prevalence of risk factors for a variety of diseases and threats to health and quality of life and to measure changes in the population's risk.

Blood Pressure – The pressure, measured in millimeters of mercury (mmHg), exerted against the artery walls. Also considered to be the force required by the heart to move blood through the vascular system.

- *Diastolic blood pressure –* The measurement of pressure in the arterial system during the resting phase of the cardiac cycle when the coronary arteries fill and perfusion of the myocardium takes place. Diastole refers to the resting of the heart.

- *Systolic blood pressure –* The measurement of pressure in the arterial system during the contraction of the heart when blood is forced out of the left ventricle into the arterial system.

Body Mass Index – A height to weight ratio field measurement which is correlated to an increased risk of Cardiovascular Diseases. BMI is in units of kg/m2 and is derived by taking the bodyweight of an individual in kilograms and dividing it by the height of that individual in meters squared. Absolute values are used to interpret BMI in adults and CDC's published growth charts for age and gender are used to interpret BMI in children.

Cardiovascular Disease – Refers to a broad spectrum of heart and blood vessel diseases, including heart disease, stroke, and peripheral vascular disease. Atherosclerosis is the underlying disease process of all major forms of Cardiovascular Disease.

Direct Costs – Costs that are clearly and directly associated with the production of goods or services.

Disparities – refers to the gaps in the quality of health and health care across racial, ethnic, and socioeconomic groups.

Healthy People 2020 – a document created by the US Department of Health and Human Services, with targets to move the US population towards greater health.

High Blood Pressure – Blood pressure is the force of the blood pushing against the walls of arteries. Blood pressure is given as two numbers that measure systolic pressure (the first number, which measures the pressure while the heart is contraction) and diastolic pressure (the second number, which measures the pressure when the heart is resting between beats).

Hospital Discharges – The number of inpatients discharge from short-stay hospitals where some type of disease was the first listed diagnosis. Discharges include people both living and dead.

Indirect Costs – costs or expenses that are not directly accountable to a cost object.

Medicare – the health insurance program administered by the U.S. government, covering people who are either 65 or older, or who meet other special criteria.

Medicaid – the health insurance program to millions of Americans, including eligible low-income adults, children, pregnant women, elderly adults and people with disabilities. Medicaid is administered by states, according to federal requirements.

Mortality – rate of death expressed as the number of deaths occurring in a population of a given size within a specified time interval.

Prevalence – the frequency of a particular condition within a defined population at a designated time.

Risk Factors – attributes or characteristics of a person's lifestyle that increases the likelihood of developing a disease or condition.

Socio-economic status – a measure of an individual's place within a social group based on various factors, including income and education.

DATA SOURCES & LIMITATIONS

CDC BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS)

- BRFSS is an on-going data collection system gathering information on adult health-related behaviors of non-institutionalized residents 18 years of age and older. A standardized questionnaire (~75 questions) is used. Questions are determined by the state BRFSS coordinator and CDC.

- Only one adult per household is interviewed. Participants are not compensated.

- Random sampling telephone survey, using disproportionate stratified sampling, random digit dialing, and a Computer Assisted Telephone Interviewing (CATI) system.

- Sample size of 4,700 over a 12 month period surveyed (sample size 95 percent confidence interval of ±3 percent). Potential to represent 96.3 percent of all households that have telephones according to the Arizona Department of Economic Security for the year 2000 in Arizona.

- Monthly data files sent to the Arizona BRFSS program and reports are prepared.

- Data is weighted based on Arizona population demographics.

- Takes into account number of adults and telephone lines in the household, cluster size, stratum size and age/race/sex distribution of the general population.

CORE QUESTION: DIABETES (ASKED EVERY YEAR)
Has a doctor, nurse, or other health professional EVER told you that you have diabetes?

- 1 Yes

- 2 Yes, but female told only during pregnancy

- 3 No

- 4 No, pre-diabetes or borderline diabetes

- 7 Don't know / Not sure

- 9 Refused

MODULE 1: PRE-DIABETES (LAST TIME ASKED IN 2014)
Have you had a test for high blood sugar or diabetes within the past three years?

- 1 Yes

- 2 No

- 7 Don't know / Not sure

- 9 Refused

ARIZONA DEPARTMENT OF HEALTH SERVICES' (ADHS) BUREAU OF VITAL STATISTICS

- Births, deaths, and fetal deaths from original documents filed with the ADHS and from transcripts of original certificates affecting Arizona residents in any other states.

- Death records/certificates of Arizonans who have died outside the U.S. are not included.

- Cost Reporting and Discharge Data Review collect information about both hospital inpatient discharges and emergency room visits.

- The Bureau of Public Health Statistics requires short-stay nonfederal hospitals to submit uniform to ADHS every six months.

- A limitation to this approach is that it excludes patient information from federal, territorial, or other small hospitals/hospices (e.g. Indian Health Services).

- Population Denominators are projections from Arizona Department of Economic Security (DES) http://pub.azdhs.gov/health-stats/menu/info/pop/index.php

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